# XPX7442RD

## 20V N-Channel Enhancement Mode Power MOSFET

RoHS COMPLIANT

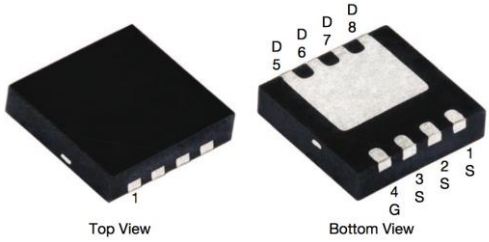
### ● Features

$V_{DS}$ = 20V,
$I_D$ = 50A
$R_{DS(ON)}$ @$V_{GS}$= 4.5V, TYP 4mΩ
$R_{DS(ON)}$ @$V_{GS}$= 2.5V, TYP 4.4mΩ

### ● General Description

• load switch
• battery protection applications

### ● Pin Configurations




TDFN3*3-8L

### ● Absolute Maximum Ratings @$T_A$=25℃ unless otherwise noted

| Parameter | | Symbol | Ratings | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 20 | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±12 | V |
| Drain Current (Continuous) *AC | $T_C$=25°C | $I_D$ | 50 | A |
| | $T_C$=100° C | | 40 | |
| Drain Current (Pulse) *B | | $I_{DM}$ | 160 | A |
| Power Dissipation | $T_C$=25°C | $P_D$ | 40 | W |
| Operating Temperature/ Storage Temperature | | $T_J/T_{STG}$ | -55~150 | ℃ |

### ● Thermal Resistance Ratings

| Parameter | | Symbol | Typical | Maximum | Unit |
|---|---|---|---|---|---|
| Maximum Junction-to-Ambient | Steady State | $R_{thJA}$ | 60 | 75 | °C/W |
| Maximum Junction-to-Case (Drain) | Steady State | $R_{thJC}$ | 2.6 | 3.1 | |

- **Electrical Characteristics** @$T_A$=25℃ unless otherwise noted

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$= 250μA | 20 | -- | -- | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 20 V, $V_{GS}$ = 0V | -- | -- | 1 | μA |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{GS}$ = $V_{DS}$, $I_{DS}$= 250μA | 0.5 | 0.7 | 1.5 | V |
| Gate Leakage Current | $I_{GSS}$ | $V_{GS}$= ±12V, $V_{DS}$=0V | -- | -- | ±100 | nA |
| Drain-Source On-state Resistance | $R_{DS(on)}$ | $V_{GS}$ = 4.5V, $I_D$ = 20A | -- | 4 | 6 | mΩ |
| | $R_{DS(on)}$ | $V_{GS}$ = 2.5V, $I_D$ = 15A | -- | 4.4 | 8 | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$= 5V, $I_D$= 20A | -- | 160 | -- | S |
| Diode Forward Voltage | $V_{SD}$ | $I_{SD}$= 20A , $V_{GS}$=0V | -- | -- | 1.3 | V |
| Diode Forward Current *AC | $I_S$ | $T_C$ =25°C | -- | -- | 40 | A |
| **Switching** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{GS}$=10V, $V_{DS}$=10V, $I_D$=20A | -- | 36 | -- | nC |
| Gate-Source Charge | $Q_{gs}$ | | -- | 9 | -- | nC |
| Gate-Drain Charge | $Q_{gd}$ | | -- | 12 | -- | nC |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{GS}$=10V, $V_{DS}$=10V, $R_L$=0.56Ω ,$R_{GEN}$=3Ω | -- | 7 | -- | ns |
| Turn-on Rise Time | $t_r$ | | -- | 8 | -- | ns |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 70 | -- | ns |
| Turn-Off Fall Time | $t_f$ | | -- | 18 | -- | ns |
| **Dynamic** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=10V,$V_{GS}$=0V, f=1.0MHz | -- | 3860 | -- | pF |
| Output Capacitance | $C_{oss}$ | | -- | 740 | -- | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | -- | 560 | -- | pF |

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in$^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A$=25°C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the t≤ 10s junction to ambient thermal resistance rating, package limited 40A

