



## High-Beta Transistor Modules Selector Guide

Powerex through cooperative efforts with its business partner Mitsubishi Electric is proud to present continued innovation in Bipolar Transistor Technology with its complete line of newly developed High-Beta Darlington Transistor Modules.

The development of the High-Beta Series was undertaken in response to the customer desires for:

- ☐ Simplified Base Drive
- ☐ Improved Switching Speed
- ☐ Increased Ruggedness

### Powerex Engineered Solutions

- ☐  $H_{fe}$  increase to 10X providing—90% base drive reduction
- ☐  $T_{(s)}$  (storage time) reduction of 10-20% providing—reduced switching power loss
- ☐ RBSOA and SCSOA (Reverse Bias and Short Circuit Safe Operating Areas) increase of up to 20%—providing increased ruggedness

### High-Beta Module Line Up

| Type                                         | Current Rating<br>$I_C$ (Amperes) | Voltage<br>$V_{CES}$ (Volts) |
|----------------------------------------------|-----------------------------------|------------------------------|
| <b>Single High-Beta Module S<sup>†</sup></b> |                                   |                              |
| KS824501HB                                   | 10                                | 600                          |
| KS624502HB                                   | 20                                | 600                          |
| KS624503HB                                   | 30                                | 600                          |
| KSF22005                                     | 50                                | 250                          |
| KS524505HB                                   | 50                                | 600                          |
| KS624530HB                                   | 300                               | 600                          |
| KS621K30HB                                   | 300                               | 1000                         |
| KS621230HB                                   | 300                               | 1200                         |
| KS624540                                     | 400                               | 600                          |
| KS621K40HB                                   | 400                               | 1000                         |
| KS621240HB                                   | 400                               | 1200                         |
| KS624550                                     | 500                               | 600                          |
| KS621K60HB                                   | 600                               | 1000                         |
| KS621260HB                                   | 600                               | 1200                         |
| KS621K80HB*                                  | 800                               | 1000                         |
| KS621280HB*                                  | 800                               | 1000                         |
| KS621K1KHB                                   | 1000                              | 1200                         |
| KS62121KHB                                   | 1000                              | 1200                         |
| <b>Dual High-Beta Module D<sup>†</sup></b>   |                                   |                              |
| KD224503HB                                   | 30                                | 600                          |
| KD224505HB                                   | 50                                | 600                          |
| KD221K05HB                                   | 50                                | 1000                         |
| KD221205HB                                   | 50                                | 1200                         |
| KD224575HB                                   | 75                                | 600                          |
| KD221K75HB                                   | 75                                | 1000                         |
| KD221275HB                                   | 75                                | 1200                         |
| KD324510HB                                   | 100                               | 600                          |
| KD421K10HB                                   | 100                               | 1000                         |
| KD421210HB                                   | 100                               | 1200                         |
| KD324515HB                                   | 150                               | 600                          |
| KD421K15HB                                   | 150                               | 1000                         |
| KD421215HB                                   | 150                               | 1200                         |
| KD424520HB                                   | 200                               | 600                          |
| KD621K20HB                                   | 200                               | 1000                         |
| KD621220HB*                                  | 200                               | 1200                         |
| KD624530HB*                                  | 300                               | 600                          |
| KD621K30HB                                   | 300                               | 1000                         |
| KD621230HB                                   | 300                               | 1200                         |
| KD621K40HB*                                  | 400                               | 1000                         |
| KD621240HB*                                  | 400                               | 1200                         |
| KD621K50HB*                                  | 500                               | 1000                         |
| KD621250HB*                                  | 500                               | 1200                         |

