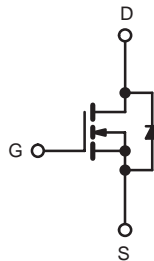
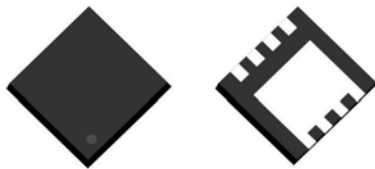


N-Channel 30V (D-S) MOSFET

| Product Summary | | |
|---------------------|---------------------------------|--------------------|
| V _{DS} (V) | R _{DS(on)} (mΩ) (Max.) | I _D (A) |
| 30 | 4.8 at V _{GS} = 10 V | 50 |
| | 6.2 at V _{GS} = 4.5 V | 50 |

Pin Configuration

DFN3x3



N-Channel MOSFET

Features

- Very Low R_{DS(on)} at 4.5V V_{gs}
- Low Gate Charge
- High Current Capability
- 100% R_g and UIS Tested
- RoHS and Halogen-Free Compliant

Applications

- DC/DC Converter
- Battery Switch
- Power Management
- For Mobile Computing

Packing Information

| Device | Marking | Reel Size | Tape Width | Quantity |
|--------|-------------|-----------|------------|----------|
| EC4316 | ECX .XXX | 13" | 12mm | 3000pcs |

Absolute Maximum Ratings

| Parameter | Symbol | Maximum | Units |
|--|-----------------------------------|----------------------|-------|
| Drain-Source Voltage | V _{DS} | 30 | V |
| Gate-Source Voltage | V _{GS} | ±20 | V |
| Continuous Drain Current ^D | I _D | T _C =25°C | A |
| | | T _C =70°C | |
| Pulsed Drain Current ^C | I _{DM} | 200 | |
| Continuous Drain Current | I _{DSM} | T _A =25°C | A |
| | | T _A =70°C | |
| Avalanche Current ^C | I _{AS} , I _{AR} | 25 | A |
| Avalanche energy L=0.1mH ^C | E _{AS} , E _{AR} | 31 | mJ |
| Power Dissipation ^B | P _D | T _C =25°C | W |
| | | T _C =70°C | |
| Power Dissipation ^A | P _{DSM} | T _A =25°C | W |
| | | T _A =70°C | |
| Junction and Storage Temperature Range | T _J , T _{STG} | -55 to 150 | °C |

Thermal Data

| Parameter | Symbol | Typ | Max | Units |
|--|------------------|-----|-----|-------|
| Maximum Junction-to-Ambient ^A | R _{θJA} | 24 | 33 | °C/W |
| Maximum Junction-to-Case | R _{θJC} | 1.9 | 2.4 | °C/W |

Electrical Characteristics (T_J = 25 °C Unless Otherwise Specified)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|-----------------------------|--|--|--|------|--------|-------|
| STATIC PARAMETERS | | | | | | |
| B _V DSS | Drain-Source Breakdown Voltage | I _D =250μA, V _{GS} =0V | 30 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =30V, V _{GS} =0V T _J =55°C | | | 1 5 | μA |
| I _{GSS} | Gate-Body leakage current | V _{DS} =0V, V _{GS} = ±20V | | | ± 20 | μA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 1 | | 2.5 | V |
| I _{D(ON)} | On state drain current | V _{GS} =10V, V _{DS} ≥ 5V | 20 | | | A |
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =10V, I _D =20A | | 4 | 4.8 | mΩ |
| | | V _{GS} =4.5V, I _D =18A | | 5.1 | 6.2 | mΩ |
| g _{FS} | Forward Transconductance | V _{DS} =15V, I _D =20A | | 80 | | S |
| V _{SD} | Diode Forward Voltage | I _S =10A, V _{GS} =0V | | 0.8 | 1.2 | V |
| I _S | Maximum Body-Diode Continuous Current ^D | T _C = 25 °C | | | 50 | A |
| DYNAMIC PARAMETERS | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} = 15 V, V _{GS} = 0V, f=1MHz | | 1515 | | pF |
| C _{oss} | Output Capacitance | | | 322 | | |
| C _{rss} | Reverse Transfer Capacitance | | | 175 | | |
| R _g | Gate resistance | f=1MHz | 0.2 | 1.2 | 2.4 | Ω |
| SWITCHING PARAMETERS | | | | | | |
| Q _g (10V) | Total Gate Charge | V _{DS} =15V, V _{GS} = 10 V, I _D =20 A | | 29 | 45 | nC |
| Q _g (4.5V) | Total Gate Charge | V _{DS} =15V, V _{GS} = 4.5V, I _D =20 A | | 14 | 21 | |
| Q _{gs} | Gate Source Charge | | | 4.5 | | |
| Q _{gd} | Gate Drain Charge | | | 4.2 | | nC |
| t _{D(on)} | Turn-On DelayTime | V _{DD} = 15 V, R _L = 1.5 Ω I _D ≅10A, V _{GEN} = 4.5V, R _g =1Ω | | 20 | 30 | ns |
| t _r | Turn-On Rise Time | | | 125 | 190 | ns |
| t _{D(off)} | Turn-Off DelayTime | | | 24 | 40 | ns |
| t _f | Turn-Off Fall Time | | | 10 | 20 | ns |
| t _{rr} | Body Diode Reverse Recovery Time | | I _F = 10A, di/dt = 100 A/μs, T _J = 25 °C | | 20 | 40 |
| Q _{rr} | Body Diode Reverse Recovery Charge | | | 10 | 20 | nC |

