

Absolute Maximum Ratings

| Symbol | Parameter | Rating | Unit | |
|---|--|-----------------------|------|---|
| Common Ratings (T_A = 25°C) | | | | |
| V _{DSS} | Drain-Source Voltage | -30 | V | |
| V _{GSS} | Gate-Source Voltage | ±25 | | |
| T _J | Maximum Junction Temperature | 150 | °C | |
| T _{STG} | Storage Temperature Range | -55 to 150 | °C | |
| I _S | Diode Continuous Forward Current | -2.5 | A | |
| Mounted on Large Heat Sink | | | | |
| I _{DP} | 300µs Pulse Drain Current Tested | T _C =25°C | -20 | A |
| | | T _C =100°C | -10 | |
| I _D | Continuous Drain Current | T _C =25°C | -8 | A |
| | | T _C =100°C | -4 | |
| P _D | Maximum Power Dissipation | T _C =25°C | 50 | W |
| | | T _C =100°C | 20 | |
| R _{θJC} | Thermal Resistance-Junction to Case | 2.5 | °C/W | |
| Mounted on PCB of 1in² Pad Area | | | | |
| I _{DP} | 300µs Pulse Drain Current Tested | T _A =25°C | -20 | A |
| | | T _A =100°C | -10 | |
| I _D | Continuous Drain Current | T _A =25°C | -4 | A |
| | | T _A =100°C | -2 | |
| P _D | Maximum Power Dissipation | T _A =25°C | 2.5 | W |
| | | T _A =100°C | 1 | |
| R _{θJA} | Thermal Resistance-Junction to Ambient | 50 | °C/W | |
| Mounted on PCB of Minimum Footprint | | | | |
| I _{DP} | 300µs Pulse Drain Current Tested | T _A =25°C | -20 | A |
| | | T _A =100°C | -10 | |
| I _D | Continuous Drain Current | T _A =25°C | -3 | A |
| | | T _A =100°C | -2 | |
| P _D | Maximum Power Dissipation | T _A =25°C | 1.6 | W |
| | | T _A =100°C | 0.6 | |
| R _{θJA} | Thermal Resistance-Junction to Ambient | 75 | °C/W | |

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

| Symbol | Parameter | Test Condition | APM3095PU | | | Unit |
|--|----------------------------------|--|-----------|------|-----------|------------|
| | | | Min. | Typ. | Max. | |
| Static Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_{DS}=-250\mu A$ | -30 | | | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=-24V, V_{GS}=0V$ | | | -1 | μA |
| | | $T_J=85^\circ C$ | | | -30 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_{DS}=-250\mu A$ | -1 | -1.5 | -2 | V |
| I_{GSS} | Gate Leakage Current | $V_{GS}=\pm 25V, V_{DS}=0V$ | | | ± 100 | nA |
| $R_{DS(ON)}^a$ | Drain-Source On-state Resistance | $V_{GS}=-10V, I_{DS}=-6A$ | | 95 | 110 | m Ω |
| | | $V_{GS}=-4.5V, I_{DS}=-3A$ | | 140 | 160 | |
| Diode Characteristics | | | | | | |
| V_{SD}^a | Diode Forward Voltage | $I_{SD}=-2.5A, V_{GS}=0V$ | | -0.7 | -1.3 | V |
| Dynamic Characteristics^b | | | | | | |
| R_G | Gate Resistance | $V_{GS}=0V, V_{DS}=0V, F=1MHz$ | | 13 | | Ω |
| C_{iss} | Input Capacitance | $V_{GS}=0V,$ $V_{DS}=-25V,$ Frequency=1.0MHz | | 550 | | pF |
| C_{oss} | Output Capacitance | | | 120 | | pF |
| C_{riss} | Reverse Transfer Capacitance | | | 75 | | pF |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}=-15V, R_L=15\Omega,$ $I_{DS}=-1A, V_{GEN}=-10V,$ $R_G=6\Omega$ | | 10 | 20 | ns |
| T_r | Turn-on Rise Time | | | 8 | 20 | ns |
| $t_{d(OFF)}$ | Turn-off Delay Time | | | 25 | 50 | ns |
| T_f | Turn-off Fall Time | | | 5 | 15 | ns |
| Gate Charge Characteristics^b | | | | | | |
| Q_g | Total Gate Charge | $V_{DS}=-15V, V_{GS}=-10V,$ $I_{DS}=-6A$ | | 10 | 13 | nC |
| Q_{gs} | Gate-Source Charge | | | 2 | | nC |
| Q_{gd} | Gate-Drain Charge | | | 1.2 | | nC |

