



# SPP2301

## P-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPP2301 is the P-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology.

This high density process is especially tailored to minimize on-state resistance.

These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits, and low in-line power loss are needed in a very small outline surface mount package.

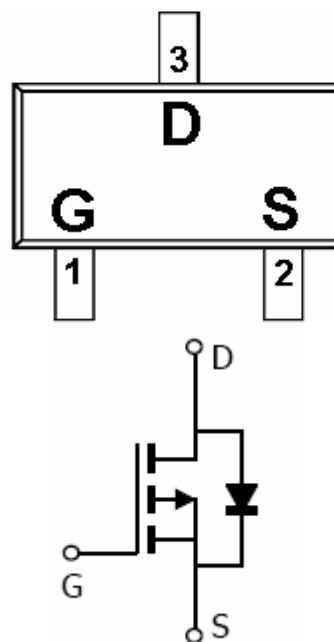
### FEATURES

- ◆  $-20V/-2.8A, R_{DS(ON)}=120m\Omega @ V_{GS}=-4.5V$
- ◆  $-20V/-2.0A, R_{DS(ON)}=170m\Omega @ V_{GS}=-2.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ SOT-23-3L package design

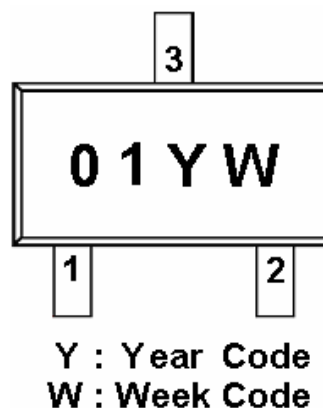
### APPLICATIONS

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC
- LCD Display inverter

### PIN CONFIGURATION(SOT-23-3L)



### PART MARKING





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### PIN DESCRIPTION

| Pin | Symbol | Description |
|-----|--------|-------------|
| 1   | G      | Gate        |
| 2   | S      | Source      |
| 3   | D      | Drain       |

### ORDERING INFORMATION

| Part Number  | Package   | Part Marking |
|--------------|-----------|--------------|
| SPP2301S23RG | SOT-23-3L | 01YW         |

※ Week Code : A ~ Z( 1 ~ 26 ) ; a ~ z( 27 ~ 52 )

※ SPP2301S23RG : Tape Reel ; Pb – Free

### ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

| Parameter                                       |                      | Symbol           | Typical | Unit |
|-------------------------------------------------|----------------------|------------------|---------|------|
| Drain-Source Voltage                            |                      | V <sub>DSS</sub> | -20     | V    |
| Gate –Source Voltage                            |                      | V <sub>GSS</sub> | ±12     | V    |
| Continuous Drain Current(T <sub>J</sub> =150°C) | T <sub>A</sub> =25°C | I <sub>D</sub>   | -3.0    | A    |
|                                                 | T <sub>A</sub> =70°C |                  | -2.0    |      |
| Pulsed Drain Current                            |                      | I <sub>DM</sub>  | -10     | A    |
| Continuous Source Current(Diode Conduction)     |                      | I <sub>S</sub>   | -1.6    | A    |
| Power Dissipation                               | T <sub>A</sub> =25°C | P <sub>D</sub>   | 1.25    | W    |
|                                                 | T <sub>A</sub> =70°C |                  | 0.8     |      |
| Operating Junction Temperature                  |                      | T <sub>J</sub>   | 150     | °C   |
| Storage Temperature Range                       |                      | T <sub>STG</sub> | -55/150 | °C   |
| Thermal Resistance-Junction to Ambient          |                      | R <sub>θJA</sub> | 120     | °C/W |



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### ELECTRICAL CHARACTERISTICS

(T<sub>A</sub>=25°C Unless otherwise noted)

