



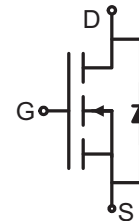
N-Channel Enhancement Mode Power MOSFET

Description

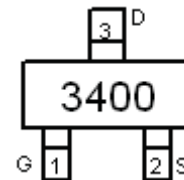
The RM3400 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

- $V_{DS} = 30V, I_D = 5.8A$
 - $R_{DS(ON)} < 59m\Omega @ V_{GS}=2.5V$
 - $R_{DS(ON)} < 45m\Omega @ V_{GS}=4.5V$
 - $R_{DS(ON)} < 41m\Omega @ V_{GS}=10V$
- High power and current handing capability
- Lead free product is acquired
- Surface mount package
- PWM applications
- Load switch
- Power management
- P/N suffix V means AEC-Q101 qualified, e.g:RM3400V
- Halogen-free



Schematic diagram



Marking and pin assignment



SOT-23 top view

Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|--------|----------------|-----------|------------|------------|
| 3400 | RM3400 | SOT-23 | Ø180mm | 8 mm | 3000 units |

Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|--|----------------|------------|------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 12 | V |
| Drain Current-Continuous | I_D | 5.8 | A |
| Drain Current-Pulsed ^(Note 1) | I_{DM} | 30 | A |
| Maximum Power Dissipation | P_D | 1.4 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 150 | $^\circ C$ |

Thermal Characteristic

| | | | |
|---|-----------------|----|--------------|
| Thermal Resistance, Junction-to-Ambient ^(Note 2) | $R_{\theta JA}$ | 89 | $^\circ C/W$ |
|---|-----------------|----|--------------|

Electrical Characteristics ($T_A=25^\circ C$ unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---------------------------------|------------|---------------------------|-----|-----|-----|---------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 30 | 33 | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=30V, V_{GS}=0V$ | - | - | 1 | μA |

| | | | | | | |
|--|--------------|--|-----|-----|-----------|------------|
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 12V, V_{DS}=0V$ | - | - | ± 100 | nA |
| On Characteristics ^(Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 0.7 | 0.9 | 1.4 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=2.5V, I_D=4A$ | - | 45 | 59 | m Ω |
| | | $V_{GS}=4.5V, I_D=5A$ | - | 31 | 45 | m Ω |
| | | $V_{GS}=10V, I_D=5.8A$ | - | 28 | 41 | m Ω |
| Forward Transconductance | g_{FS} | $V_{DS}=5V, I_D=5A$ | 10 | - | - | S |
| Dynamic Characteristics ^(Note4) | | | | | | |
| Input Capacitance | C_{ISS} | $V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$ | - | 820 | - | PF |
| Output Capacitance | C_{OSS} | | - | 99 | - | PF |
| Reverse Transfer Capacitance | C_{RSS} | | - | 77 | - | PF |
| Switching Characteristics ^(Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=15V, R_L=2.7\Omega$ $V_{GS}=10V, R_{GEN}=3\Omega$ | - | 3.3 | - | nS |
| Turn-on Rise Time | t_r | | - | 4.8 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 26 | - | nS |
| Turn-Off Fall Time | t_f | | - | 4 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=15V, I_D=5.8A,$ $V_{GS}=4.5V$ | - | 9.5 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 1.5 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 3 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage ^(Note 3) | V_{SD} | $V_{GS}=0V, I_S=5.8A$ | - | - | 1.2 | V |
| Diode Forward Current ^(Note 2) | I_S | | - | - | 5.8 | A |

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

RATING AND CHARACTERISTICS CURVES (RM3400)