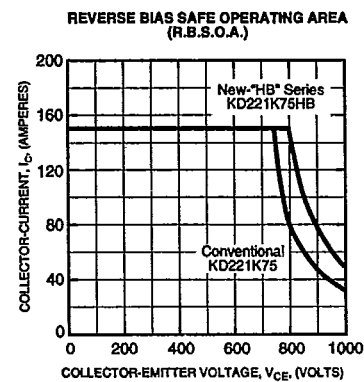
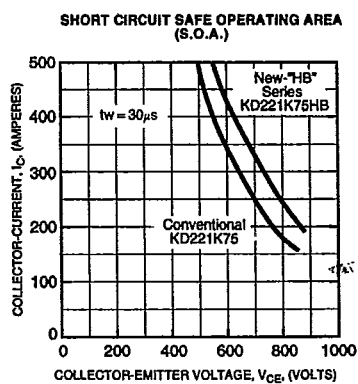
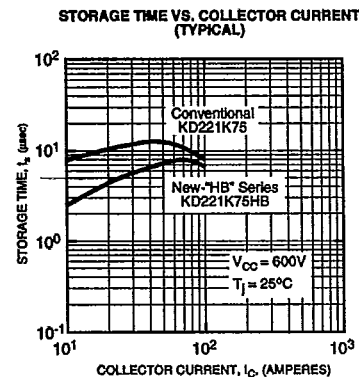
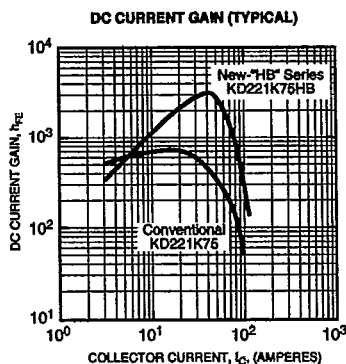
| Type                                         | Current Rating<br>$I_C$ (Amperes) | Voltage<br>$V_{CES}$ (Volts) |
|----------------------------------------------|-----------------------------------|------------------------------|
| <b>6 in 1 High-Beta Module E<sup>†</sup></b> |                                   |                              |
| KEE24501HB                                   | 10                                | 600                          |
| KED235A1HB                                   | 15                                | 500                          |
| QM15TG 9B                                    | 15                                | 500                          |
| KED245A1HB                                   | 15                                | 600                          |
| KE721KA1HB                                   | 15                                | 1000                         |
| KE7212A1HB                                   | 15                                | 1200                         |
| KED23502HB                                   | 20                                | 500                          |
| QM20TG 9B                                    | 20                                | 450                          |
| KED24502HB                                   | 20                                | 600                          |
| KEF24503HB                                   | 30                                | 600                          |
| KE524503HB                                   | 30                                | 600                          |
| KE721K03HB                                   | 30                                | 1000                         |
| KE721203HB                                   | 30                                | 1200                         |
| KET24505HB                                   | 50                                | 600                          |
| KE524505HB                                   | 50                                | 600                          |
| KE921K05HB                                   | 50                                | 1000                         |
| KE921205HB                                   | 50                                | 1200                         |
| KET24575HB                                   | 75                                | 600                          |
| KE524575HB                                   | 75                                | 600                          |
| KET24510HB                                   | 100                               | 600                          |
| KE524510HB                                   | 100                               | 600                          |
| KET24515HB                                   | 150                               | 600                          |
| KE524515HB                                   | 150                               | 600                          |
| <b>High-Beta Module M<sup>†</sup></b>        |                                   |                              |
| KMG24501HB                                   | 10                                | 600                          |
| KMK245A1HB                                   | 15                                | 600                          |
| KMK24502HB                                   | 20                                | 600                          |

\* Under Development

Note:  
600V = 3 Stage Darlington/1000 and 1200V = 4 Stage Darlington, KE5 = All Screw Terminals, KEF or KET = TAB Signal Terminal.

† Second Digit  
S = Single  
D = Dual  
E = 6 in 1  
M = Includes Diode Converter

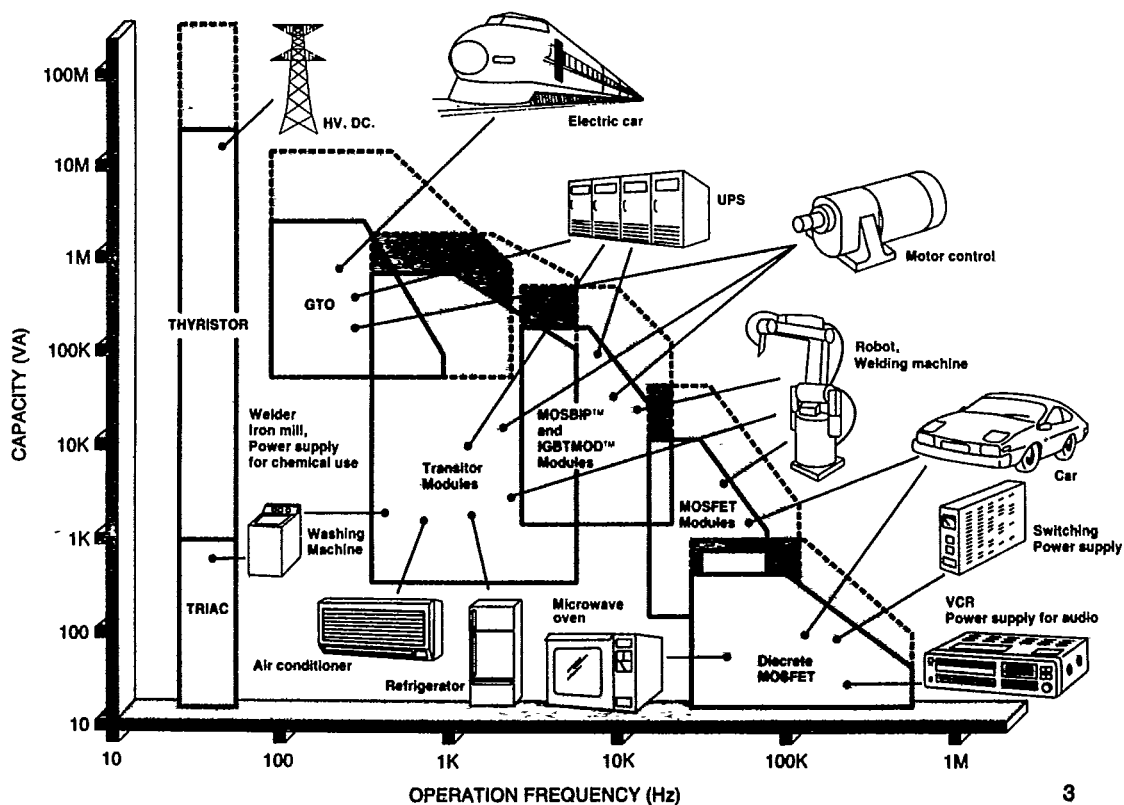
The curves at the right provide a comparative analysis of some of the key High-Beta parameters as compared to the conventional bipolar devices:



### Application of Power Devices

Current Product Range

Future Development Plan





## High-Beta Transistor Modules Selector Guide

Major Ratings and Characteristics at  $T_c = 25^\circ\text{C}$  ( $T_j$  Maximum =  $150^\circ\text{C}$ )

| MAXIMUM RATINGS                                |                               |                           |                                         |                                         |                         |                                        | ELECTRICAL CHARACTERISTICS |                             |                           |                          |                            |
|------------------------------------------------|-------------------------------|---------------------------|-----------------------------------------|-----------------------------------------|-------------------------|----------------------------------------|----------------------------|-----------------------------|---------------------------|--------------------------|----------------------------|
|                                                |                               |                           |                                         |                                         |                         |                                        | Diodes                     |                             | Transistors               |                          |                            |
| Type                                           | V <sub>CE(SUS)</sub><br>Volts | V <sub>CEV</sub><br>Volts | Continuous<br>I <sub>C</sub><br>Amperes | Continuous<br>I <sub>B</sub><br>Amperes | P <sub>T</sub><br>Watts | V <sub>max</sub><br>Isolation<br>Volts | I <sub>FM</sub><br>Amperes | I <sub>FSM</sub><br>Amperes | Test Conditions           |                          |                            |
|                                                |                               |                           |                                         |                                         |                         |                                        |                            |                             | I <sub>C</sub><br>Amperes | V <sub>CE</sub><br>Volts | h <sub>FE</sub><br>Minimum |
| High-Beta Single Darlington Transistor Modules |                               |                           |                                         |                                         |                         |                                        |                            |                             |                           |                          |                            |
| KS824501HB                                     | 450                           | 600                       | 10                                      | 1                                       | 50                      | 2500                                   | 10                         | 100                         | 10                        | 2                        | 250                        |
| KS524502HB                                     | 450                           | 600                       | 20                                      | 1                                       | 90                      | 2500                                   | 20                         | 200                         | 20                        | 2                        | 250                        |
| KS524503HB▲                                    | 450                           | 600                       | 30                                      | 1.8                                     | 250                     | 2500                                   | 30                         | 300                         | 30                        | 2.5                      | 750                        |
| KSF22005                                       | 200                           | 250                       | 50                                      | 3                                       | 200                     | 1500                                   | 50                         | 500                         | 50                        | 5                        | 1000                       |
| KS524505HB▲                                    | 450                           | 600                       | 50                                      | 3                                       | 310                     | 2500                                   | 50                         | 500                         | 50                        | 2.5                      | 750                        |
| KS624530HB                                     | 450                           | 600                       | 300                                     | —                                       | —                       | 2500                                   | 300                        | 3000                        | 300                       | 2.5                      | 750                        |
| KS624540                                       | 450                           | 600                       | 400                                     | 10                                      | 1500                    | 2500                                   | 400                        | 4000                        | 400                       | 2.5                      | 750                        |
| KS624550                                       | 450                           | 600                       | 500                                     | 10                                      | 1780                    | 2500                                   | 500                        | 5000                        | 500                       | 2.5                      | 750                        |
| KS621K30HB▲                                    | 850                           | 1000                      | 300                                     | 16                                      | 1980                    | 2500                                   | 300                        | 3000                        | 300                       | 4                        | 750                        |
| KS621230HB▲                                    | 950                           | 1200                      | 300                                     | 16                                      | 1980                    | 2500                                   | 300                        | 3000                        | 300                       | 4                        | 750                        |
| KS621K40HB▲                                    | 850                           | 1000                      | 400                                     | 20                                      | 3120                    | 2500                                   | 400                        | 4000                        | 400                       | 4                        | 750                        |
| KS621240HB▲                                    | 950                           | 1200                      | 400                                     | 20                                      | 3120                    | 2500                                   | 400                        | 4000                        | 400                       | 4                        | 750                        |
| KS621K60HB▲                                    | 850                           | 1000                      | 600                                     | 30                                      | 3500                    | 2500                                   | 600                        | 6000                        | 600                       | 4                        | 750                        |
| KS621260HB▲                                    | 950                           | 1200                      | 600                                     | 30                                      | 3500                    | 2500                                   | 600                        | 6000                        | 600                       | 4                        | 750                        |
| KS621K80HB*▲                                   | 850                           | 1000                      | 800                                     | —                                       | —                       | 2500                                   | 800                        | 8000                        | —                         | —                        | —                          |
| KS621280HB*▲                                   | 950                           | 1200                      | 800                                     | —                                       | —                       | 2500                                   | 800                        | 8000                        | —                         | —                        | —                          |
| KS621K1KHB▲                                    | 850                           | 1000                      | 1000                                    | 50                                      | 7000                    | 2500                                   | 1000                       | 10000                       | 1000                      | 4                        | 750                        |
| KS62121KHB▲                                    | 950                           | 1200                      | 1000                                    | 50                                      | 7000                    | 2500                                   | 1000                       | 10000                       | 1000                      | 4                        | 750                        |