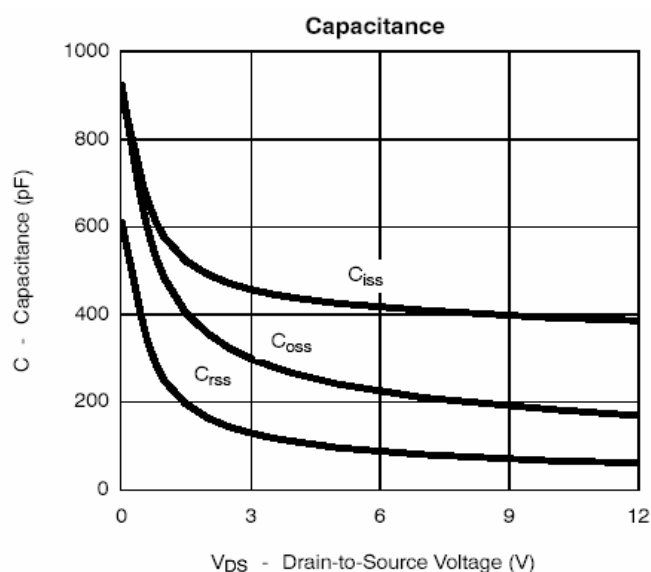
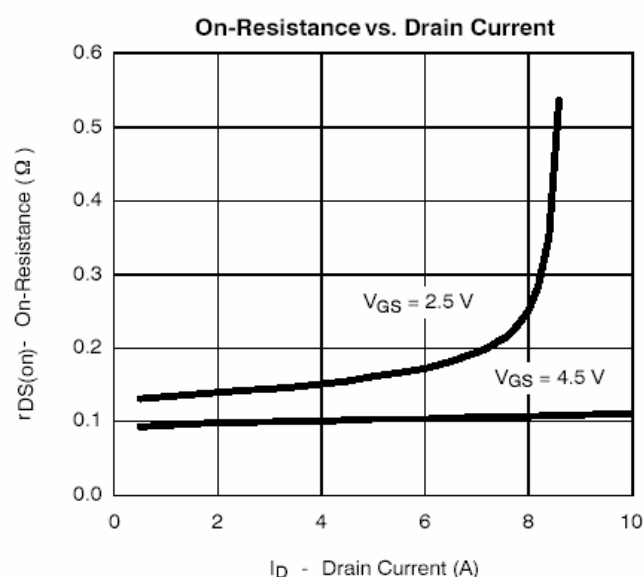
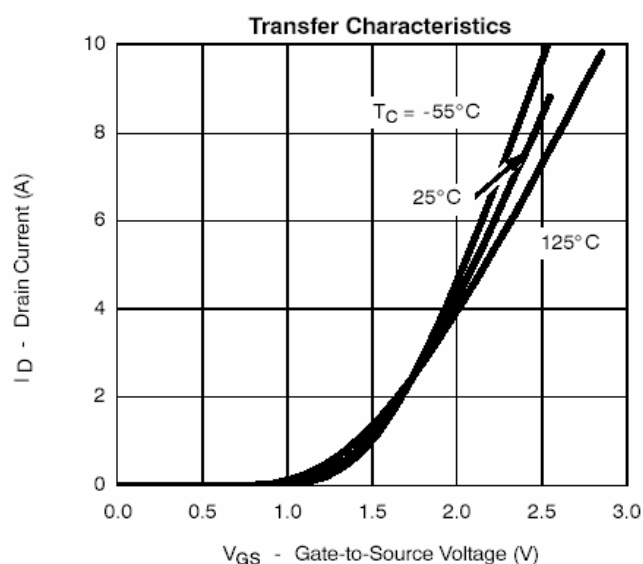
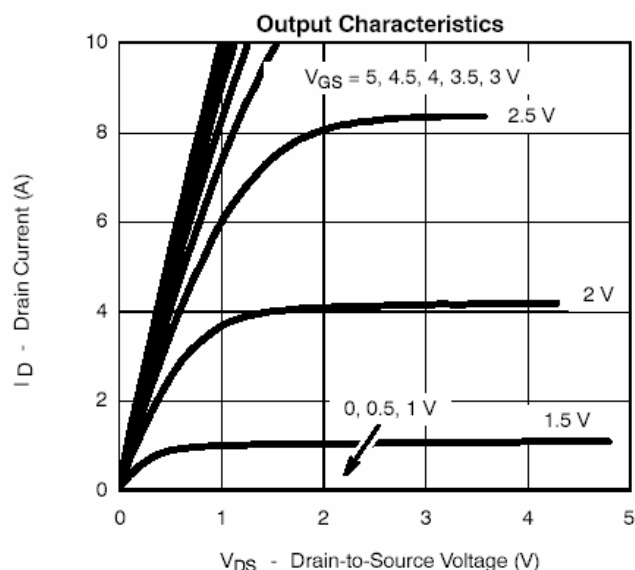
| Parameter                       | Symbol               | Conditions                                                                                                       | Min.  | Typ   | Max. | Unit |
|---------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------|-------|-------|------|------|
| <b>Static</b>                   |                      |                                                                                                                  |       |       |      |      |
| Drain-Source Breakdown Voltage  | V <sub>(BR)DSS</sub> | V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA                                                                      | -20   |       |      | V    |
| Gate Threshold Voltage          | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA                                                        | -0.45 |       | -1.5 |      |
| Gate Leakage Current            | I <sub>GSS</sub>     | V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V                                                                       |       |       | ±100 | nA   |
| Zero Gate Voltage Drain Current | I <sub>DSS</sub>     | V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V                                                                       |       |       | -1   | uA   |
|                                 |                      | V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V<br>T <sub>J</sub> =55°C                                               |       |       | -10  |      |
| On-State Drain Current          | I <sub>D(on)</sub>   | V <sub>DS</sub> ≤ -5V, V <sub>GS</sub> =-4.5V                                                                    | -6    |       |      | A    |
|                                 |                      | V <sub>DS</sub> ≤ -5V, V <sub>GS</sub> =-2.5V                                                                    | -3    |       |      |      |
| Drain-Source On-Resistance      | R <sub>DS(on)</sub>  | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2.8A                                                                    |       | 0.095 | 0.12 | Ω    |
|                                 |                      | V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-2.0A                                                                    |       | 0.150 | 0.17 |      |