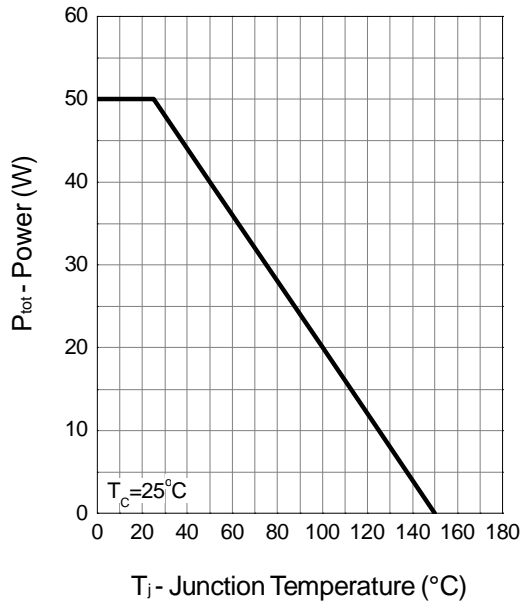
Notes:

a : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

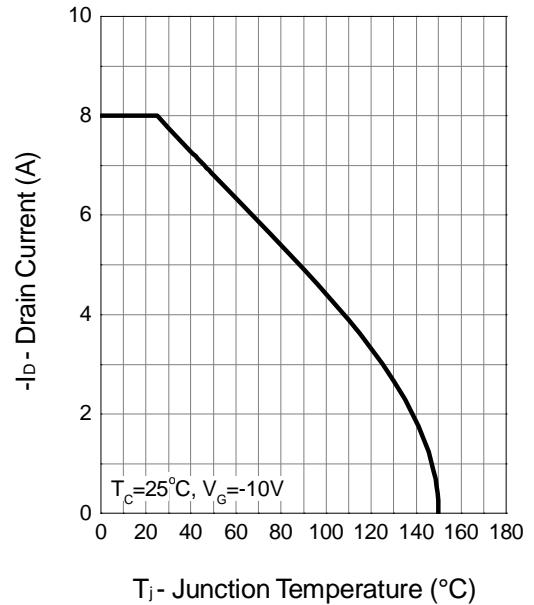
b : Guaranteed by design, not subject to production testing.