| High-Beta Dual Darlington Transistor Modules   |                               |                           |                                         |                                         |                         |                                        |                            |                             |                           |                          |                            |
| KD224503HB                                     | 450                           | 600                       | 30                                      | 1.8                                     | 250                     | 2500                                   | 30                         | 300                         | 30                        | 2.5                      | 750                        |
| KD224505HB                                     | 450                           | 600                       | 50                                      | 3                                       | 310                     | 2500                                   | 50                         | 500                         | 50                        | 2.5                      | 750                        |
| KD221K05HB▲                                    | 850                           | 1000                      | 50                                      | 3                                       | 400                     | 2500                                   | 50                         | 500                         | 50                        | 4                        | 750                        |
| KD221205HB▲                                    | 950                           | 1200                      | 50                                      | 3                                       | 400                     | 2500                                   | 50                         | 500                         | 50                        | 4                        | 750                        |
| KD224575HB                                     | 450                           | 600                       | 75                                      | 4.5                                     | 350                     | 2500                                   | 75                         | 750                         | 75                        | 2.5                      | 750                        |
| KD221K75HB▲                                    | 850                           | 1000                      | 75                                      | 4                                       | 500                     | 2500                                   | 75                         | 750                         | 75                        | 4                        | 750                        |
| KD221275HB▲                                    | 950                           | 1200                      | 75                                      | 4                                       | 500                     | 2500                                   | 75                         | 750                         | 75                        | 4                        | 750                        |
| KD324510HB                                     | 450                           | 600                       | 100                                     | 6                                       | 620                     | 2500                                   | 100                        | 1000                        | 100                       | 2.5                      | 750                        |
| KD421K10HB▲                                    | 850                           | 1000                      | 100                                     | 5                                       | 800                     | 2500                                   | 100                        | 1000                        | 100                       | 4                        | 750                        |
| KD421210HB▲                                    | 950                           | 1200                      | 100                                     | 5                                       | 800                     | 2500                                   | 100                        | 1000                        | 100                       | 4                        | 750                        |
| KD324515HB                                     | 450                           | 600                       | 150                                     | 9                                       | 690                     | 2500                                   | 150                        | 1500                        | 150                       | 2.5                      | 750                        |
| KD421K15HB▲                                    | 850                           | 1000                      | 150                                     | 8                                       | 1000                    | 2500                                   | 150                        | 1500                        | 150                       | 4                        | 750                        |
| KD421215HB▲                                    | 950                           | 1200                      | 150                                     | 8                                       | 1000                    | 2500                                   | 150                        | 1500                        | 150                       | 4                        | 750                        |
| KD424520HB                                     | 450                           | 600                       | 200                                     | 12                                      | 1240                    | 2500                                   | 200                        | 2000                        | 200                       | 2.5                      | 750                        |
| KD621K20HB▲                                    | 850                           | 1000                      | 200                                     | 10                                      | 1560                    | 2500                                   | 200                        | 2000                        | 200                       | 4                        | 750                        |
| KD621220HB▲                                    | 950                           | 1200                      | 200                                     | 10                                      | 1560                    | 2500                                   | 200                        | 2000                        | 200                       | 4                        | 750                        |
| KD624530HB*                                    | 450                           | 600                       | 300                                     | —                                       | —                       | 2500                                   | 300                        | 3000                        | 300                       | 2.5                      | 750                        |
| KD621K30HB*▲                                   | 850                           | 1000                      | 300                                     | 16                                      | 1980                    | 2500                                   | 300                        | 3000                        | 300                       | 4                        | 750                        |
| KD621230HB*▲                                   | 950                           | 1200                      | 300                                     | 16                                      | 1980                    | 2500                                   | 300                        | 3000                        | 300                       | 4                        | 750                        |
| KD621K40HB*▲                                   | 850                           | 1000                      | 400                                     | —                                       | —                       | 2500                                   | 400                        | 4000                        | 400                       | 4                        | 750                        |
| KD621240HB*▲                                   | 950                           | 1200                      | 400                                     | —                                       | —                       | 2500                                   | 400                        | 4000                        | 400                       | 4                        | 750                        |
| KD621K50HB*▲                                   | 850                           | 1000                      | 500                                     | —                                       | —                       | 2500                                   | 500                        | 5000                        | 500                       | 4                        | 750                        |
| KD621250HB*▲                                   | 950                           | 1200                      | 500                                     | —                                       | —                       | 2500                                   | 500                        | 5000                        | 500                       | 4                        | 750                        |