| Forward Transconductance        | g <sub>fs</sub>      | V <sub>DS</sub> =-5V, I <sub>D</sub> =-2.8A                                                                      |       | 6.5   |      | S    |
| Diode Forward Voltage           | V <sub>SD</sub>      | I <sub>S</sub> =-1.6A, V <sub>GS</sub> =0V                                                                       |       | -0.8  | -1.2 | V    |
| <b>Dynamic</b>                  |                      |                                                                                                                  |       |       |      |      |
| Total Gate Charge               | Q <sub>g</sub>       | V <sub>DS</sub> =-6V, V <sub>GS</sub> =-4.5V<br>I <sub>D</sub> =-2.8A                                            |       | 5.8   | 10   | nC   |
| Gate-Source Charge              | Q <sub>gs</sub>      |                                                                                                                  |       | 0.85  |      |      |
| Gate-Drain Charge               | Q <sub>gd</sub>      |                                                                                                                  |       | 1.7   |      |      |
| Input Capacitance               | C <sub>iss</sub>     | V <sub>DS</sub> =-6V, V <sub>GS</sub> =0V<br>f=1MHz                                                              |       | 415   |      | pF   |
| Output Capacitance              | C <sub>oss</sub>     |                                                                                                                  |       | 223   |      |      |
| Reverse Transfer Capacitance    | C <sub>rss</sub>     |                                                                                                                  |       | 87    |      |      |
| Turn-On Time                    | t <sub>d(on)</sub>   | V <sub>DD</sub> =-6V, R <sub>L</sub> =6Ω<br>I <sub>D</sub> =-1.0A, V <sub>GEN</sub> =-4.5V<br>R <sub>G</sub> =6Ω |       | 13    | 25   | ns   |
|                                 | t <sub>r</sub>       |                                                                                                                  |       | 36    | 60   |      |
| Turn-Off Time                   | t <sub>d(off)</sub>  |                                                                                                                  |       | 42    | 70   |      |
|                                 | t <sub>f</sub>       |                                                                                                                  |       | 34    | 60   |      |