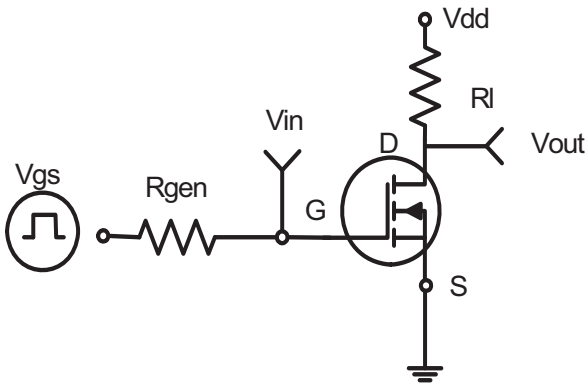


Figure 1: Switching Test Circuit

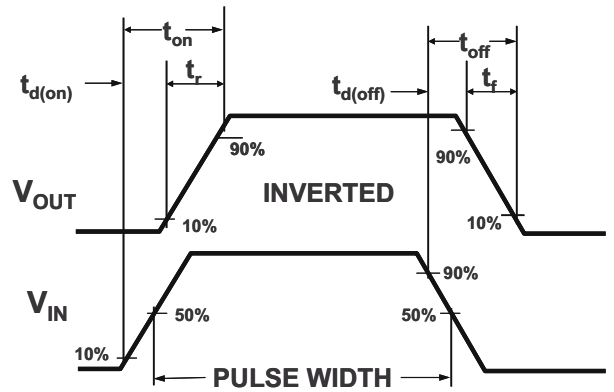


Figure 2: Switching Waveforms

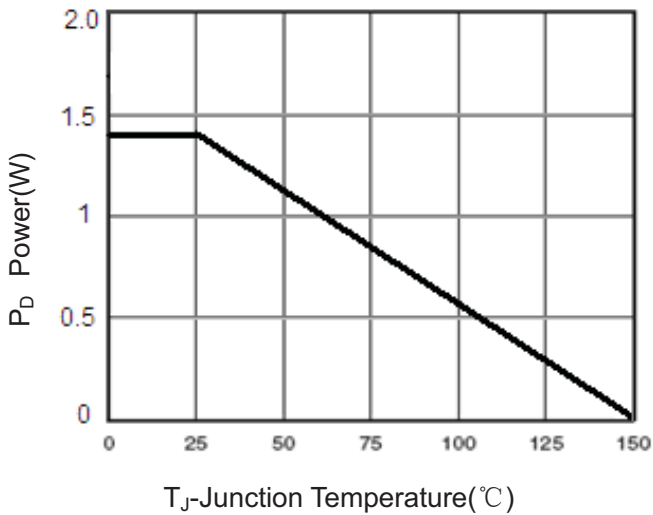


Figure 3 Power Dissipation

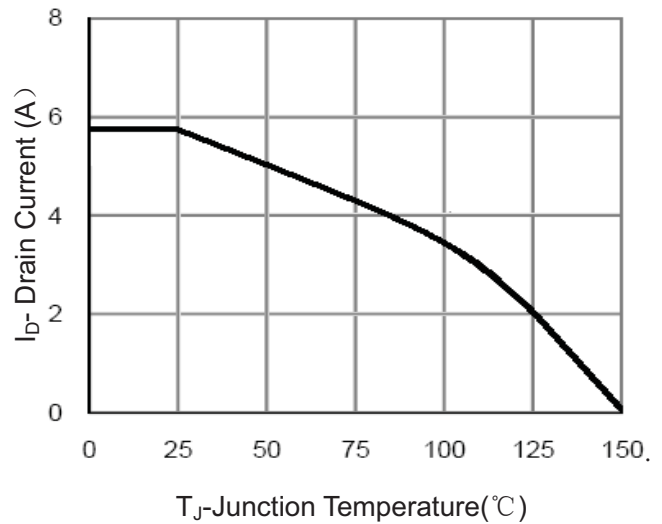


Figure 4 Drain Current

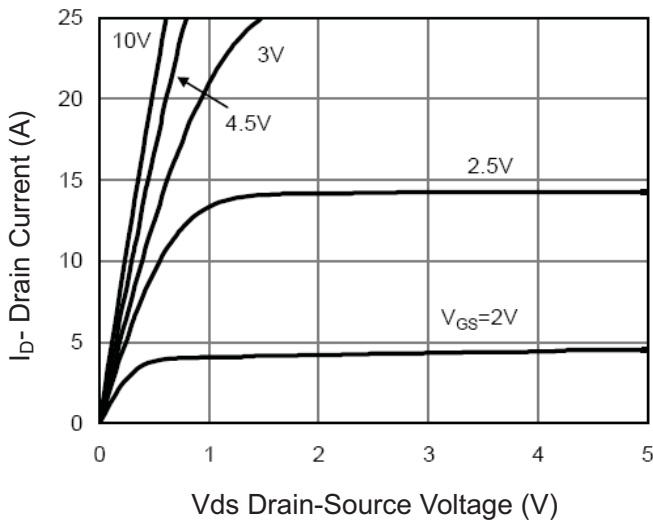


Figure 5 Output Characteristics

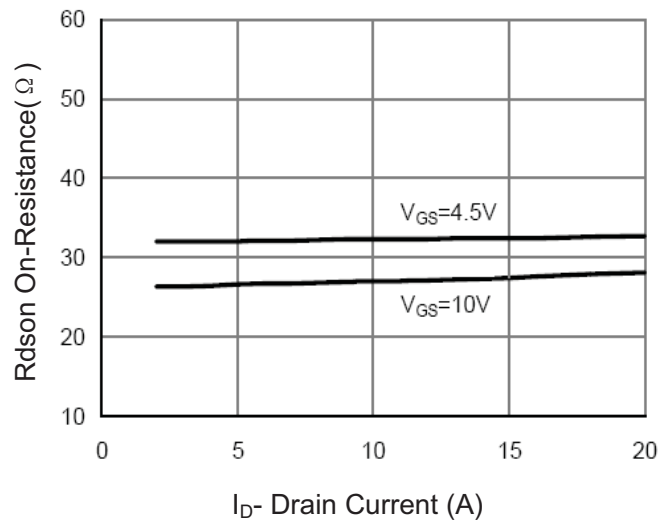


Figure 6 Drain-Source On-Resistance

RATING AND CHARACTERISTICS CURVES (RM3400)