Typical Characteristics

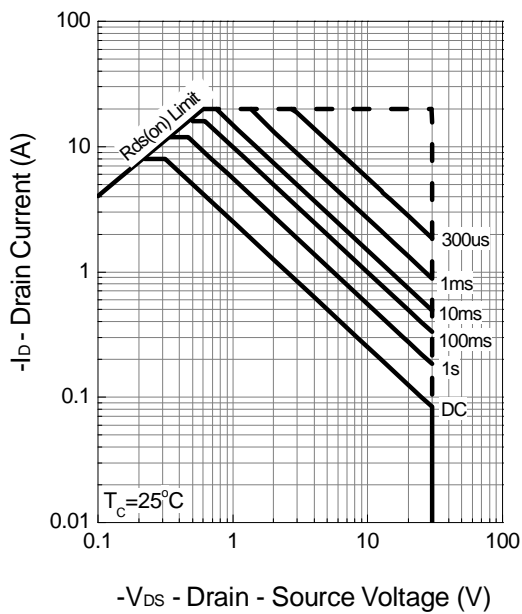
Power Dissipation



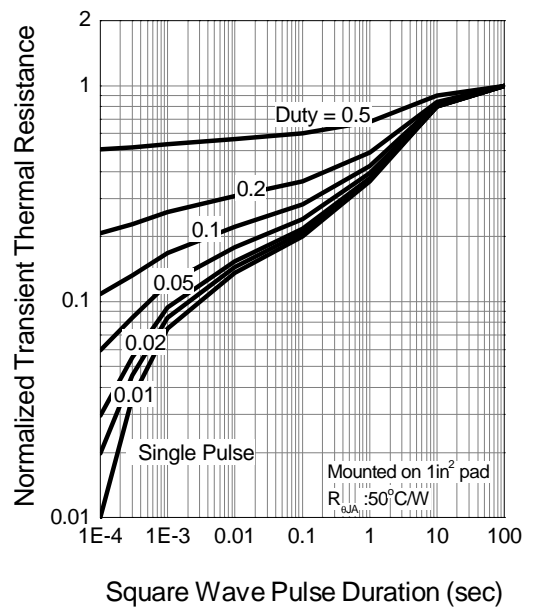
Drain Current



Safe Operation Area

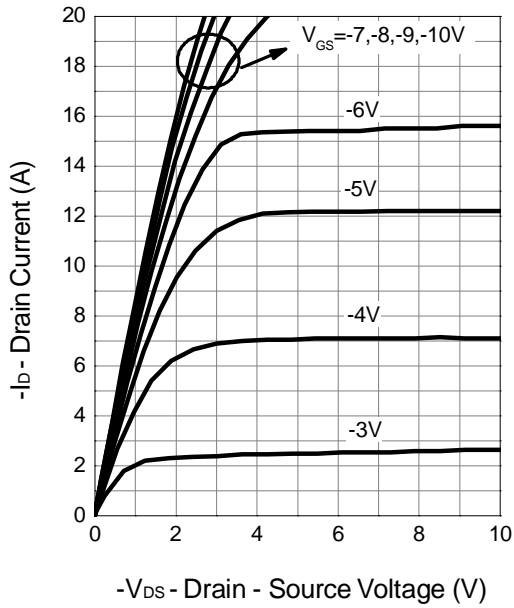


Thermal Transient Impedance

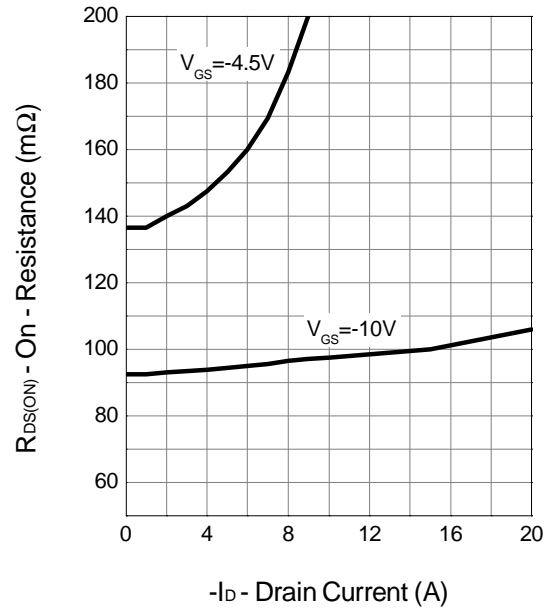


Typical Characteristics (Cont.)