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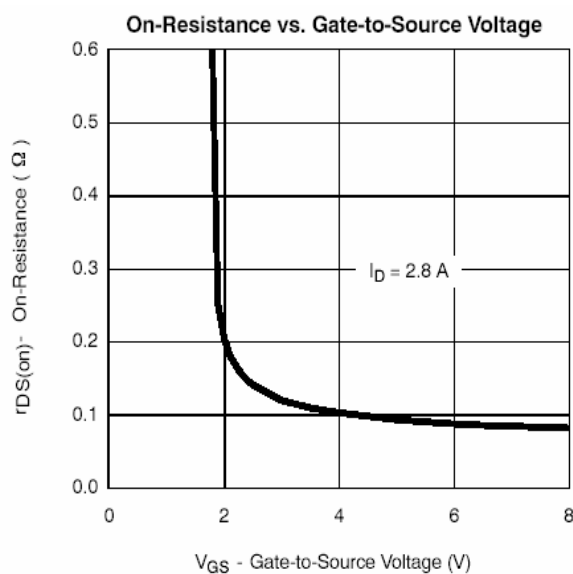
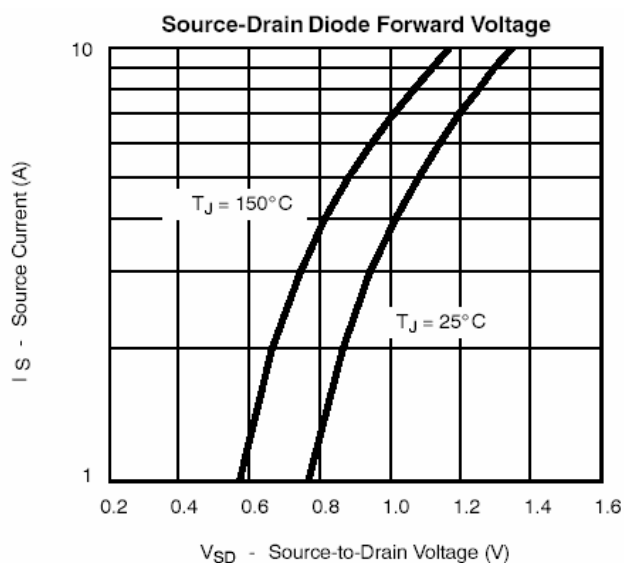
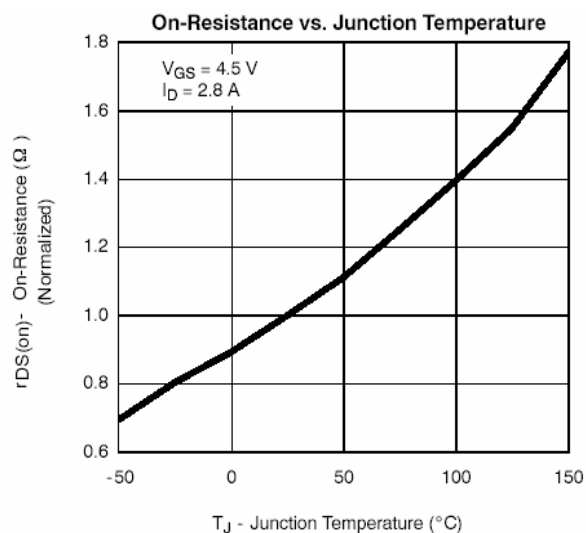
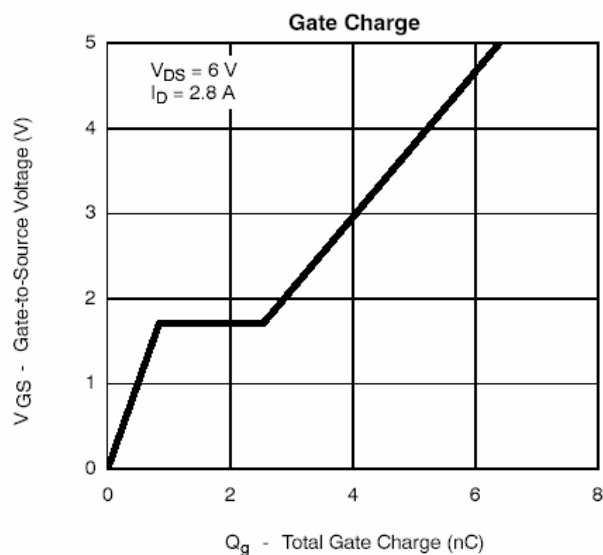