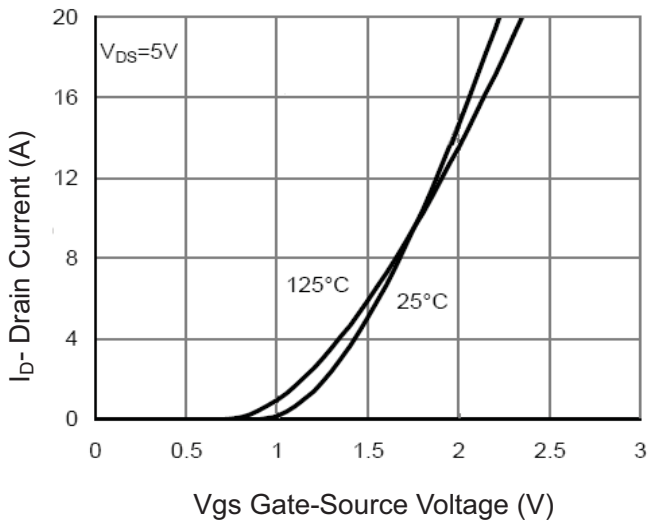


Figure 7 Transfer Characteristics

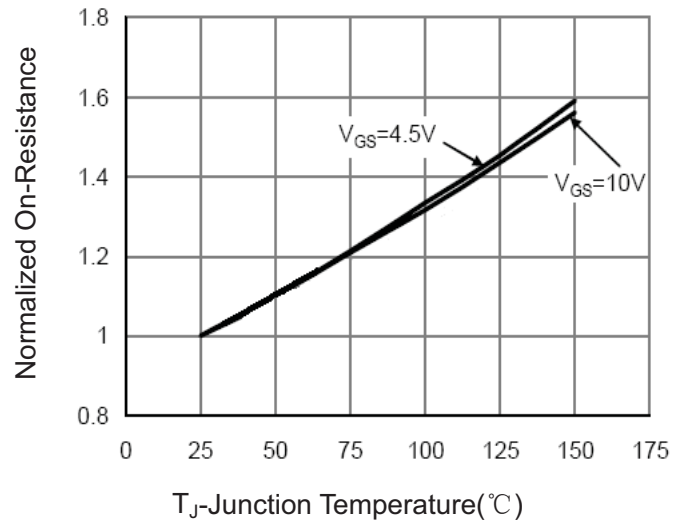


Figure 8 Drain-Source On-Resistance

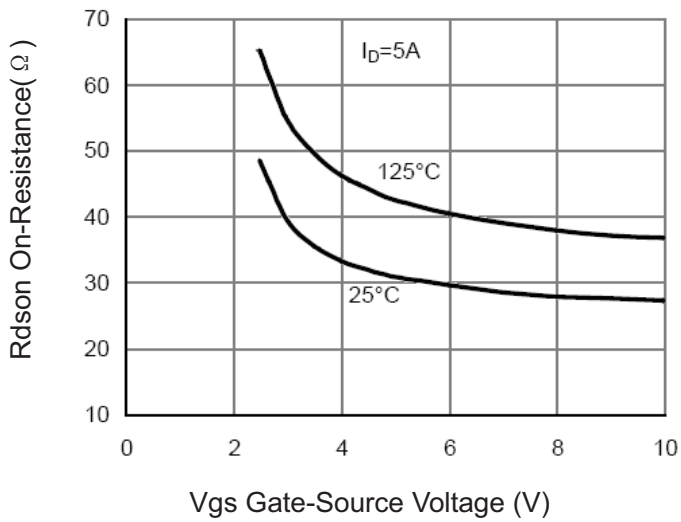


Figure 9 Rdson vs Vgs