- **Typical Performance Characteristics（(TJ = 25 °C, unless otherwise noted)）**

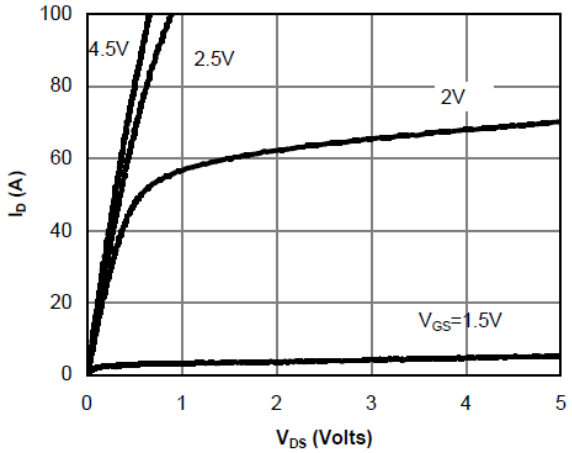


Fig 1: On-Region Characteristics

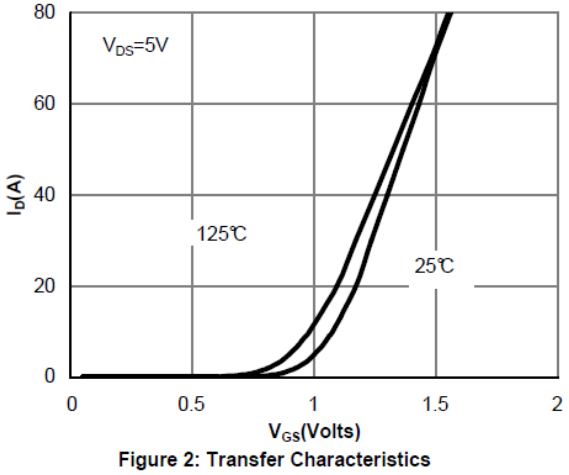


Figure 2: Transfer Characteristics

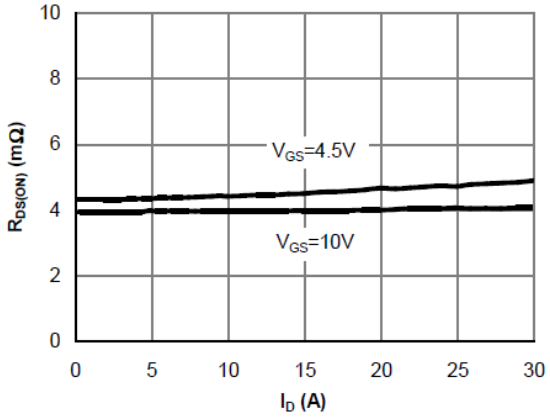


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

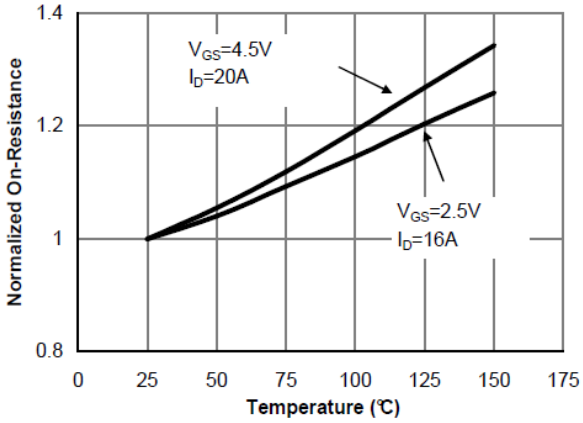


Figure 4: On-Resistance vs. Junction Temperature

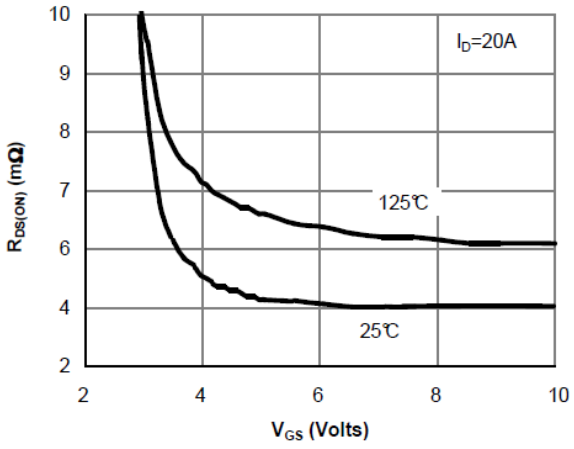


Figure 5: On-Resistance vs. Gate-Source Voltage