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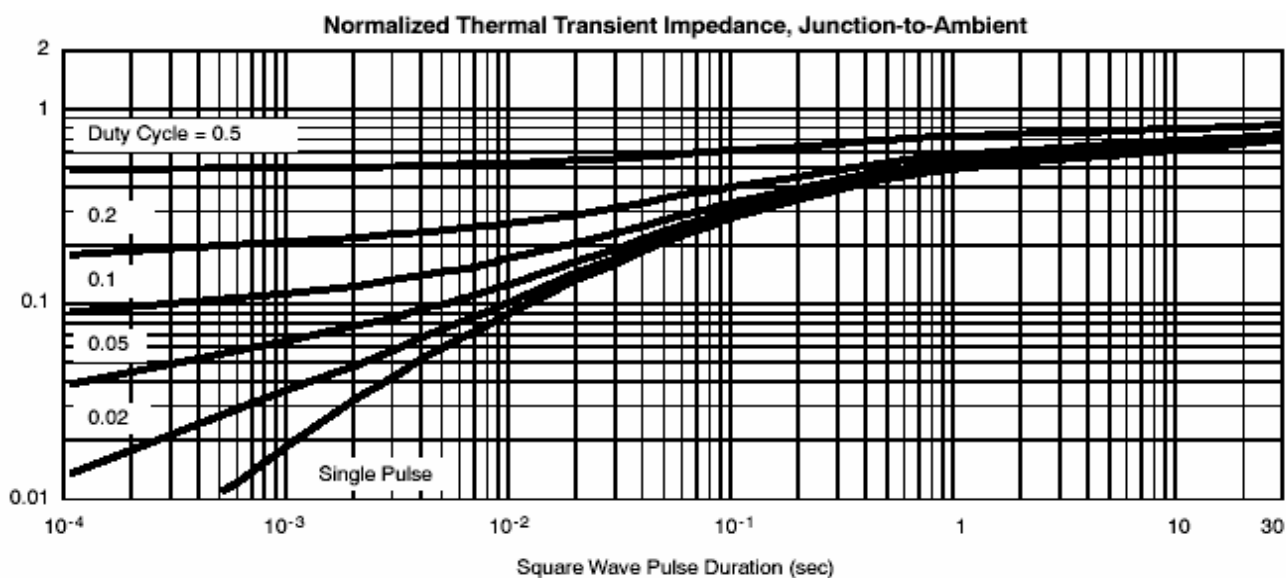
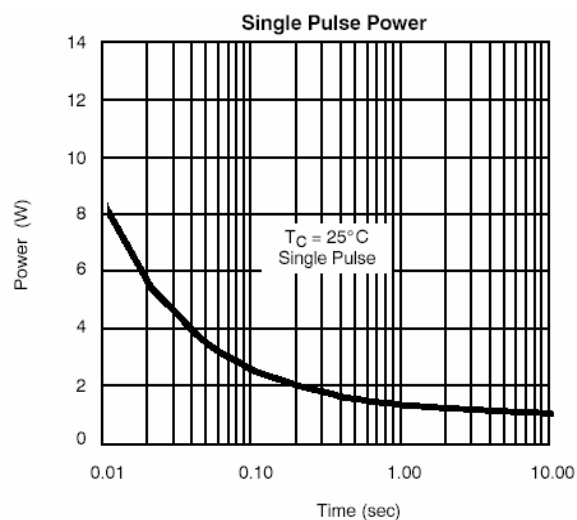
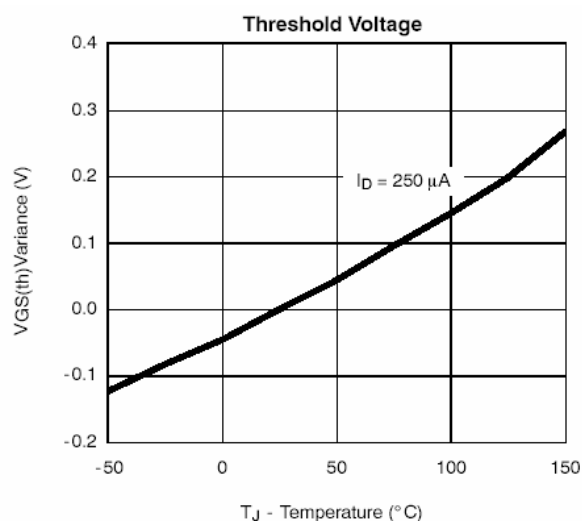