\* Under Development

▲ These High-Beta "HB" Types are Four-Stage Darlington Transistor Modules

## THERMAL AND MECHANICAL CHARACTERISTICS

## Diodes

Interface  
per Module

## Transistors

## Diodes

## Weight

I<sub>C</sub>  
Amperes

## Test Conditions

I<sub>B</sub>  
AmperesV<sub>CE(SAT)</sub>  
Volts

## Resistive Load Switching Times

t<sub>ON</sub>  
μst<sub>L</sub>  
μst<sub>F</sub>  
μsI<sub>FM</sub>  
AmperesV<sub>FM</sub>  
VoltsR<sub>ΘCS</sub>  
°C/WR<sub>ΘJC</sub>  
°C/WR<sub>ΘJC</sub>  
°C/W

Grams

|      |       |     |     |    |     |      |     |      |       |       |      |
|------|-------|-----|-----|----|-----|------|-----|------|-------|-------|------|
| 10   | 0.04  | 2   | 1.5 | 10 | 2   | 10   | 1.5 | 0.4  | 1.5   | 2.5   | 25   |
| 20   | 0.08  | 2   | 1.5 | 12 | 2   | 20   | 1.5 | 0.15 | 0.8   | 2.2   | 90   |
| 30   | 0.04  | 2.5 | 2   | 8  | 3   | 30   | 1.8 | 0.15 | 0.5   | 2.0   | 90   |
| 50   | 0.65  | 2   | 1.5 | 12 | 3   | 50   | 1.8 | 0.25 | 0.9   | 1.5   | 35   |
| 50   | 0.067 | 2.5 | 2   | 8  | 3   | 50   | 1.8 | 0.15 | 0.4   | 1.3   | 90   |
| —    | —     | —   | —   | —  | —   | —    | —   | —    | —     | —     | —    |
| 400  | 0.53  | 2.5 | 3   | 15 | 3.5 | 400  | 1.8 | 0.04 | 0.083 | 0.25  | 640  |
| 500  | 0.67  | 2.5 | 3   | 15 | 3   | 500  | 1.8 | 0.04 | 0.07  | 0.25  | 640  |
| 300  | 0.4   | 4   | 2.5 | 15 | 3   | 300  | 1.8 | 0.04 | 0.063 | 0.3   | 1100 |
| 300  | 0.4   | 4   | 2.5 | 15 | 3   | 300  | 1.8 | 0.04 | 0.063 | 0.3   | 1100 |
| 400  | 0.53  | 4   | 2.5 | 15 | 3   | 400  | 1.8 | 0.02 | 0.04  | 0.175 | 870  |
| 400  | 0.53  | 4   | 2.5 | 15 | 3   | 400  | 1.8 | 0.02 | 0.04  | 0.175 | 870  |
| 600  | 0.8   | 4   | 2.5 | 15 | 3   | 600  | 1.8 | 0.02 | 0.035 | 0.16  | 1100 |
| 600  | 0.8   | 4   | 2.5 | 15 | 3   | 600  | 1.8 | 0.02 | 0.035 | 0.16  | 1100 |
| —    | —     | —   | —   | —  | —   | —    | —   | —    | —     | —     | —    |
| —    | —     | —   | —   | —  | —   | —    | —   | —    | —     | —     | —    |
| 1000 | 1.33  | 4   | 2.5 | 15 | 3   | 1000 | 1.8 | 0.01 | 0.018 | 0.07  | —    |
| 1000 | 1.33  | 4   | 2.5 | 15 | 3   | 1000 | 1.8 | 0.01 | 0.018 | 0.07  | —    |

|     |       |     |     |    |   |     |     |       |       |      |      |
|-----|-------|-----|-----|----|---|-----|-----|-------|-------|------|------|
| 30  | 0.04  | 2.5 | 2   | 8  | 3 | 30  | 1.8 | 0.15  | 0.5   | 2    | 210  |
| 50  | 0.067 | 2.5 | 2   | 8  | 3 | 50  | 1.8 | 0.15  | 0.4   | 1.3  | 210  |
| 50  | 0.067 | 4   | 2.5 | 15 | 3 | 50  | 1.8 | 0.13  | 0.31  | 1.2  | 250  |
| 50  | 0.067 | 4   | 2.5 | 15 | 3 | 50  | 1.8 | 0.13  | 0.31  | 1.2  | 250  |
| 75  | 0.1   | 2.5 | 2   | 8  | 3 | 75  | 1.8 | 0.15  | 0.35  | 1.3  | 210  |
| 75  | 0.1   | 4   | 2.5 | 15 | 3 | 75  | 1.8 | 0.13  | 0.25  | 1.2  | 250  |
| 75  | 0.1   | 4   | 2.5 | 15 | 3 | 75  | 1.8 | 0.13  | 0.25  | 1.25 | 250  |
| 100 | 0.13  | 2.5 | 2.5 | 10 | 2 | 100 | 1.8 | 0.1   | 0.2   | 0.6  | 400  |
| 100 | 0.13  | 4   | 2.5 | 15 | 3 | 100 | 1.8 | 0.075 | 0.155 | 0.65 | 470  |
| 100 | 0.13  | 4   | 2.5 | 15 | 3 | 100 | 1.8 | 0.075 | 0.155 | 0.65 | 470  |
| 150 | 0.2   | 2.5 | 2.5 | 10 | 2 | 150 | 1.8 | 0.1   | 0.18  | 0.6  | 420  |
| 150 | 0.2   | 4   | 2.5 | 15 | 3 | 150 | 1.8 | 0.075 | 0.125 | 0.6  | 470  |
| 150 | 0.2   | 4   | 2.5 | 15 | 3 | 150 | 1.8 | 0.075 | 0.125 | 0.6  | 470  |
| 200 | 0.26  | 2.5 | 2.5 | 10 | 2 | 200 | 1.8 | 0.075 | 0.1   | 0.33 | 470  |
| 200 | 0.27  | 4   | 2.5 | 15 | 3 | 200 | 1.8 | 0.04  | 0.08  | 0.35 | 870  |
| 200 | 0.27  | 4   | 2.5 | 15 | 3 | 200 | 1.8 | 0.04  | 0.08  | 0.35 | 870  |
| —   | —     | —   | —   | —  | — | —   | —   | —     | —     | —    | —    |
| 300 | 0.4   | 4   | 2.5 | 15 | 3 | 300 | 1.8 | 0.04  | 0.063 | 0.3  | 1100 |
| 300 | 0.4   | 4   | 2.5 | 15 | 3 | 300 | 1.8 | 0.04  | 0.063 | 0.3  | 1100 |
| 400 | —     | 4   | —   | —  | — | —   | —   | —     | —     | —    | —    |
| 400 | —     | 4   | —   | —  | — | —   | —   | —     | —     | —    | —    |
| 500 | —     | 4   | —   | —  | — | —   | —   | —     | —     | —    | —    |
| 500 | —     | 4   | —   | —  | — | —   | —   | —     | —     | —    | —    |