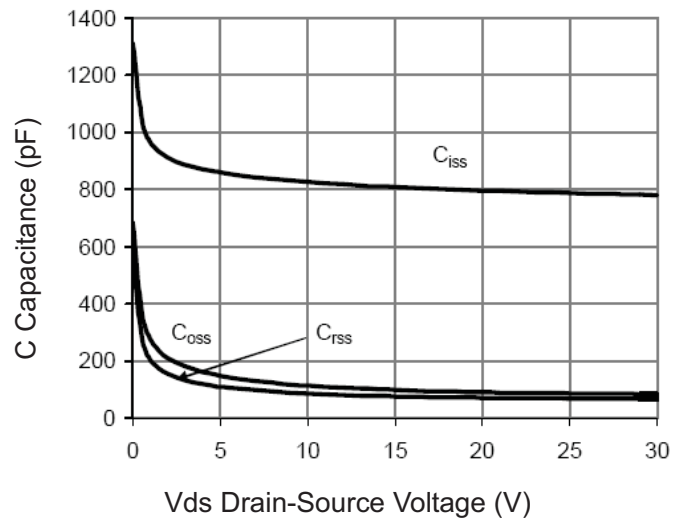


Figure 10 Capacitance vs Vds

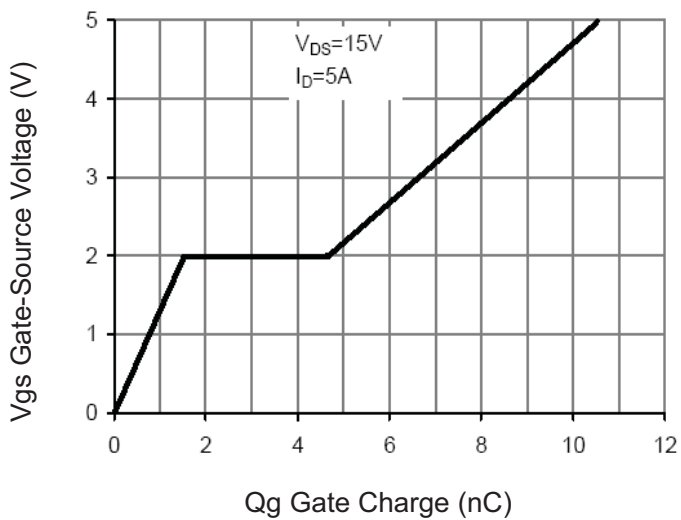


Figure 11 Gate Charge

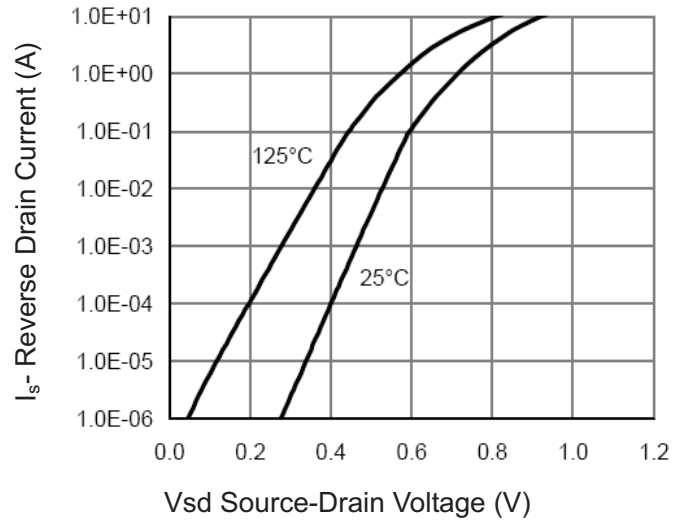


Figure 12 Source- Drain Diode Forward

RATING AND CHARACTERISTICS CURVES (RM3400)

