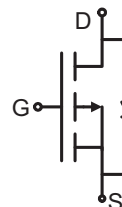


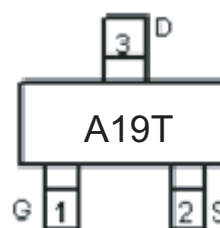
P-Channel Enhancement Mode Power MOSFET

Description

The RM3401 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 load switch or in PWM applications.



Schematic diagram



Marking and pin Assignment



SOT-23 top view

General Features

- $V_{DS} = -30V, I_D = -4.2A$
 $R_{DS(ON)} < 130m\Omega @ V_{GS} = -2.5V$
 $R_{DS(ON)} < 75m\Omega @ V_{GS} = -4.5V$
 $R_{DS(ON)} < 55m\Omega @ V_{GS} = -10V$
- High power and current handling capability
- Lead free product is acquired
- Surface mount package

Application

- PWM applications
- Load switch
- Power management
- P/N suffix V means AEC-Q101 qualified, e.g:RM3401V
- Halogen-free

Package Marking And Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|--------|----------------|-----------|------------|------------|
| A19T | RM3401 | 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 | -4.2 | A |
| Drain Current-Pulsed ^(Note 1) | I_{DM} | -30 | A |
| Maximum Power Dissipation | P_D | 1.2 | 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) | $R_{\theta JA}$ | 104 | $^\circ C/W$ |
|-------------------------------------------------------------|-----------------|-----|--------------|

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 | | - | V |

| | | | | | | |
|-------------------------------------------|--------------|------------------------------------------------------------|------|-----|-----------|------------|
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=-24V, V_{GS}=0V$ | - | - | -1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 10V, V_{DS}=0V$ | - | - | ± 100 | nA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -0.7 | -1 | -1.3 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=-10V, I_D=-4.2A$ | - | 47 | 55 | m Ω |
| | | $V_{GS}=-4.5V, I_D=-4A$ | - | 56 | 75 | m Ω |
| | | $V_{GS}=-2.5V, I_D=-1A$ | | 72 | 130 | m Ω |
| Forward Transconductance | g_{FS} | $V_{DS}=-5V, I_D=-4.2A$ | - | 10 | - | S |
| Dynamic Characteristics (Note4) | | | | | | |
| Input Capacitance | C_{ISS} | $V_{DS}=-15V, V_{GS}=0V,$ $F=1.0MHz$ | - | 880 | - | PF |
| Output Capacitance | C_{OSS} | | - | 105 | - | PF |
| Reverse Transfer Capacitance | C_{RSS} | | - | 65 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=-15V, I_D=-4.2A$ $V_{GS}=-10V, R_{GEN}=6\Omega$ | - | 7 | - | nS |
| Turn-on Rise Time | t_r | | - | 3 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 30 | - | nS |
| Turn-Off Fall Time | t_f | | - | 12 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=-15V, I_D=-4.2A, V_{GS}=-4.5V$ | - | 8.5 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 1.8 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 2.7 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V_{SD} | $V_{GS}=0V, I_S=-4.2A$ | - | - | -1.2 | V |

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 (RM3401)

