

WPM1481

Single P-Channel, -12V, -5.5A, Power MOSFET

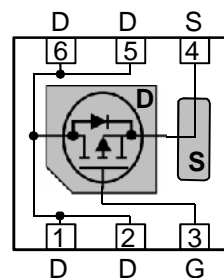
| V _{DS} (V) | Typical R _{ds(on)} () | I _D (A) |
|---------------------|---------------------------------|--------------------|
| -12 | 0.022 @ V _{GS} =-4.5V | -5.5 |
| | 0.030 @ V _{GS} =-2.5V | -4.0 |
| | 0.045 @ V _{GS} =-1.8V | -2.5 |



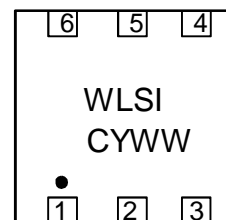
DFN2*2-6L

Descriptions

The WPM1481 is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent R_{DS (ON)} with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WPM1481 is Pb-free.



Pin configuration (Top view)



WLSI = Company Code
 C = Device Code
 Y = Year
 WW = Week

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- Small package DFN2*2-6L

Applications

- Driver for Relay, Solenoid, Motor, LED etc.
- DC-DC converter circuit
- Power Switch
- Load Switch
- Charging

Marking

Order information

| Device | Package | Shipping |
|---------------|-----------|----------------|
| WPM1481- 6/TR | DFN2*2-6L | 3000/Reel&Tape |

Absolute Maximum ratings

| Parameter | | Symbol | 10 S | Steady State | Unit |
|--|--------------------------|-----------|----------|--------------|------|
| Drain-Source Voltage | | V_{DS} | -12 | | V |
| Gate-Source Voltage | | V_{GS} | ±12 | | |
| Continuous Drain Current ^{a d} | $T_A=25^{\circ}\text{C}$ | I_D | -5.1 | -4.3 | A |
| | $T_A=70^{\circ}\text{C}$ | | -4.0 | -3.4 | |
| Maximum Power Dissipation ^{a d} | $T_A=25^{\circ}\text{C}$ | P_D | 1.9 | 1.4 | W |
| | $T_A=70^{\circ}\text{C}$ | | 1.2 | 0.9 | |
| Continuous Drain Current ^{b d} | $T_A=25^{\circ}\text{C}$ | I_D | -3.7 | -3.0 | A |
| | $T_A=70^{\circ}\text{C}$ | | -3.0 | -2.4 | |
| Maximum Power Dissipation ^{b d} | $T_A=25^{\circ}\text{C}$ | P_D | 1.0 | 0.6 | W |
| | $T_A=70^{\circ}\text{C}$ | | 0.6 | 0.4 | |
| Pulsed Drain Current ^c | | I_{DM} | -24 | | A |
| Operating Junction Temperature | | T_J | -55~150 | | °C |
| Lead Temperature | | T_L | 260 | | °C |
| Storage Temperature Range | | T_{stg} | -55 ~150 | | °C |

Thermal resistance ratings

| Parameter | | Symbol | Typical | Maximum | Unit |
|---|--------------|----------|---------|---------|------|
| Junction-to-Ambient Thermal Resistance ^a | t 10 s | R_{JA} | 49 | 64 | °C/W |
| | Steady State | | 66 | 88 | |
| Junction-to-Ambient Thermal Resistance ^b | t 10 s | R_{JA} | 84 | 118 | |
| | Steady State | | 125 | 180 | |
| Junction-to-Case Thermal Resistance | | R_{JC} | 32 | 42 | |

a Surface mounted on FR-4 Board using 1 square inch pad size, 1oz copper

b Surface mounted on FR-4 board using minimum pad size, 1oz copper

c Pulse width<380μs, Single pulse

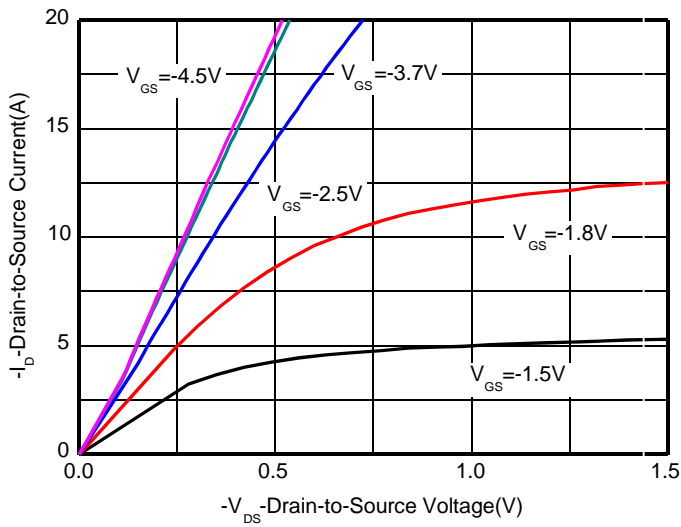
d Maximum junction temperature $T_J=150^{\circ}\text{C}$.