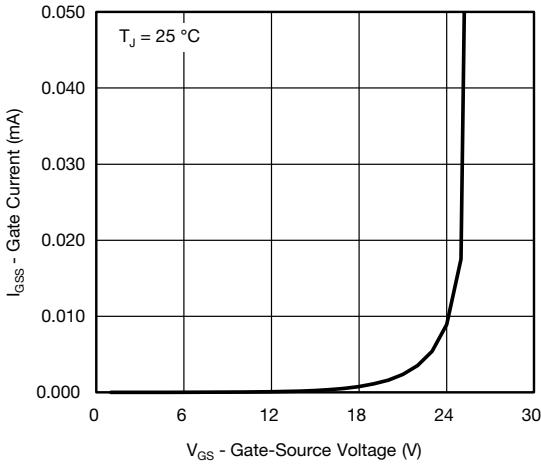
A. The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A =25° C. The Power dissipation P_{DSM} is based on R_{θJA} and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design, and the maximum temperature of 150° C may be used if the PCB allows it.

B. The power dissipation P_D is based on T_{J(MAX)}=150° C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

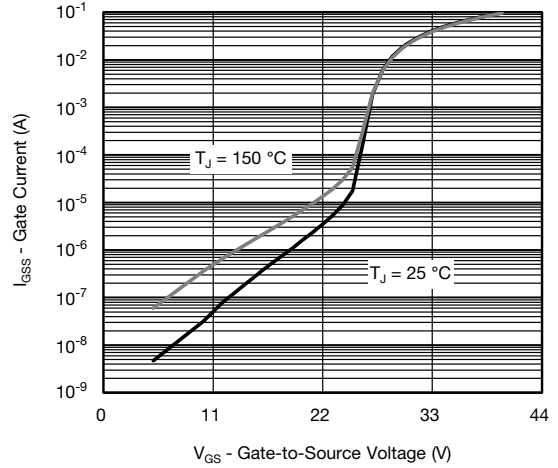
C. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150° C. Ratings are based on low frequency and duty cycles to keep initial T_J=25° C.

D. The maximum current rating is package limited.

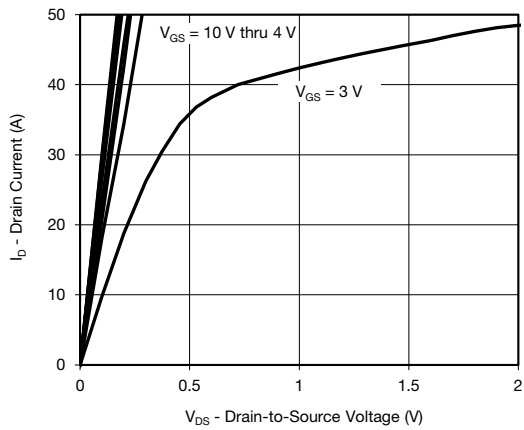
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