Typical Electrical and Thermal Characteristics

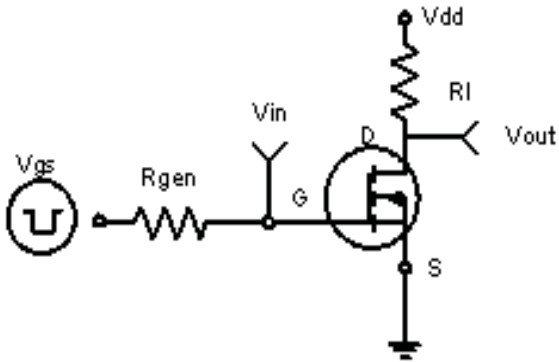


Figure 1: Switching Test Circuit

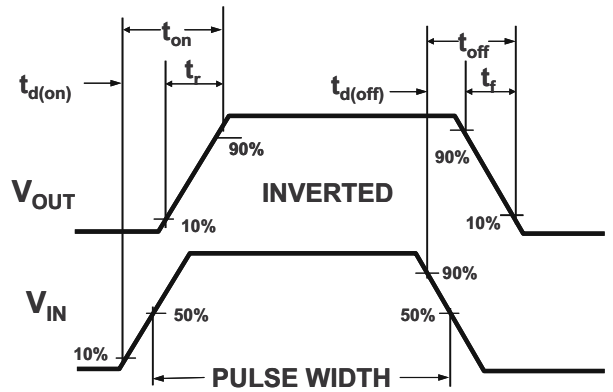


Figure 2: Switching Waveforms