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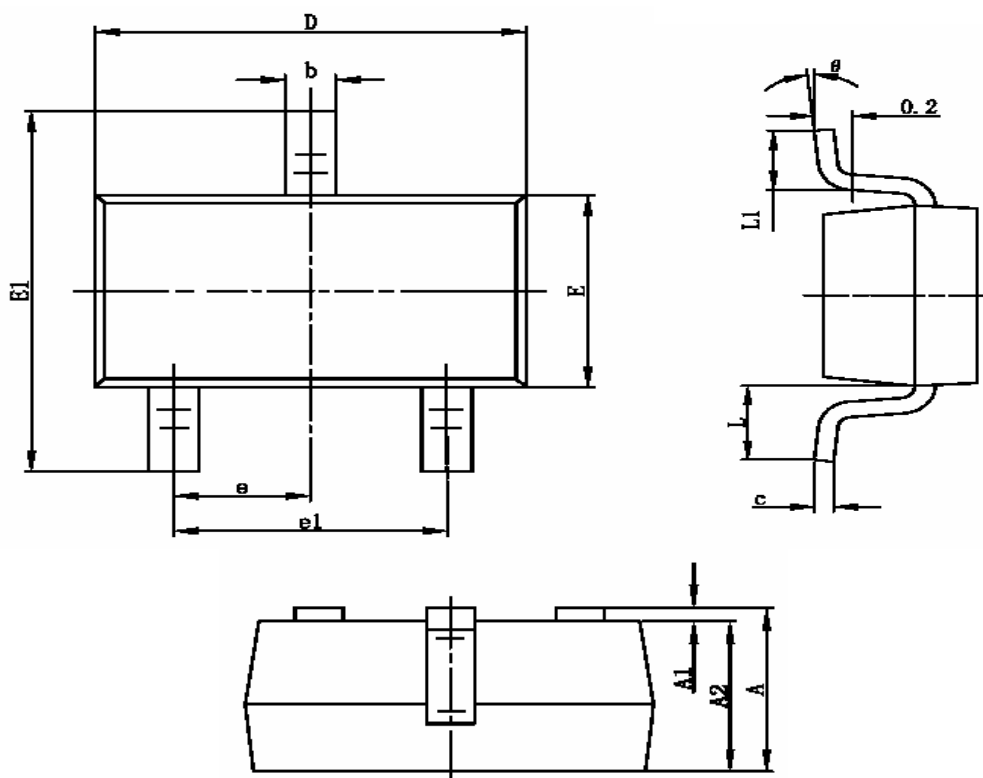




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### SOT-23-3L PACKAGE OUTLINE



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.050                     | 1.250 | 0.041                | 0.049 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 1.050                     | 1.150 | 0.041                | 0.045 |
| b      | 0.300                     | 0.400 | 0.012                | 0.016 |
| c      | 0.100                     | 0.200 | 0.004                | 0.008 |
| D      | 2.820                     | 3.020 | 0.111                | 0.119 |
| E      | 1.500                     | 1.700 | 0.059                | 0.067 |
| E1     | 2.650                     | 2.950 | 0.104                | 0.116 |
| e      | 0.950TYP                  |       | 0.037TYP             |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.700REF                  |       | 0.028REF             |       |
| L1     | 0.300                     | 0.600 | 0.012                | 0.024 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |



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