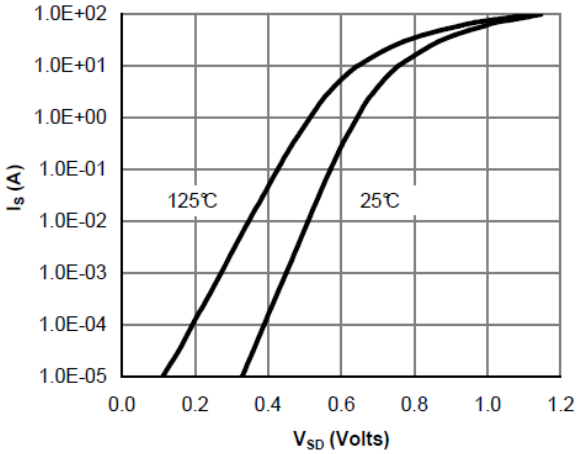


Figure 6: Body-Diode Characteristics

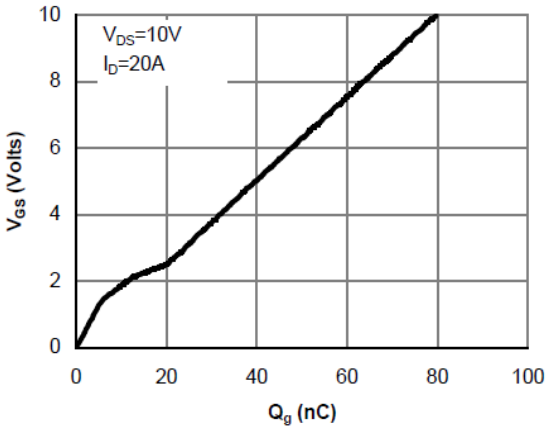



Figure 7: Gate-Charge Characteristics

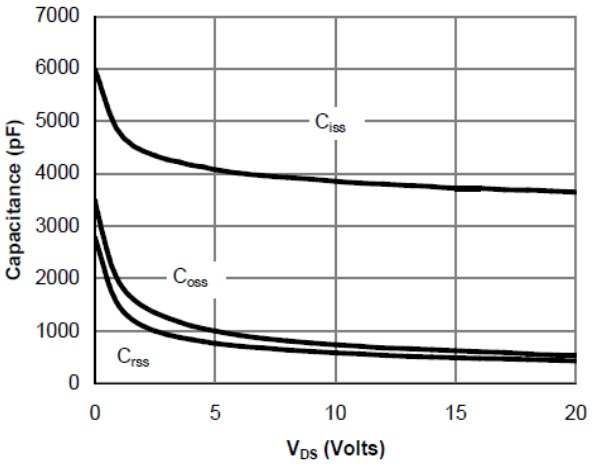



Figure 8: Capacitance Characteristics

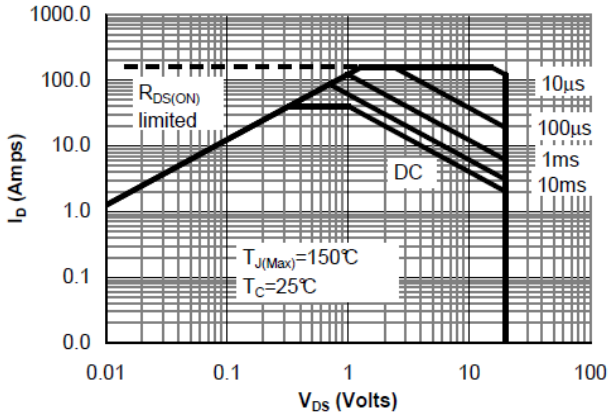



Figure 9: Maximum Forward Biased Safe Operating Area

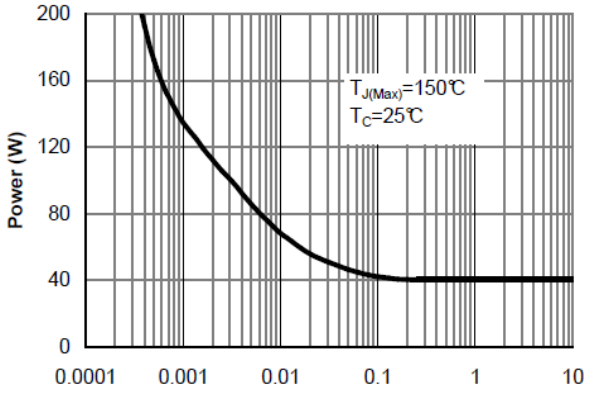



Figure 10: Single Pulse Power Rating Junction-to-Case

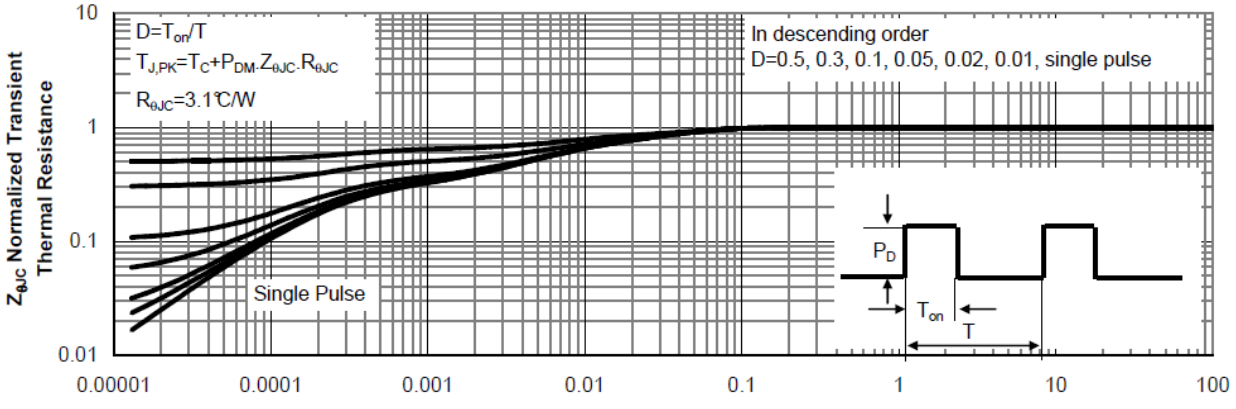