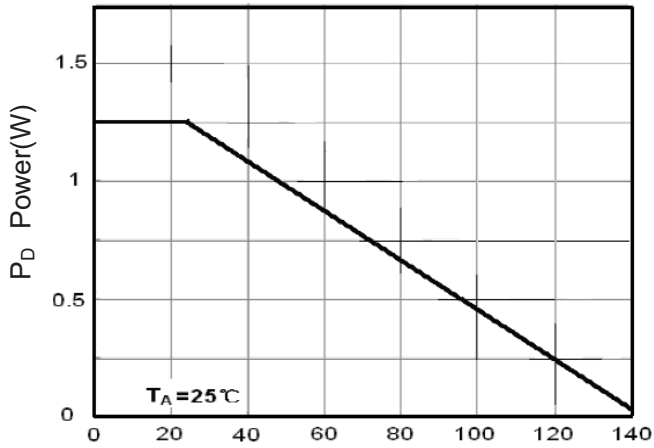


Figure 3 Power Dissipation

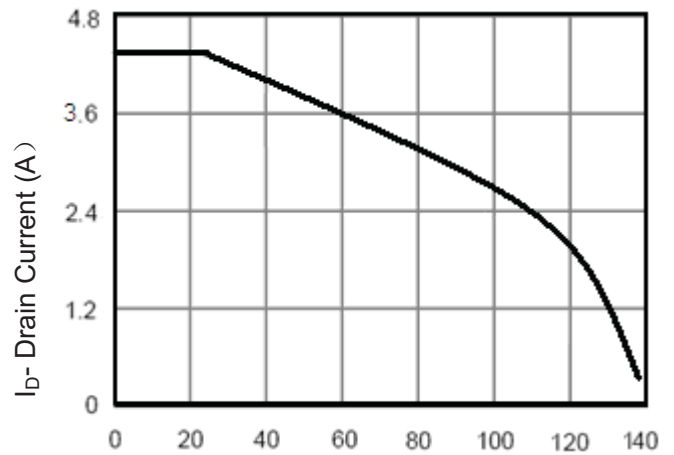


Figure 4 Drain Current

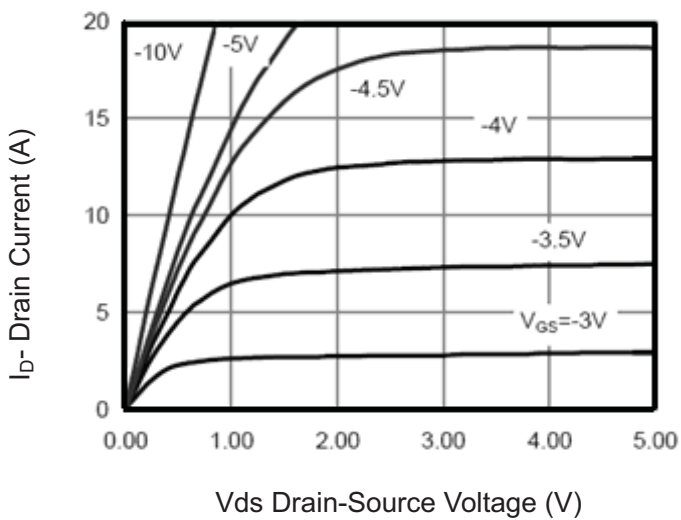