## High-Beta Transistor Modules Selector Guide

Major Ratings and Characteristics at  $T_C = 25^\circ\text{C}$  ( $T_J$  Maximum =  $150^\circ\text{C}$ )

| MAXIMUM RATINGS                             |                         |                    |                                |                                |                |                                 | ELECTRICAL CHARACTERISTICS |                      |                  |                   |                     |
|---------------------------------------------|-------------------------|--------------------|--------------------------------|--------------------------------|----------------|---------------------------------|----------------------------|----------------------|------------------|-------------------|---------------------|
|                                             |                         |                    |                                |                                |                |                                 | Diodes                     |                      | Transistors      |                   |                     |
| Type                                        | $V_{CE0(SUS)}$<br>Volts | $V_{CEV}$<br>Volts | Continuous<br>$I_C$<br>Amperes | Continuous<br>$I_B$<br>Amperes | $P_T$<br>Watts | $V_{RMS}$<br>Isolation<br>Volts | $I_{FM}$<br>Amperes        | $I_{FSM}$<br>Amperes | Test Conditions  |                   |                     |
|                                             |                         |                    |                                |                                |                |                                 |                            |                      | $I_C$<br>Amperes | $V_{CE}$<br>Volts | $h_{FE}$<br>Minimum |
| High-Beta Six-Darlington Transistor Modules |                         |                    |                                |                                |                |                                 |                            |                      |                  |                   |                     |
| KEE24501HB                                  | 450                     | 600                | 10                             | 1                              | 50             | 2500                            | 10                         | 100                  | 10               | 2                 | 250                 |
| KED235A1HB                                  | 350                     | 500                | 15                             | 1                              | 90             | 2500                            | 15                         | 150                  | 15               | 2                 | 250                 |
| QM15TG-9B                                   | 450                     | 500                | 15                             | 1                              | 83             | 2000                            | 15                         | 150                  | 15               | 2                 | 250                 |
| KED245A1HB                                  | 450                     | 600                | 15                             | 1                              | 90             | 2500                            | 15                         | 150                  | 15               | 2                 | 250                 |
| KE721KA1HB                                  | 850                     | 1000               | 15                             | 1                              | 150            | 2500                            | 15                         | 150                  | 15               | 3                 | 250                 |
| KE7212A1HB                                  | 950                     | 1200               | 15                             | 1                              | 150            | 2500                            | 15                         | 150                  | 15               | 3                 | 250                 |
| KED23502HB                                  | 350                     | 500                | 20                             | 1                              | 90             | 2500                            | 20                         | 200                  | 20               | 2                 | 250                 |
| QM20TG-9B                                   | 450                     | 500                | 20                             | 1                              | 100            | 2000                            | 20                         | 200                  | 20               | 2                 | 250                 |
| KED24502HB                                  | 450                     | 600                | 20                             | 1                              | 90             | 2500                            | 20                         | 200                  | 20               | 2                 | 250                 |
| KEF24503HB                                  | 450                     | 600                | 30                             | 1.8                            | 250            | 2500                            | 30                         | 300                  | 30               | 2.5               | 750                 |
| KE524503HB                                  | 450                     | 600                | 30                             | 1.8                            | 250            | 2500                            | 30                         | 300                  | 30               | 2.5               | 750                 |
| KE721K03HB                                  | 850                     | 1000               | 30                             | 2                              | 310            | 2500                            | 30                         | 300                  | 30               | 4                 | 750                 |
| KE721203HB                                  | 950                     | 1200               | 30                             | 2                              | 310            | 2500                            | 30                         | 300                  | 30               | 4                 | 750                 |
| KET24505HB                                  | 450                     | 600                | 50                             | 3                              | 310            | 2500                            | 50                         | 500                  | 50               | 2.5               | 750                 |
| KE524505HB                                  | 450                     | 600                | 50                             | 3                              | 310            | 2500                            | 50                         | 500                  | 50               | 2.5               | 750                 |
| KE921K05HB                                  | 850                     | 1000               | 50                             | 3                              | 400            | 2500                            | 50                         | 500                  | 50               | 4                 | 750                 |
| KE921205HB                                  | 950                     | 1200               | 50                             | 3                              | 400            | 2500                            | 50                         | 500                  | 50               | 4                 | 750                 |
| KET24575HB                                  | 450                     | 600                | 75                             | 4.5                            | 350            | 2500                            | 75                         | 750                  | 75               | 2.5               | 750                 |
| KE524575HB                                  | 450                     | 600                | 75                             | 4.5                            | 350            | 2500                            | 75                         | 750                  | 75               | 2.5               | 750                 |
| KET24510HB                                  | 450                     | 600                | 100                            | 6                              | 620            | 2500                            | 100                        | 1000                 | 100              | 2.5               | 750                 |
| KE524510HB                                  | 450                     | 600                | 100                            | 6                              | 620            | 2500                            | 100                        | 1000                 | 100              | 2.5               | 750                 |
| KET24515HB*                                 | 450                     | 600                | 150                            | 9                              | —              | 2500                            | 150                        | 1500                 | 150              | 2.5               | 750                 |
| KE524515HB*                                 | 450                     | 600                | 150                            | 9                              | —              | 2500                            | 150                        | 1500                 | 150              | 2.5               | 750                 |