Figure 11: Normalized Maximum Transient Thermal Impedance

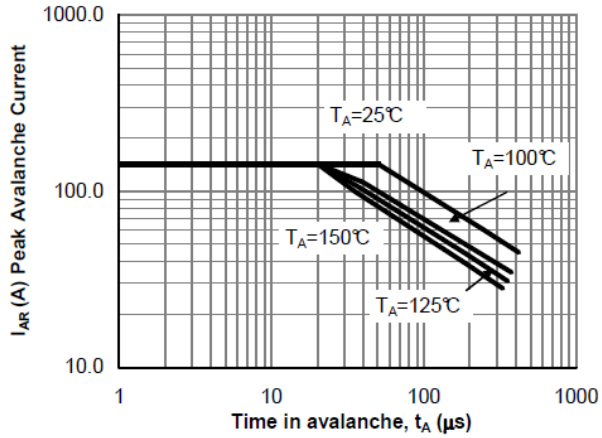


Figure 12: Single Pulse Avalanche capability

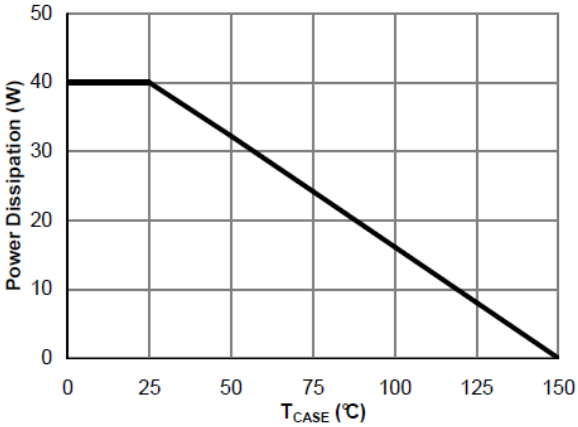


Figure 13: Power De-rating

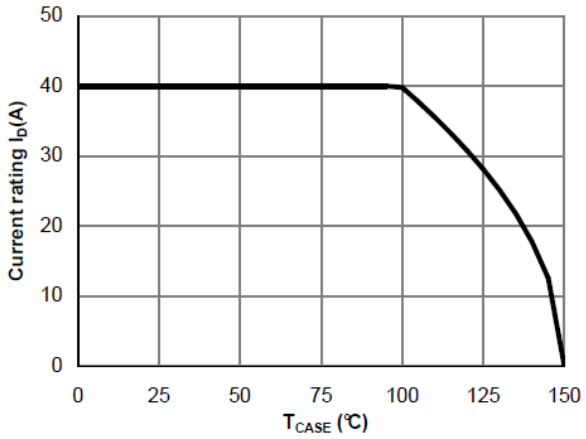


Figure 14: Current De-rating

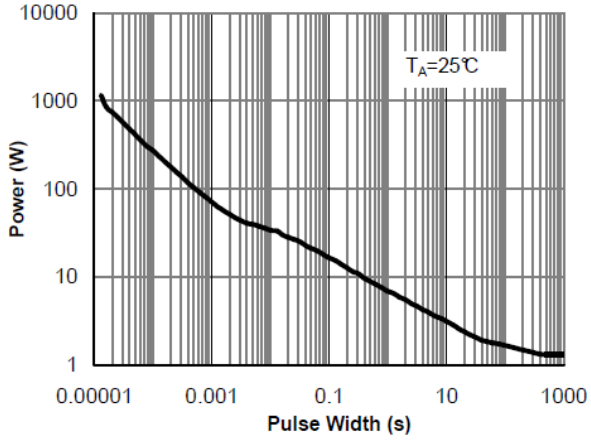


Figure 15: Single Pulse Power Rating Junction-to-Ambient

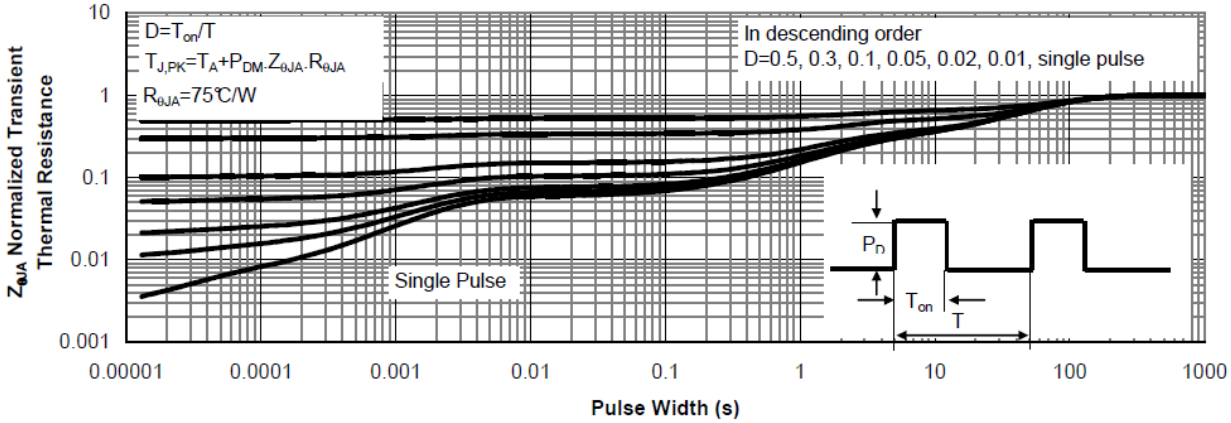
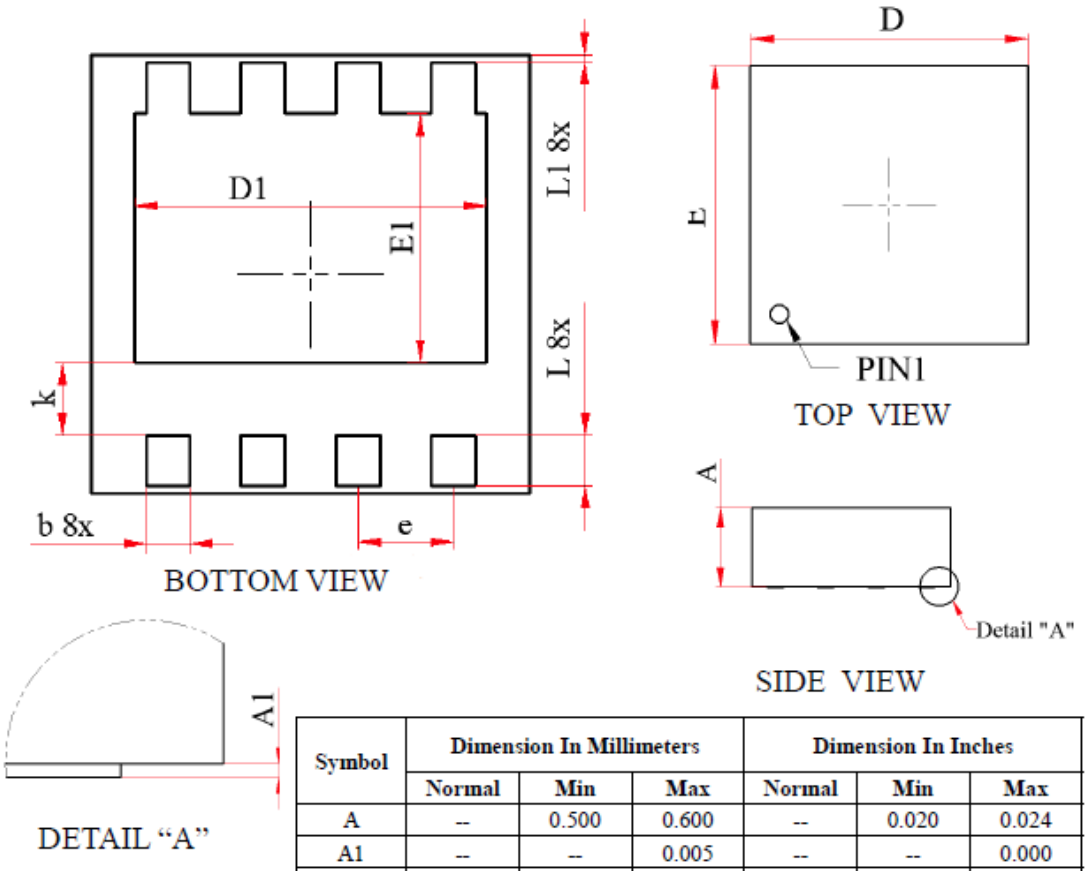