Figure 5 Output Characteristics

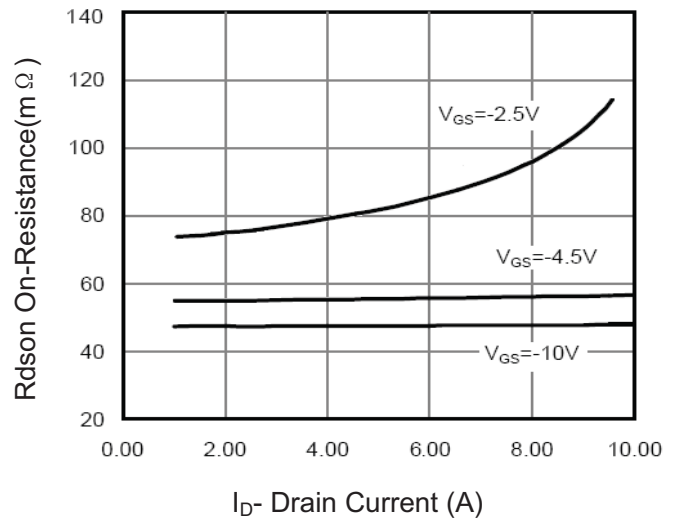
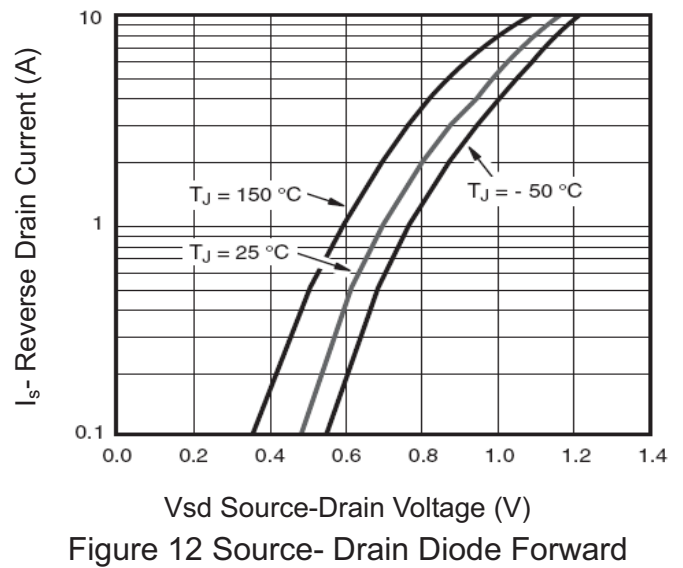
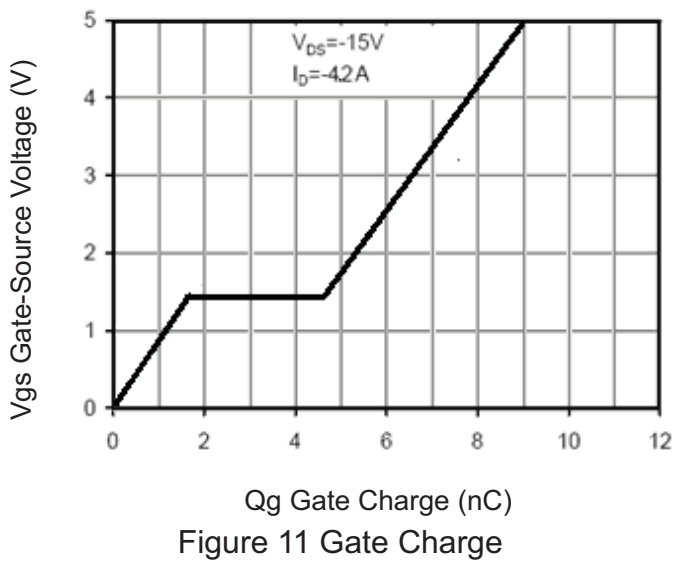
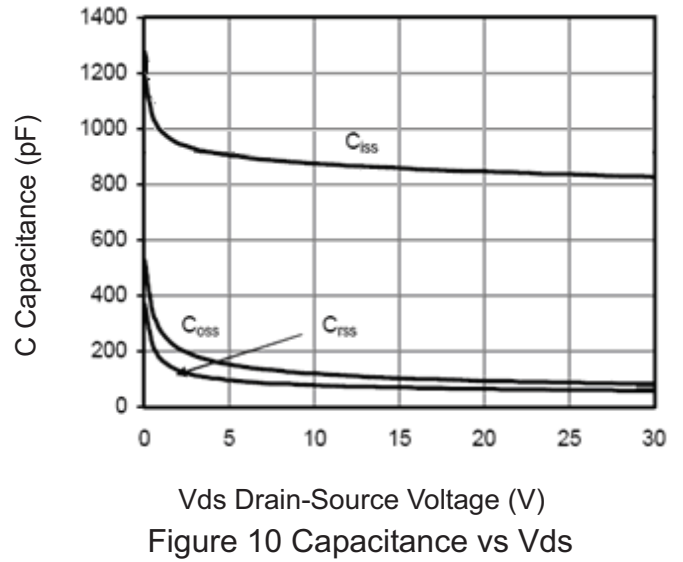