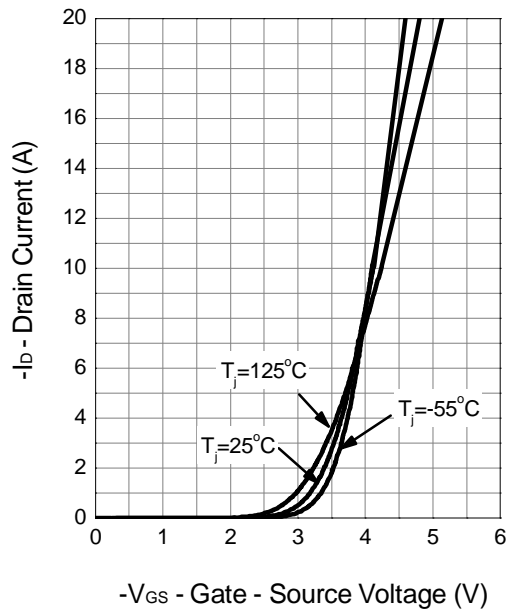
Output Characteristics



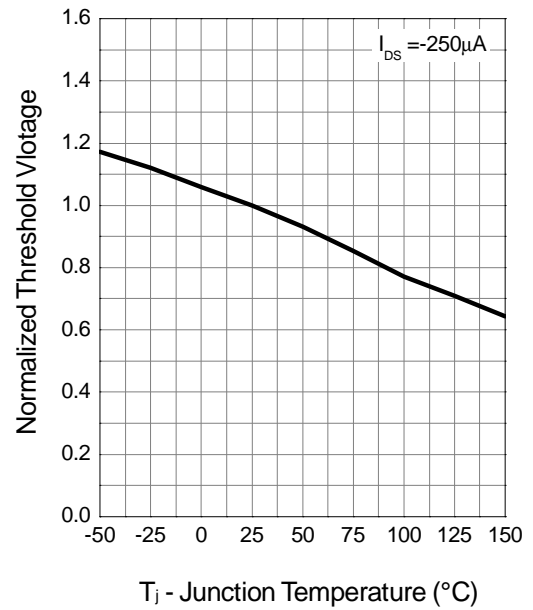
Drain-Source On Resistance



Transfer Characteristics

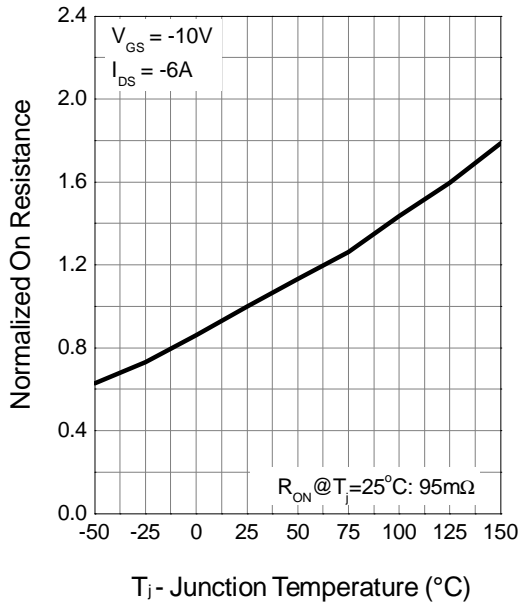


Gate Threshold Voltage

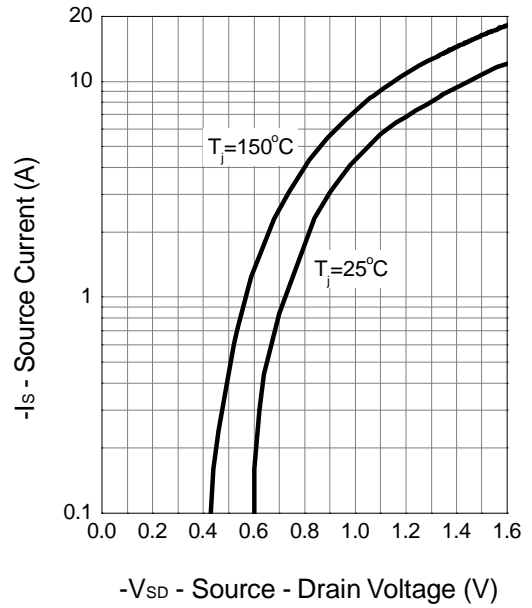


Typical Characteristics (Cont.)