e Pulse test: Pulse width <380 us duty cycle <2%.

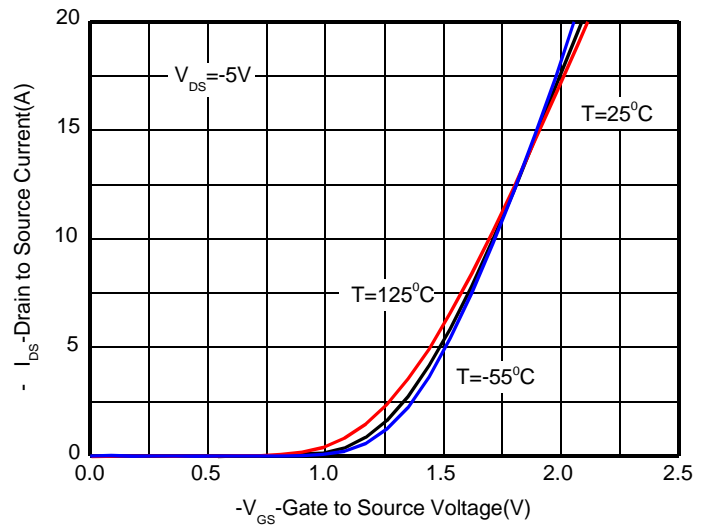
Electronics Characteristics (Ta=25°C, unless otherwise noted)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---------------------|---|------|-------|------|------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-to-Source Breakdown Voltage | BV _{DSS} | V _{GS} = 0 V, I _D = -250uA | -12 | | | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = -10V, V _{GS} = 0V | | | -1 | uA |
| Gate-to-source Leakage Current | I _{GSS} | V _{DS} = 0 V, V _{GS} = ±10V | | | ±100 | nA |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | V _{GS} = V _{DS} , I _D = -250uA | -0.4 | | -0.9 | V |
| Drain-to-source On-resistance ^{b, e} | R _{DS(on)} | V _{GS} = -4.5V, I _D = -5.5A | | 22 | 26 | m |
| | | V _{GS} = -2.5V, I _D = -4.0A | | 30 | 38 | |
| | | V _{GS} = -1.8V, I _D = -2.5A | | 45 | 59 | |
| Forward Transconductance ^e | g _{FS} | V _{DS} = -5.0V, I _D = -5.5A | | 23 | | S |
| CAPACITANCES, CHARGES | | | | | | |
| Input Capacitance | C _{ISS} | V _{GS} = 0 V, | | 1880 | | pF |
| Output Capacitance | C _{OSS} | f = 1.0 MHz, | | 437 | | |
| Reverse Transfer Capacitance | C _{RSS} | V _{DS} = -10 V | | 413 | | |
| Total Gate Charge | Q _{G(TOT)} | V _{GS} = -4.5 V, V _{DS} = -10 V, I _D = -5.5A | | 44.5 | | nC |
| Threshold Gate Charge | Q _{G(TH)} | | | 3.5 | | |
| Gate-to-Source Charge | Q _{GS} | | | 1.7 | | |
| Gate-to-Drain Charge | Q _{GD} | | | 9.25 | | |
| SWITCHING CHARACTERISTICS | | | | | | |
| Turn-On Delay Time | td _(ON) | V _{GS} = -4.5 V, | | 33.6 | | ns |
| Rise Time | tr | V _{DS} = -6 V, | | 35.6 | | |
| Turn-Off Delay Time | td _(OFF) | R _L = 3 Ω, | | 50 | | |
| Fall Time | tf | R _G = 6 Ω | | 63 | | |
| BODY DIODE CHARACTERISTICS | | | | | | |
| Forward Voltage | V _{SD} | V _{GS} = 0 V, I _S = 1.0A | | -0.76 | -1.5 | V |