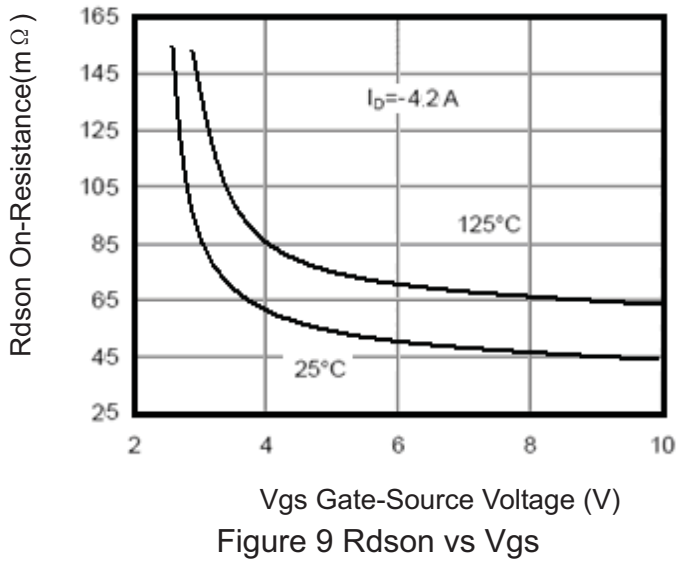
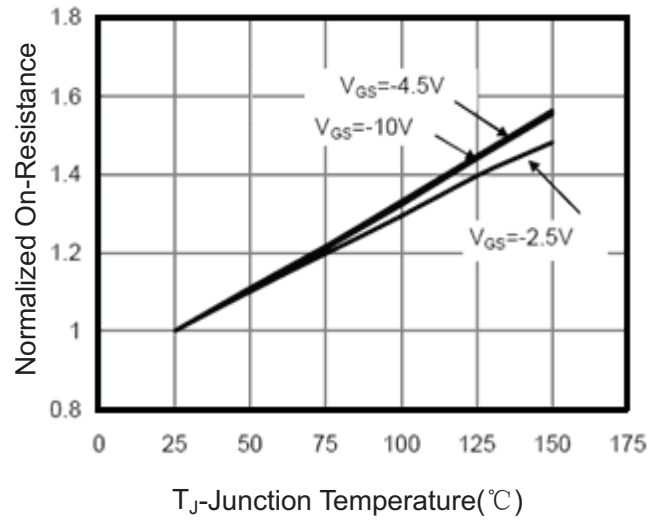
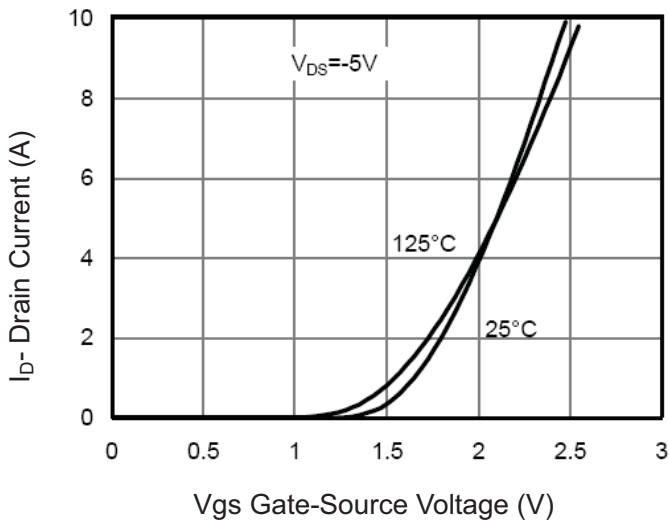
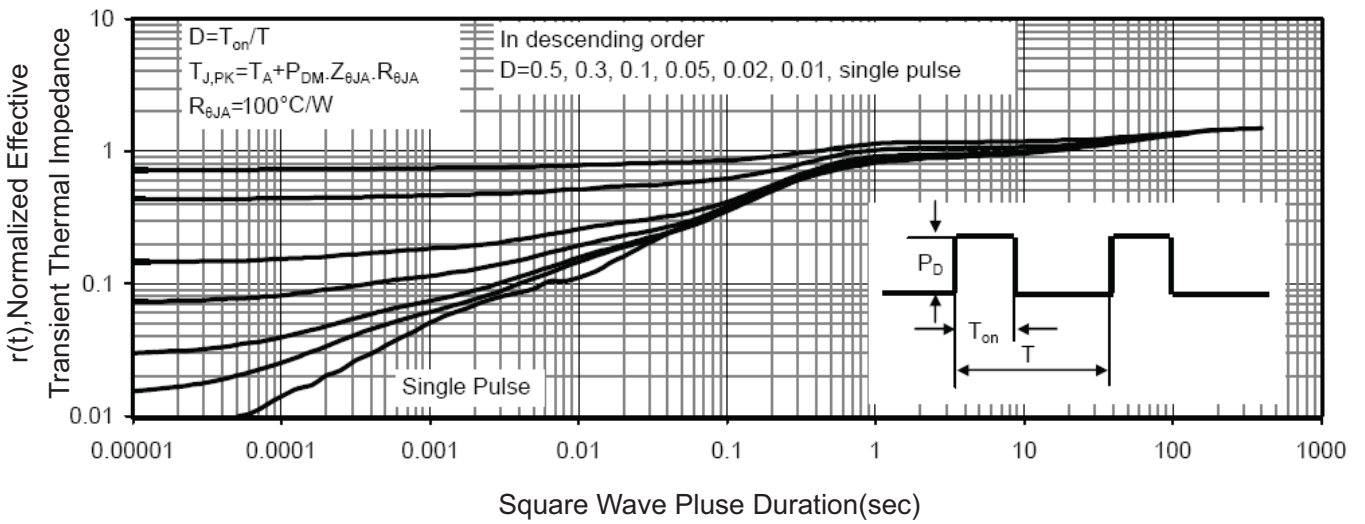
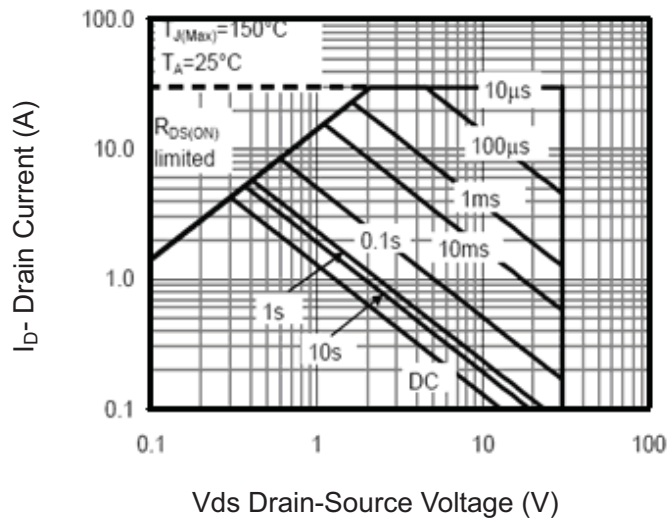