Figure 16: Normalized Maximum Transient Thermal Impedance

- **Package Information**

**TDFN3*3-8L**




| Symbol | Dimension In Millimeters | | | Dimension In Inches | | |
|---|---|---|---|---|---|---|
| | Normal | Min | Max | Normal | Min | Max |
| A | -- | 0.500 | 0.600 | -- | 0.020 | 0.024 |
| A1 | -- | -- | 0.005 | -- | -- | 0.000 |
| D | 3.000 | 2.950 | 3.070 | 0.118 | 0.116 | 0.121 |
| E | 3.000 | 2.950 | 3.070 | 0.118 | 0.116 | 0.121 |
| D1 | 2.400 | 2.300 | 2.500 | 0.094 | 0.091 | 0.098 |
| E1 | 1.700 | 1.600 | 1.800 | 0.067 | 0.063 | 0.071 |
| b | 0.300 | 0.250 | 0.350 | 0.012 | 0.010 | 0.014 |
| L | 0.350 | 0.300 | 0.400 | 0.014 | 0.012 | 0.016 |
| L1 | 0.050 | 0.010 | 0.090 | 0.002 | 0.000 | 0.004 |
| k | 0.500 REF | | | 0.020 REF | | |
| e | 0.650 BSC | | | 0.026 BSC | | |

Flow (wave) soldering (solder dipping)

| Product | Peak Temperature | Dipping Time |
|---|---|---|
| Pb device | 245℃±5℃ | 5sec±1sec |
| Pb-Free device | 260℃+0/-5℃ | 5sec±1sec |

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