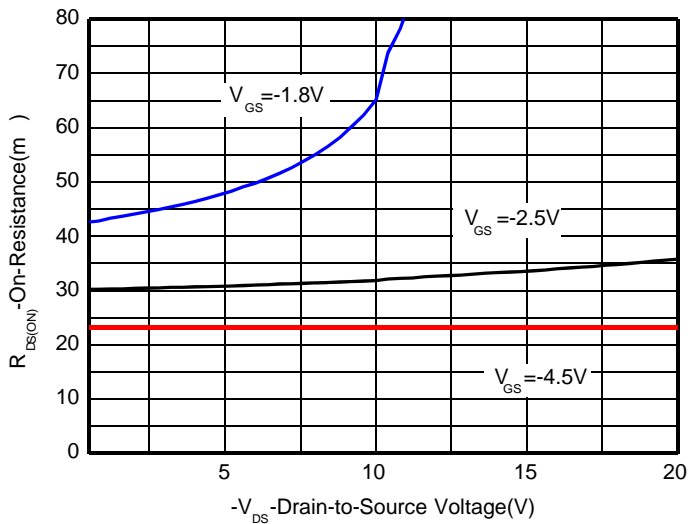
Typical Characteristics (Ta=25°C, unless otherwise noted)



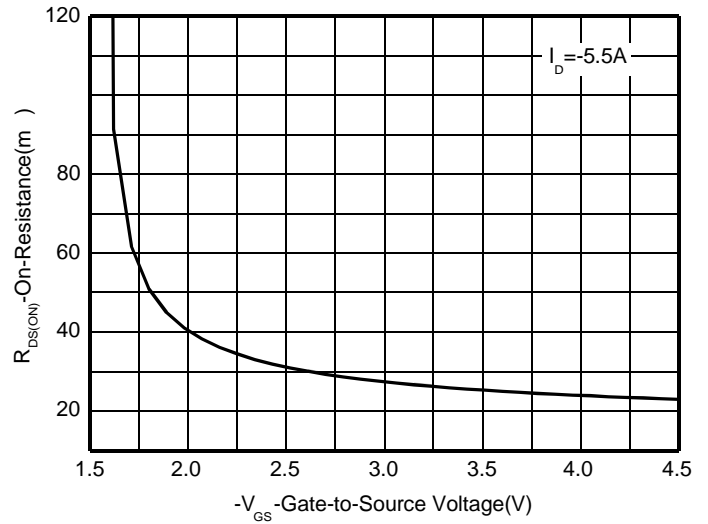
Output characteristics



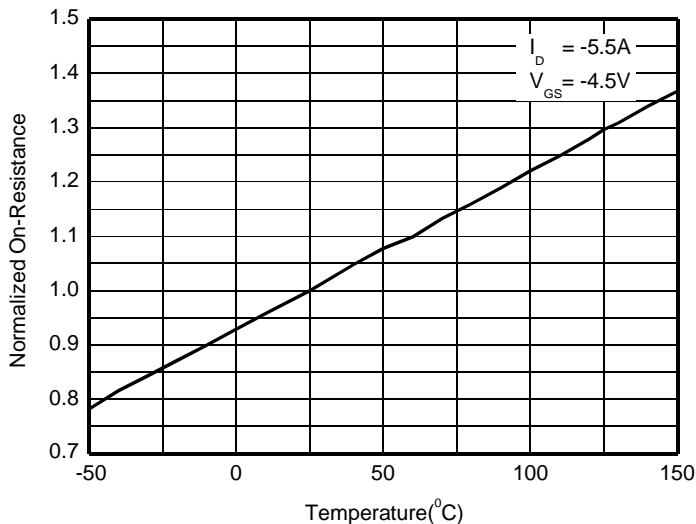
Transfer characteristics



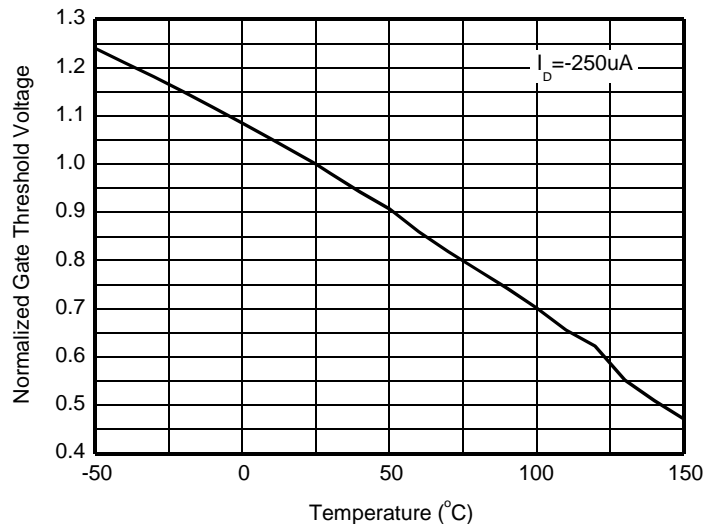
On-Resistance vs. Drain current