\* Under Development

Major Ratings and Characteristics at  $T_C = 25^\circ\text{C}$  ( $T_J$  Maximum =  $150^\circ\text{C}$ )

| MAXIMUM RATINGS                                                         |                         |                         |                  |                     |  |                            |                    |                     |                      |                   |                                 |
|-------------------------------------------------------------------------|-------------------------|-------------------------|------------------|---------------------|--|----------------------------|--------------------|---------------------|----------------------|-------------------|---------------------------------|
| Transistor Output Section                                               |                         |                         |                  |                     |  | Diode Bridge Input Section |                    |                     |                      |                   |                                 |
| Type                                                                    | $V_{CE0(SUS)}$<br>Volts | $V_{CEV(SUS)}$<br>Volts | $I_C$<br>Amperes | $I_{CM}$<br>Amperes |  | $V_{RMS}$<br>Volts         | $V_{FSM}$<br>Volts | $I_{FM}$<br>Amperes | $I_{FSM}$<br>Amperes | $V_{FM}$<br>Volts | $V_{RMS}$<br>Isolation<br>Volts |
| <b>Converter Power Modules<br/>Three Phase Input Three Phase Output</b> |                         |                         |                  |                     |  |                            |                    |                     |                      |                   |                                 |
| KMG24501HB                                                              | 450                     | 600                     | 10               | 20                  |  | 800                        | 900                | 30                  | 400                  | 1.1               | 2500                            |
| KMK245A1HB                                                              | 450                     | 600                     | 15               | 30                  |  | 800                        | 900                | 30                  | 400                  | 1.1               | 2500                            |
| KMK24502HB                                                              | 450                     | 600                     | 20               | 40                  |  | 800                        | 900                | 30                  | 400                  | 1.1               | 2500                            |

