

7294621 POWEREX INC

40C 00607 D T-33-15

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DATA SHEETS



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**"O.E.M. Line"**  
**Silicon Power Transistors**  
**Westinghouse Type 163**  
**Type 164**

20 Amperes, 200 Watts  
 Collector Voltages, 40 to 300 Volts

**Maximum Ratings**

| Voltage Type | V <sub>CB0</sub> | V <sub>CE</sub> | V <sub>EB0</sub> |
|--------------|------------------|-----------------|------------------|
| 163-04       | 164-04           | 55              | 40               |
| 163-06       | 164-06           | 75              | 60               |
| 163-08       | 164-08           | 95              | 80               |
| 163-10       | 164-10           | 115             | 100              |
| 163-12       | 164-12           | 135             | 120              |
| 163-14       | 164-14           | 155             | 140              |
| 163-16       | 164-16           | 175             | 160              |
| 163-18       | 164-18           | 195             | 180              |
| 163-20       | 164-20           | 215             | 200              |
| 163-22       | 164-22           | 235             | 220              |
| 163-24       | 164-24           | 255             | 240              |
| 163-26       | 164-26           | 275             | 260              |
| 163-28       | 164-28           | 295             | 280              |
| 163-30       | 164-30           | 315             | 300              |

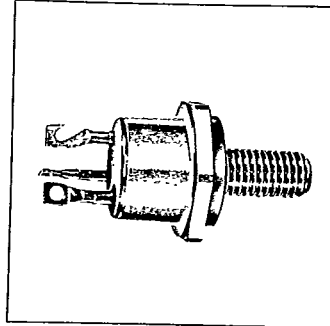
**Current**  
 Collector current, I<sub>c</sub>, A dc.....20  
 Base current, I<sub>b</sub>, A dc.....7.5

**Power**  
 Power dissipation, P<sub>T</sub> @ T<sub>C</sub>=75°C,  
 watts, max.....200  
 Linear derating factor from 75°C..2.0W/°C

**Temperature**  
 Storage and operating temperature,  
 T<sub>stg</sub>, T<sub>J</sub>.....-65 to +175°C

**Application**  
 Westinghouse Types 163 and 164 NPN silicon power transistors are a series of low-cost units designed expressly to meet the needs of Original Equipment Manufacturers of commercial electronic and control apparatus. Their low saturation resistance, high collector voltage and high temperature characteristics make them ideally suited for use in regulator, amplifier and switching circuits. In many applications, one of these units can replace two or more germanium power transistors.

Westinghouse



**Typical Applications**

Amplifiers  
 Switching Circuits  
 Industrial Controls  
 Regulators  
 Power Supplies  
 Pulse Generators  
 Oscillators  
 Inverters  
 Ignition Systems  
 Modulators  
 Servo Systems  
 Sweep Circuits  
 Logic Circuits  
 Active Filters

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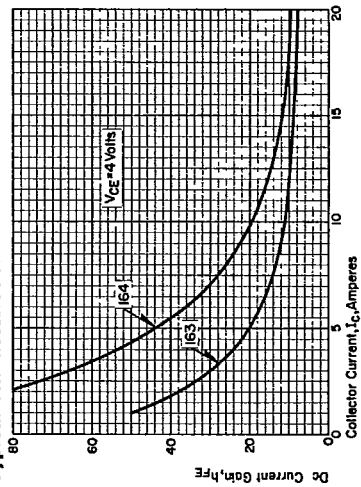
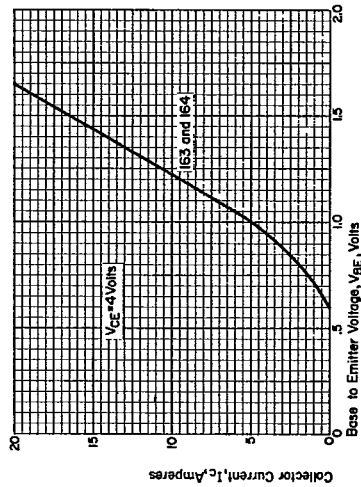
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### Electrical Characteristics