On-Resistance vs. Gate-to-Source voltage



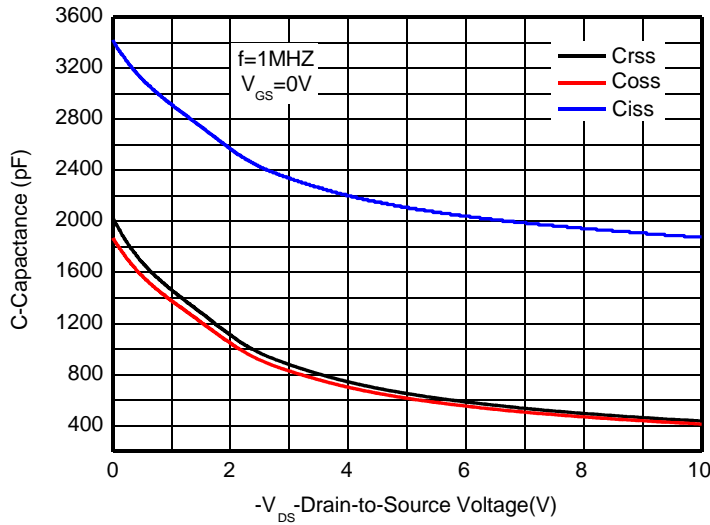
On-Resistance vs. Junction temperature



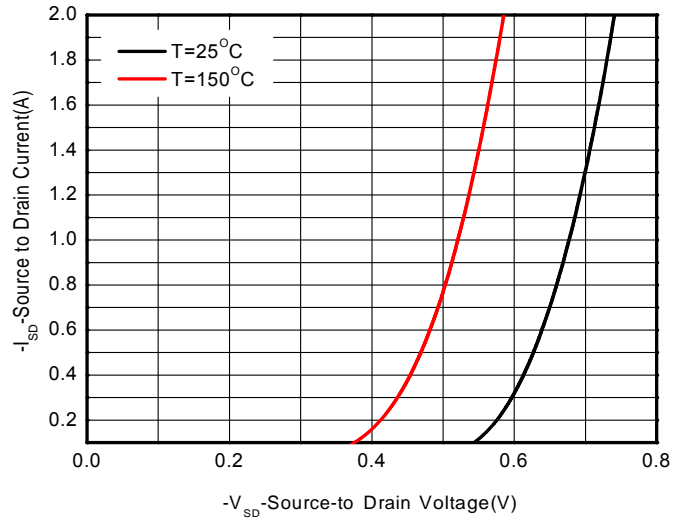
Threshold voltage vs. Temperature



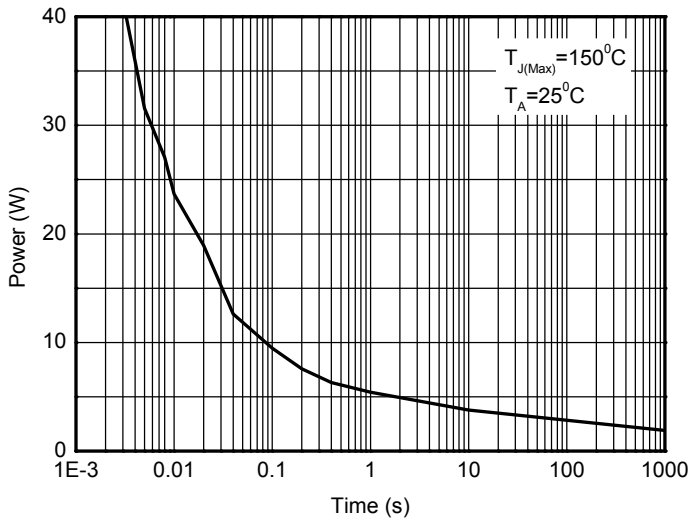
WPM1481



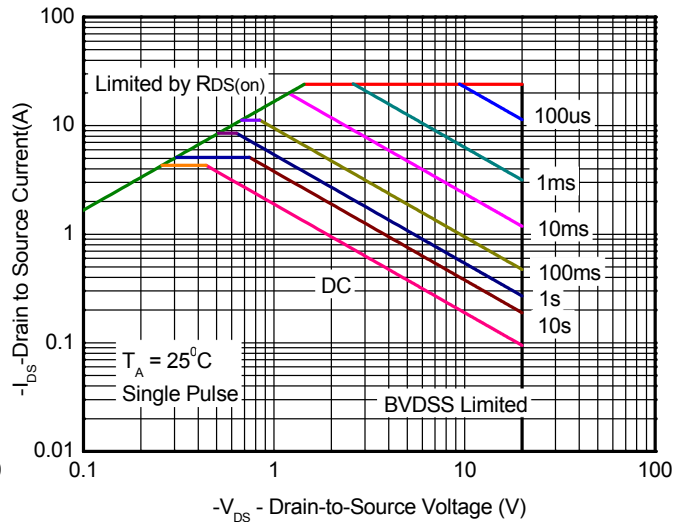
Capacitance