|                           |                           |     |                               |                                |                      |                      |                            |                          | THERMAL AND MECHANICAL CHARACTERISTICS |                          |                          |        |
|---------------------------|---------------------------|-----|-------------------------------|--------------------------------|----------------------|----------------------|----------------------------|--------------------------|----------------------------------------|--------------------------|--------------------------|--------|
|                           |                           |     |                               |                                |                      | Diodes               |                            |                          | Interface<br>per Module                | Transistors              | Diodes                   | Weight |
| I <sub>C</sub><br>Amperes | Test Conditions           |     | V <sub>CE(SAT)</sub><br>Volts | Resistive Load Switching Times |                      |                      | I <sub>FM</sub><br>Amperes | V <sub>FM</sub><br>Volts | R <sub>θCS</sub><br>°C/W               | R <sub>θJC</sub><br>°C/W | R <sub>θJC</sub><br>°C/W | Grams  |
|                           | I <sub>B</sub><br>Amperes |     |                               | t <sub>on</sub><br>μs          | t <sub>s</sub><br>μs | t <sub>f</sub><br>μs |                            |                          |                                        |                          |                          |        |
| 10                        | 0.04                      | 2   |                               | 1.5                            | 10                   | 2                    | 10                         | 1.5                      | 0.9                                    | 1.7                      | 2.8                      | 50     |
| 15                        | 0.06                      | 2   |                               | 1.5                            | 10                   | 2                    | 15                         | 1.5                      | 0.35                                   | 1.65                     | 2.8                      | 90     |
| 15                        | 0.06                      | 2   |                               | 1.5                            | 10                   | 2                    | 15                         | 1.5                      | 0.55                                   | 1.5                      | 2.5                      | 70     |
| 15                        | 0.06                      | 2   |                               | 1.5                            | 10                   | 2                    | 15                         | 1.5                      | 0.35                                   | 1.65                     | 2.8                      | 90     |
| 15                        | 0.06                      | 3   |                               | 2                              | 10                   | 3                    | 15                         | 1.8                      | 0.35                                   | 0.8                      | 2                        | 230    |
| 15                        | 0.06                      | 3   |                               | 2                              | 10                   | 3                    | 15                         | 1.5                      | 0.35                                   | 0.8                      | 2                        | 230    |
| 20                        | 0.08                      | 2   |                               | 1.5                            | 12                   | 2                    | 20                         | 1.5                      | 0.35                                   | 1.5                      | 2.5                      | 90     |
| 20                        | 0.08                      | 2   |                               | 2                              | 10                   | 2                    | 20                         | 1.5                      | 0.55                                   | 1.25                     | 2.5                      | 70     |
| 20                        | 0.08                      | 2   |                               | 1.5                            | 12                   | 2                    | 20                         | 1.5                      | 0.35                                   | 1.5                      | 2.5                      | 90     |
| 30                        | 0.2                       | 2.5 |                               | 2                              | 8                    | 3                    | 30                         | 1.8                      | 0.35                                   | 0.5                      | 2                        | 230    |
| 30                        | 0.2                       | 2.5 |                               | 2                              | 8                    | 3                    | 30                         | 1.8                      | 0.2                                    | 0.5                      | 2                        | 520    |
| 30                        | 0.04                      | 4   |                               | 2.5                            | 15                   | 3                    | 30                         | 1.8                      | 0.25                                   | 0.4                      | 1.5                      | 410    |
| 30                        | 0.04                      | 4   |                               | 2.5                            | 15                   | 3                    | 30                         | 1.8                      | 0.25                                   | 0.4                      | 1.5                      | 410    |
| 50                        | 0.067                     | 2.5 |                               | 2                              | 8                    | 3                    | 50                         | 1.8                      | 0.2                                    | 0.4                      | 1.3                      | 520    |
| 50                        | 0.1                       | 4   |                               | —                              | —                    | —                    | 50                         | 1.8                      | —                                      | 0.31                     | 1.2                      | 660    |
| 50                        | 0.1                       | 4   |                               | 2.5                            | 15                   | 3                    | 50                         | 1.8                      | 0.2                                    | 0.31                     | 1.2                      | 660    |
| 50                        | 0.067                     | 4   |                               | 2.5                            | 15                   | 3                    | 50                         | 1.8                      | 0.2                                    | 0.31                     | 1.2                      | 660    |
| 75                        | 0.1                       | 2.5 |                               | 2                              | 8                    | 3                    | 75                         | 1.8                      | 0.2                                    | 0.35                     | 1.3                      | 660    |
| 75                        | 0.1                       | 2.5 |                               | 2                              | 8                    | 3                    | 75                         | 1.8                      | 0.2                                    | 0.35                     | 1.3                      | 520    |
| 100                       | 0.13                      | 2.5 |                               | 2.5                            | 10                   | 2                    | 100                        | 1.8                      | 0.15                                   | 0.2                      | 0.6                      | 820    |
| 100                       | 0.13                      | 2.5 |                               | 2.5                            | 10                   | 2                    | 100                        | 1.8                      | 0.15                                   | 0.2                      | 0.6                      | 520    |
| 150                       | —                         | 2.5 |                               | —                              | —                    | —                    | 150                        | 1.8                      | —                                      | —                        | —                        | —      |
| 150                       | —                         | 2.5 |                               | —                              | —                    | —                    | 150                        | 1.8                      | —                                      | —                        | —                        | —      |

| ELECTRICAL CHARACTERISTICS |                       |                         |                        |                        |                            |                                | FREE WHEEL DIODE  |                   |                         | THERMAL AND MECHANICAL CHARACTERISTICS |                       |                       |                       |                       |        |
|----------------------------|-----------------------|-------------------------|------------------------|------------------------|----------------------------|--------------------------------|-------------------|-------------------|-------------------------|----------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------|
| Static Transistor Inverter |                       |                         |                        |                        |                            | Dynamic                        |                   |                   |                         |                                        | Interface Per Module  | Transistors           | FW-Diodes             | Br-Diode              | Weight |
| Test Conditions            |                       |                         |                        |                        |                            | Resistive Load Switching Times |                   |                   |                         |                                        | R <sub>θCS</sub> °C/W | R <sub>θJC</sub> °C/W | R <sub>θJC</sub> °C/W | R <sub>θJC</sub> °C/W | Grams  |
| I <sub>C</sub> Amperes     | V <sub>CE</sub> Volts | h <sub>FE</sub> Minimum | I <sub>C</sub> Amperes | I <sub>B</sub> Amperes | V <sub>CE(SAT)</sub> Volts | t <sub>on</sub> μs             | t <sub>s</sub> μs | t <sub>f</sub> μs | I <sub>FM</sub> Amperes | V <sub>FM</sub> Volts                  |                       |                       |                       |                       |        |
| 10                         | 2                     | 250                     | 10                     | 0.04                   | 2                          | 1.5                            | 10                | 2                 | 10                      | 1.5                                    | 0.9                   | 1.7                   | 2.8                   | 0.9                   | 50     |
| 15                         | 2                     | 250                     | 15                     | 0.05                   | 2                          | 1.5                            | 10                | 2                 | 15                      | 1.5                                    | 0.35                  | 1.65                  | 2.8                   | 0.9                   | 110    |
| 20                         | 2                     | 250                     | 20                     | 0.08                   | 2                          | 1.5                            | 12                | 2                 | 20                      | 1.5                                    | 0.35                  | 1.5                   | 2.5                   | 0.9                   | 110    |