Figure 6 Drain-Source On-Resistance

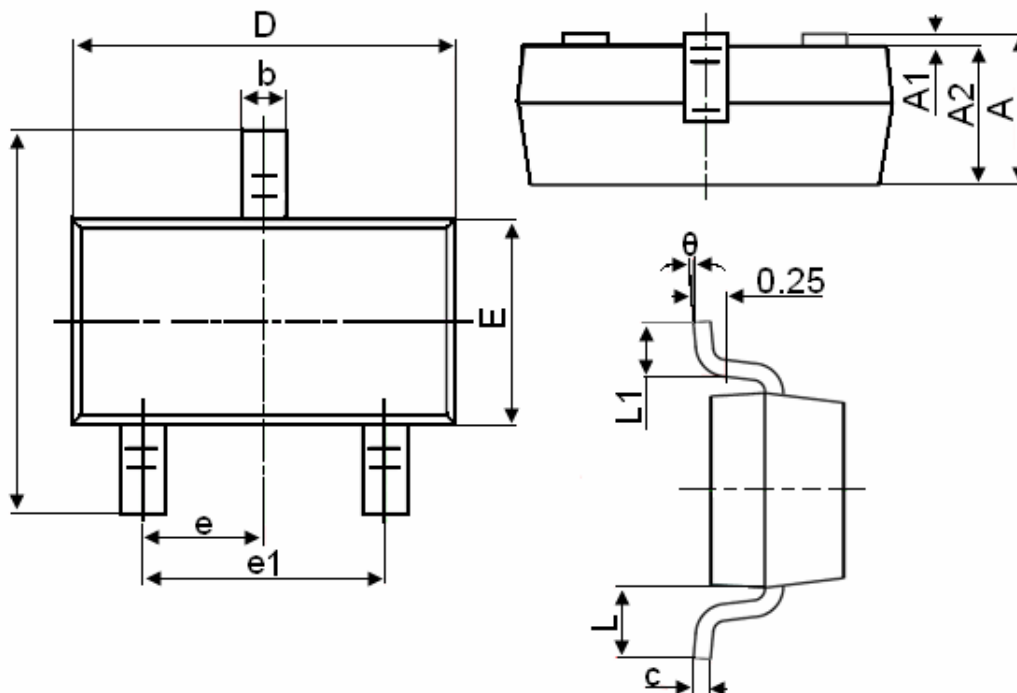
RATING AND CHARACTERISTICS CURVES (RM3401V)



RATING AND CHARACTERISTICS CURVES (RM3401V)



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) |
|---------------|--------------------|-------------------------|-----------------------|-------------------------|------------------------------|----------------------------|
| DFN | 100 | 10,000 | 100,000 | 2,500 | 5,000 | 40,000 |
| SOP-8 | 100 | 10,000 | 100,000 | 4,000 | 4,000 | 20,000 |
| 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 |
| SOT223 | — | — | — | 2,500 | 2,500 | 20,000 |
| 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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