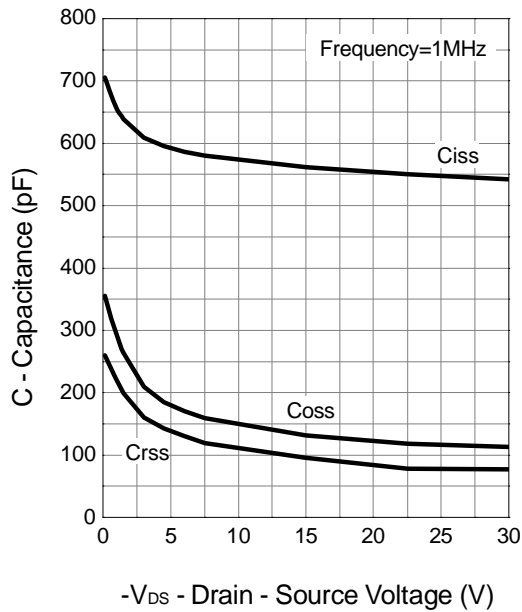
Drain-Source On Resistance



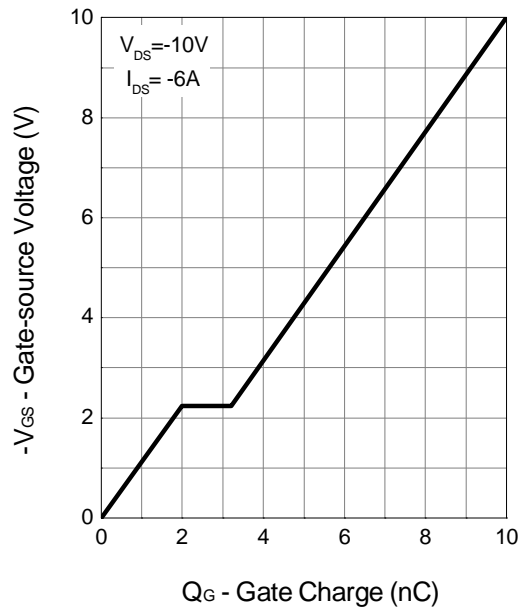
Source-Drain Diode Forward



Capacitance

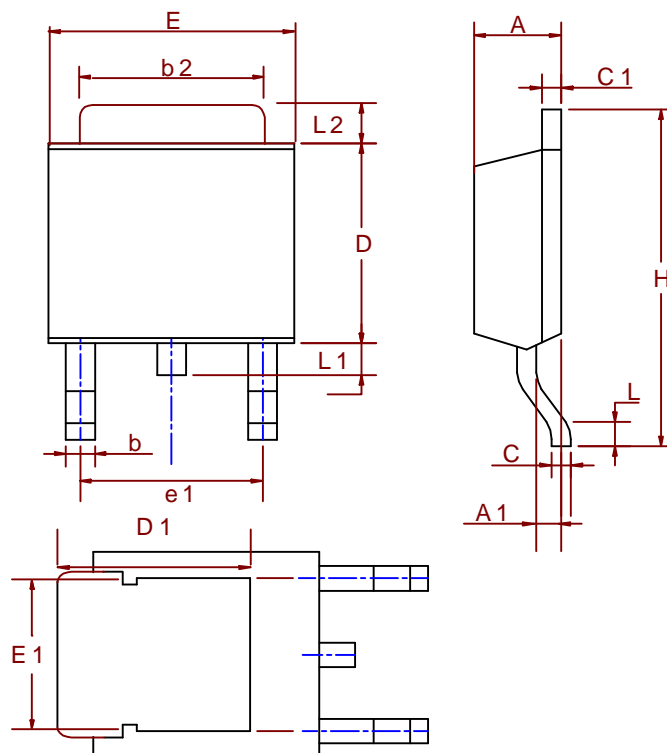


Gate Charge



Package Information

TO-252 (Reference JEDEC Registration TO-252)