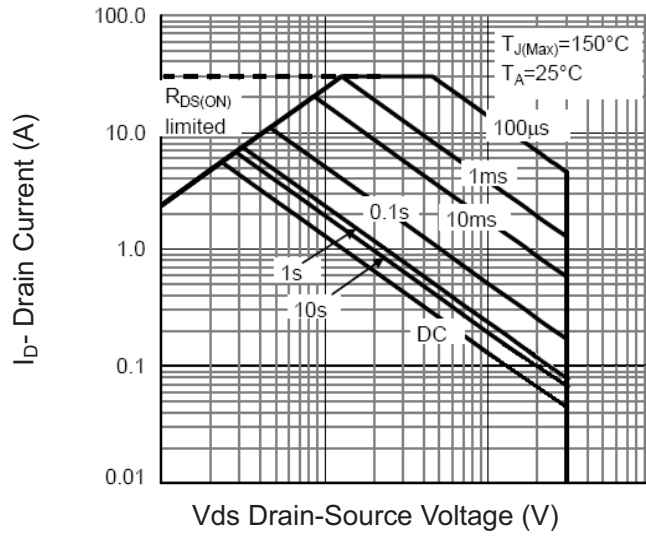


Figure 13 Safe Operation Area

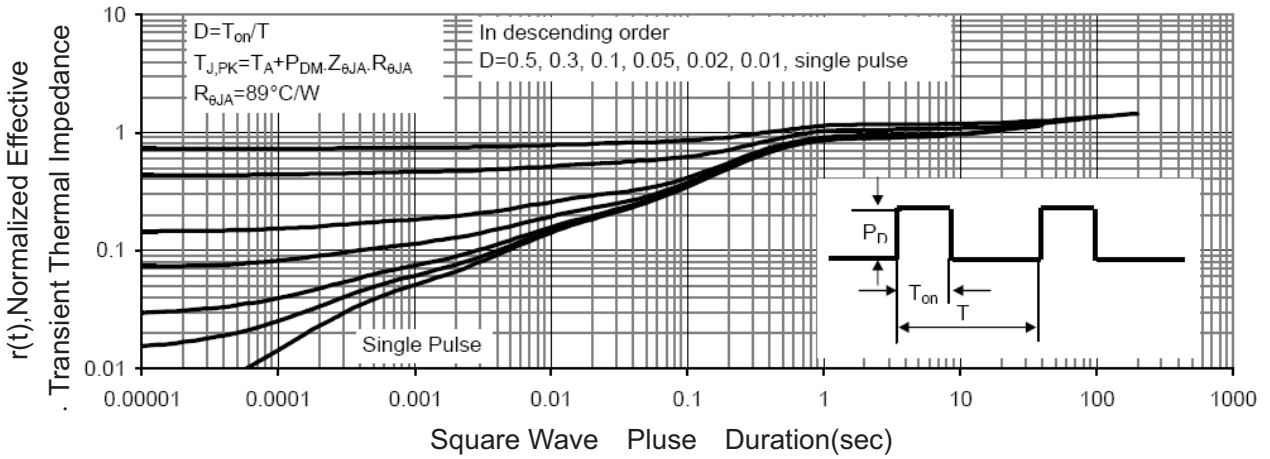
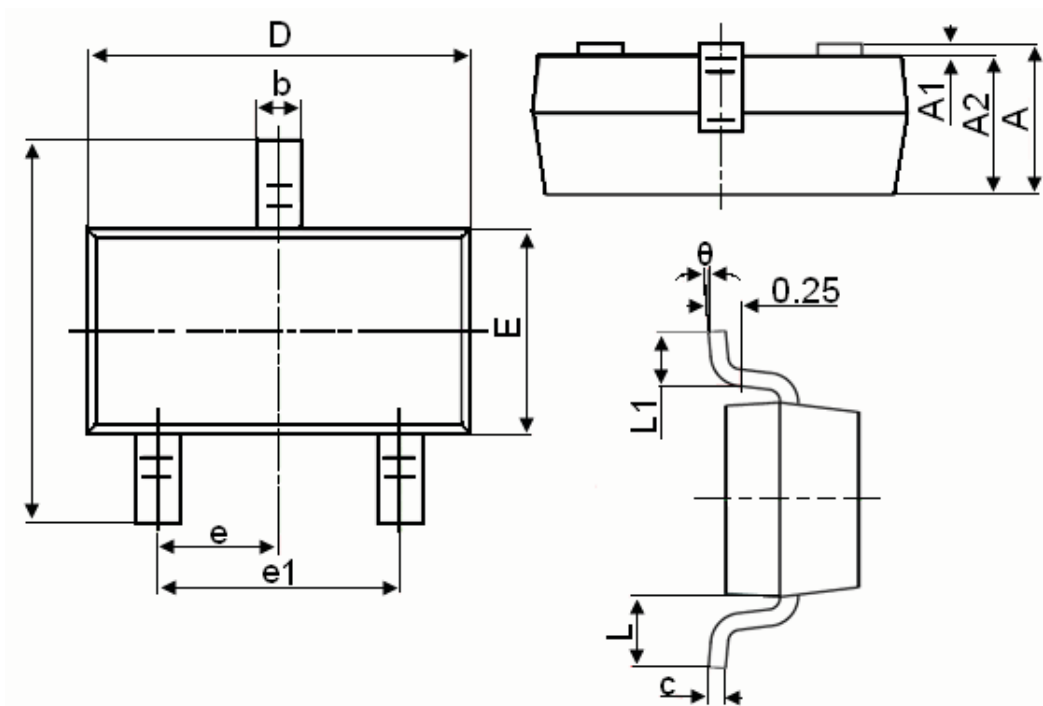