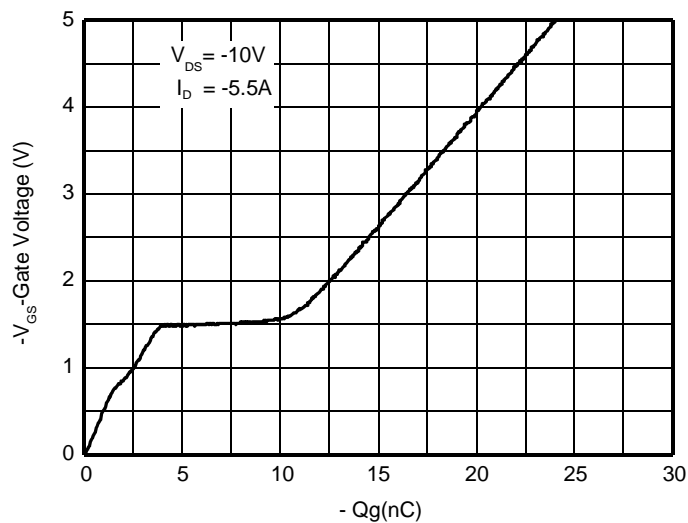
Body diode forward voltage



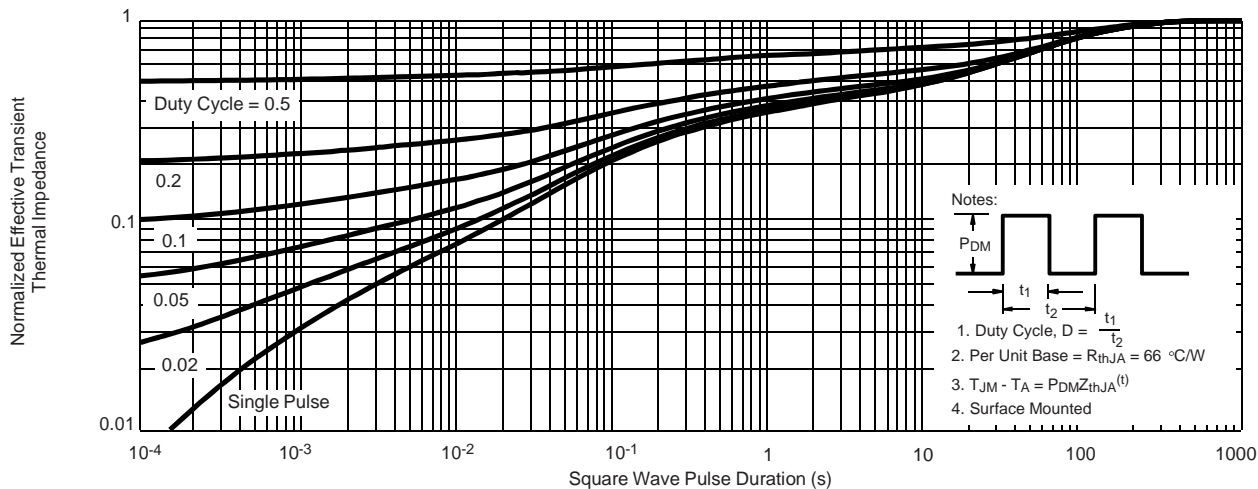
Single pulse power



Safe operating power



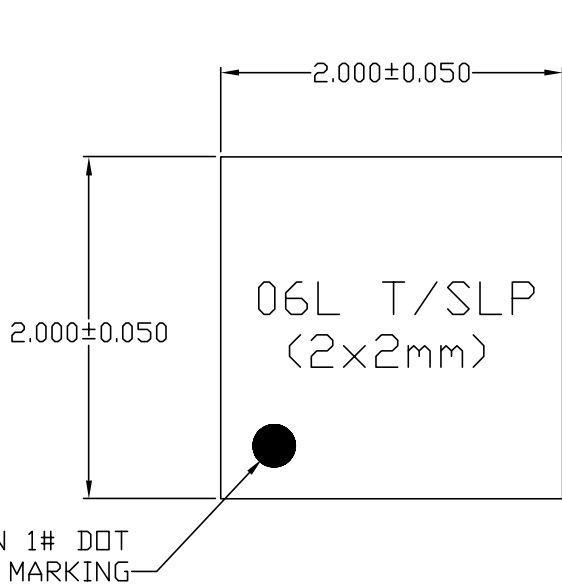
Gate Charge Characteristics



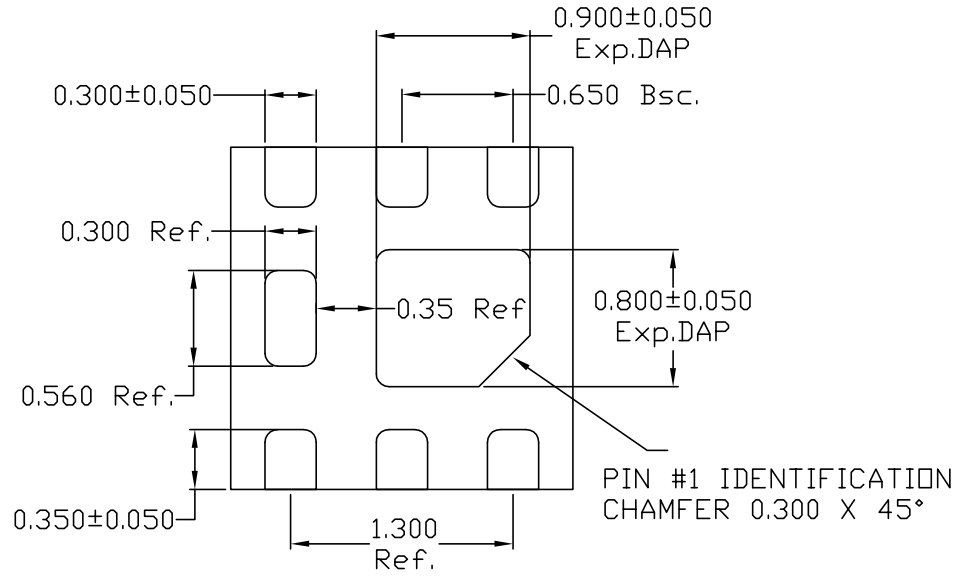
Transient thermal response (Junction-to-Ambient)

Package outline dimensions

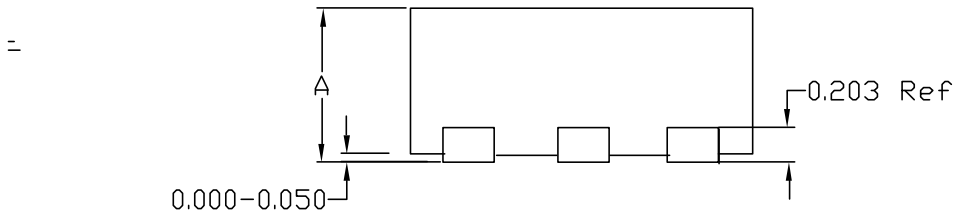
DFN2*2-6L



Top view



Bottom view



Side View

NOTE:

1) TSLP AND SLP SHARE THE SAME EXPOSE OUTLINE BUT WITH DIFFERENT THICKNESS:

| | | TSLP | SLP |
|---|------|-------|-------|
| A | MAX. | 0.800 | 0.900 |
| | NOM. | 0.750 | 0.850 |
| | MIN. | 0.700 | 0.800 |