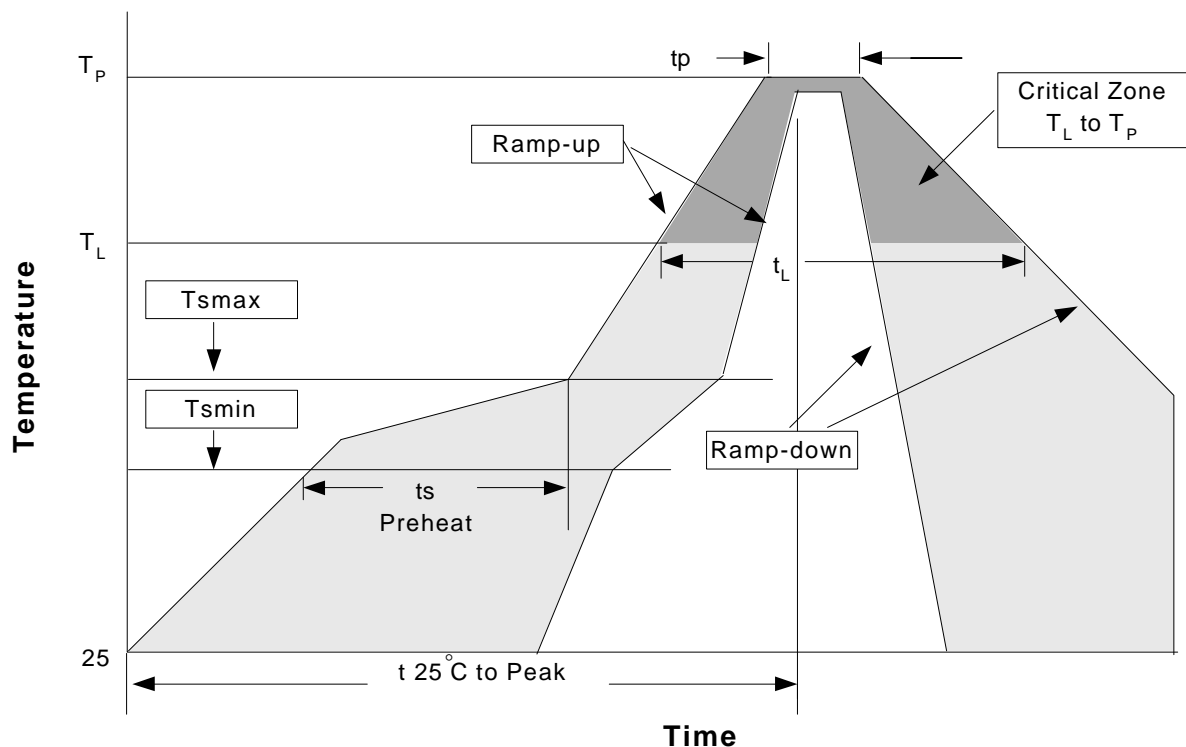


| Dim | Millimeters | | Inches | |
|-----|-------------|-------|-----------|-------|
| | Min. | Max. | Min. | Max. |
| A | 2.18 | 2.39 | 0.086 | 0.094 |
| A1 | 0.89 | 1.27 | 0.035 | 0.050 |
| b | 0.508 | 0.89 | 0.020 | 0.035 |
| b2 | 5.207 | 5.461 | 0.205 | 0.215 |
| C | 0.46 | 0.58 | 0.018 | 0.023 |
| C1 | 0.46 | 0.58 | 0.018 | 0.023 |
| D | 5.334 | 6.22 | 0.210 | 0.245 |
| D1 | 5.2 REF | | 0.205 REF | |
| E | 6.35 | 6.73 | 0.250 | 0.265 |
| E1 | 5.3 REF | | 0.209 REF | |
| e1 | 3.96 | 5.18 | 0.156 | 0.204 |
| H | 9.398 | 10.41 | 0.370 | 0.410 |
| L | 0.51 | | 0.020 | |
| L1 | 0.64 | 1.02 | 0.025 | 0.040 |
| L2 | 0.89 | 2.032 | 0.035 | 0.080 |

Physical Specifications

| | |
|--------------------|--|
| Terminal Material | Solder-Plated Copper (Solder Material : 90/10 or 63/37 SnPb), 100%Sn |
| Lead Solderability | Meets EIA Specification RSI86-91, ANSI/J-STD-002 Category 3. |

Reflow Condition (IR/Convection or VPR Reflow)



Classification Reflow Profiles

| Profile Feature | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|--|----------------------------------|----------------------------------|
| Average ramp-up rate (T_L to T_P) | 3°C/second max. | 3°C/second max. |
| Preheat <ul style="list-style-type: none"> - Temperature Min (T_{smin}) - Temperature Max (T_{smax}) - Time (min to max) (t_s) | 100°C 150°C 60-120 seconds | 150°C 200°C 60-180 seconds |
| Time maintained above: <ul style="list-style-type: none"> - Temperature (T_L) - Time (t_L) | 183°C 60-150 seconds | 217°C 60-150 seconds |
| Peak/Classification Temperature (T_P) | See table 1 | See table 2 |
| Time within 5°C of actual Peak Temperature (t_p) | 10-30 seconds | 20-40 seconds |
| Ramp-down Rate | 6°C/second max. | 6°C/second max. |
| Time 25°C to Peak Temperature | 6 minutes max. | 8 minutes max. |

Notes: All temperatures refer to topside of the package .Measured on the body surface.

Classification Reflow Profiles(Cont.)