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT-23 Package Information



| Symbol | Dimensions in Millimeters | |
|--------|---------------------------|-------|
| | MIN. | MAX. |
| A | 0.900 | 1.150 |
| A1 | 0.000 | 0.100 |
| A2 | 0.900 | 1.050 |
| b | 0.300 | 0.500 |
| c | 0.080 | 0.150 |
| D | 2.800 | 3.000 |
| E | 1.200 | 1.400 |
| E1 | 2.250 | 2.550 |
| e | 0.950TYP | |
| e1 | 1.800 | 2.000 |
| L | 0.550REF | |
| L1 | 0.300 | 0.500 |
| θ | 0° | 8° |

Notes

1. All dimensions are in millimeters.
2. Tolerance $\pm 0.10\text{mm}$ (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

| Package | Tube (pcs/tube) | Tube (pcs/inner box) | Tube (pcs/cartoon) | Tape&Reel (pcs/reel) | Tape&Reel (pcs/inner box) | Tape&Reel (pcs/cartoon) |
|---------------|--------------------|-------------------------|-----------------------|-------------------------|------------------------------|----------------------------|
| SOP-8(DFN) | 100 | 10,000 | 100,000 | 2,500 | 5,000 | 40,000 |
| TSSOP-8 | 100 | 32,000 | 128,000 | 3,000 | 6,000 | 48,000 |
| SOT-23-3L | --- | --- | --- | 3,000 | 30,000 | 120,000 |
| SOT-23-6L | --- | --- | --- | 3,000 | 30,000 | 120,000 |
| SOT-23(6R) | --- | --- | --- | 3,000 | 30,000 | 120,000 |
| SOT-363 | --- | --- | --- | 3,000 | 30,000 | 120,000 |
| SOT-523 | --- | --- | --- | 3,000 | 30,000 | 120,000 |
| TO-220 | 50 | 1,000 | 5,000 | --- | --- | --- |
| TO-220F | 50 | 1,000 | 10,000 | --- | --- | --- |
| TO-247 | 30 | 300 | 1,200 | --- | --- | --- |
| TO-251 | 80 | 4,000 | 40,000 | --- | --- | --- |
| TO-251S(4R) | 80 | 4,000 | 40,000 | --- | --- | --- |
| TO-252-2L(4R) | 80 | 4,000 | 40,000 | 2,500 | 2,500 | 25,000 |
| TO-263-2L | 50 | 1,000 | 10,000 | 800 | 800 | 8,000 |
| TO-3P | 30 | 300 | 3,000 | --- | --- | --- |
| TO-92 | --- | --- | --- | 1,000(袋装) | 10,000 | 100,000 |

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