$T_C = 25^\circ\text{C}$  unless otherwise specified

| Symbol                                                                                                                            | Type 163 |      | Type 164 |      |
|-----------------------------------------------------------------------------------------------------------------------------------|----------|------|----------|------|
|                                                                                                                                   | Min.     | Typ. | Max.     | Typ. |
| Collector cut-off current at $V_{CE} = \text{max. rating}$ , $T_C = 175^\circ\text{C}$ , $V_{BE} = -1.5\text{ Vdc}$ , $I_{CBO}$   | ..       | ..   | 30       | ..   |
| Emitter cut-off current at $V_{BE} = 15\text{ Vdc}$ , $I_C = 0$ , $T_C = 175^\circ\text{C}$ , $I_{EBO}$                           | ..       | ..   | 25       | ..   |
| Turn-on time at $V_{CE} = 12\text{ Vdc}$ , $I_C = 5\text{ A}$ , $I_B = 1.0\text{ A}$ , microseconds                               | ..       | ..   | 6        | ..   |
| Turn-on time at $V_{CE} = 12\text{ Vdc}$ , $I_C = 5\text{ A}$ , $I_B = 0.6\text{ A}$ , microseconds                               | ..       | ..   | 12       | ..   |
| Turn-off time at $V_{CE} = 12\text{ Vdc}$ , $V_{BE} = -15\text{ Vdc}$ , $I_C = 5\text{ A}$ , $I_B = -1.0\text{ A}$ , microseconds | ..       | ..   | ..       | ..   |
| Turn-off time at $V_{CE} = 12\text{ Vdc}$ , $V_{BE} = -15\text{ Vdc}$ , $I_C = 5\text{ A}$ , $I_B = -0.6\text{ A}$ , microseconds | ..       | ..   | ..       | ..   |
| Collector-emitter saturation voltage at $I_C = 5.0\text{ Adc}$ , $I_B = 0.5\text{ Adc}$ , $V_{CE}(\text{sat})$                    | ..       | ..   | 1.1      | ..   |
| Base-emitter voltage at $I_C = 5.0\text{ Adc}$ , $I_B = 0.5\text{ Adc}$ , $V_{BE}(\text{sat})$                                    | ..       | ..   | 2.2      | ..   |
| Dc current gain at $V_{CE} = 4\text{ Vdc}$ , $I_C = 5.0\text{ Adc}$ , $h_{FE}$                                                    | 15       | ..   | 25       | ..   |

### Typical Characteristics

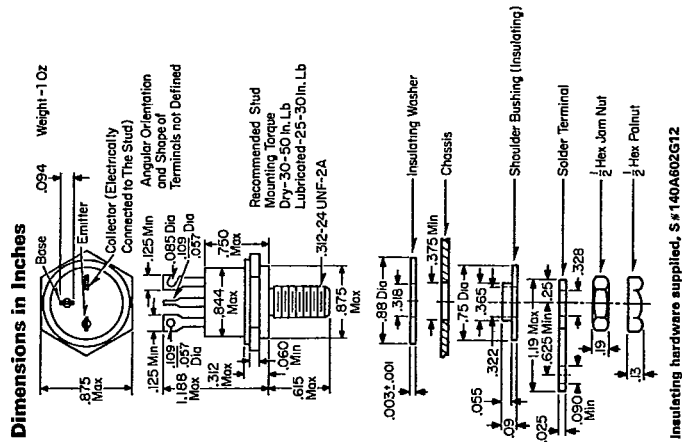
Figure 1. Typical dc gain versus collector current at  $T_C = 25^\circ\text{C}$ .Figure 2. Typical transconductance characteristics at  $T_C = 25^\circ\text{C}$ .

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**Insulating hardware supplied, S#140A602G12**

April, 1967  
Supersedes TD 54-672, pages 5 and 6, dated  
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E. D. C/2116/DB: E. D. C/2117

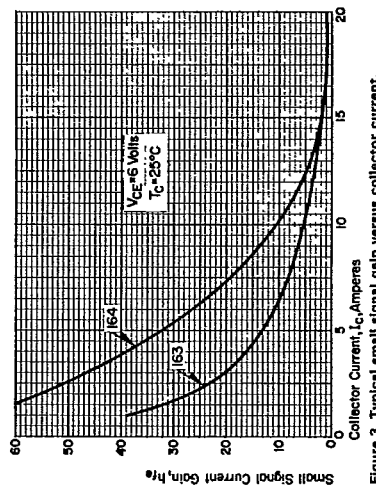
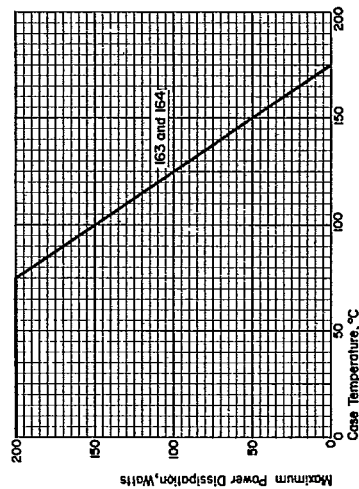


Figure 3. Typical small signal gain versus collector current.



**Figure 4. Dewatering curve.**

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