Table 1. SnPb Eutectic Process – Package Peak Reflow Temperatures

| Package Thickness | Volume mm ³ <350 | Volume mm ³ ≥350 |
|-------------------|--------------------------------|--------------------------------|
| <2.5 mm | 240 +0/-5°C | 225 +0/-5°C |
| ≥2.5 mm | 225 +0/-5°C | 225 +0/-5°C |

Table 2. Pb-free Process – Package Classification Reflow Temperatures

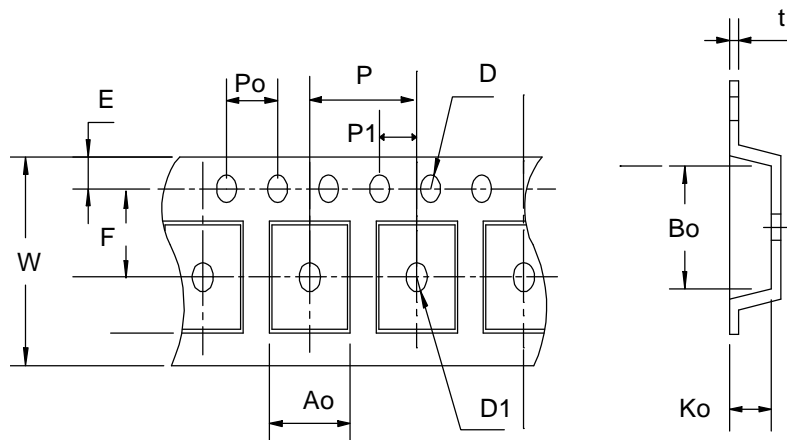
| Package Thickness | Volume mm ³ <350 | Volume mm ³ 350-2000 | Volume mm ³ >2000 |
|-------------------|--------------------------------|------------------------------------|---------------------------------|
| <1.6 mm | 260 +0°C* | 260 +0°C* | 260 +0°C* |
| 1.6 mm – 2.5 mm | 260 +0°C* | 250 +0°C* | 245 +0°C* |
| ≥2.5 mm | 250 +0°C* | 245 +0°C* | 245 +0°C* |

*Tolerance: The device manufacturer/supplier **shall** assure process compatibility up to and including the stated classification temperature (this means Peak reflow temperature +0°C. For example 260°C+0°C) at the rated MSL level.

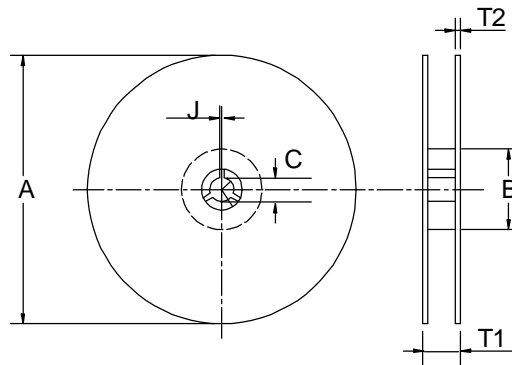
Reliability Test Program

| Test item | Method | Description |
|---------------|---------------------|---------------------------|
| SOLDERABILITY | MIL-STD-883D-2003 | 245°C,5 SEC |
| HOLT | MIL-STD 883D-1005.7 | 1000 Hrs Bias @ 125°C |
| PCT | JESD-22-B, A102 | 168 Hrs, 100% RH, 121°C |
| TST | MIL-STD 883D-1011.9 | -65°C ~ 150°C, 200 Cycles |

Carrier Tape & Reel Dimensions



Carrier Tape & Reel Dimensions (Cont.)



| Application | A | B | C | J | T1 | T2 | W | P | E |
|-------------|----------|----------|----------|----------|-------------------|----------|-----------------|---------|----------|
| TO-252 | 330 ±3 | 100 ±2 | 13 ±0.5 | 2 ±0.5 | 16.4 +0.3 -0.2 | 2.5± 0.5 | 16+ 0.3 -0.1 | 8 ±0.1 | 1.75±0.1 |
| | F | D | D1 | Po | P1 | Ao | Bo | Ko | t |
| | 7.5 ±0.1 | 1.5 +0.1 | 1.5±0.25 | 4.0 ±0.1 | 2.0 ±0.1 | 6.8 ±0.1 | 10.4±0.1 | 2.5±0.1 | 0.3±0.05 |

(mm)

Cover Tape Dimensions

| Application | Carrier Width | Cover Tape Width | Devices Per Reel |
|-------------|---------------|------------------|------------------|
| TO- 252 | 16 | 13.3 | 2500 |

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