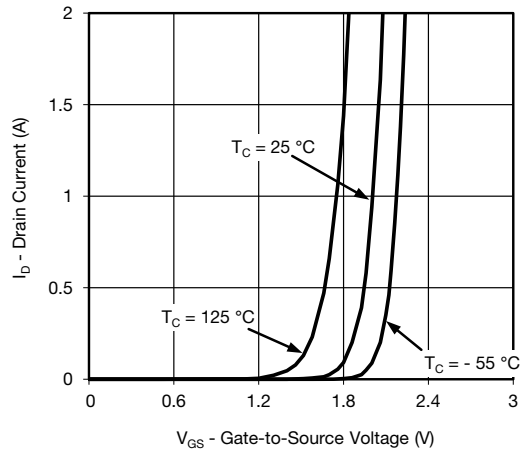
Gate Source Voltage vs. Gate Current



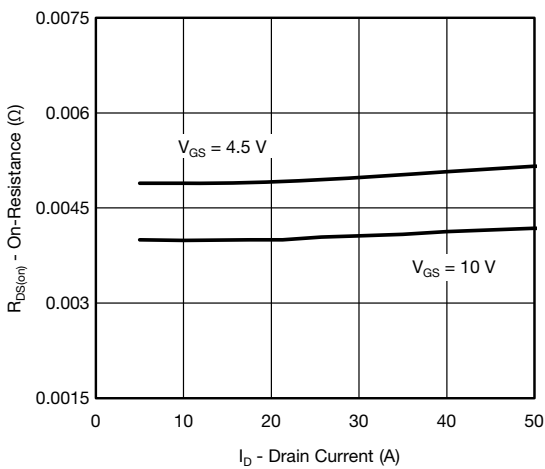
Gate Source Voltage vs. Gate Current



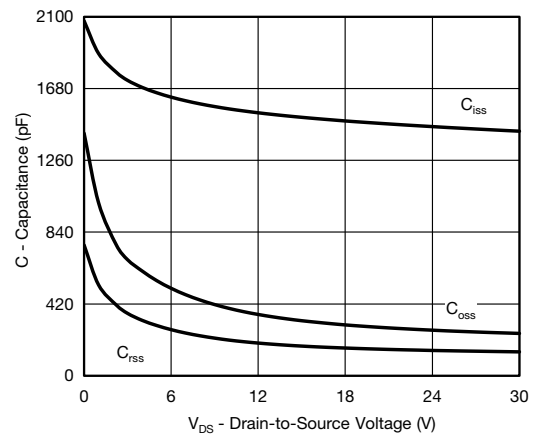
Output Characteristics



Transfer Characteristics

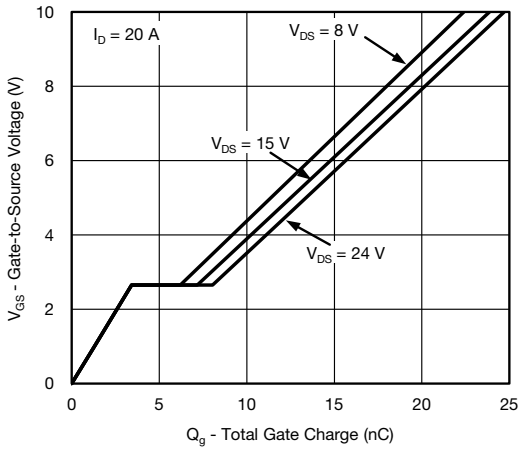


On-Resistance vs. Drain Current

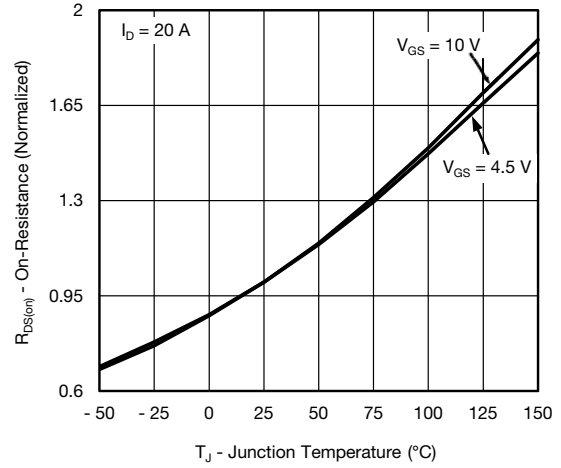


Capacitance

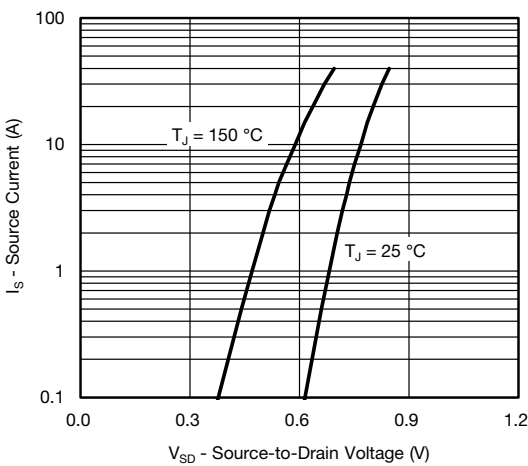
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



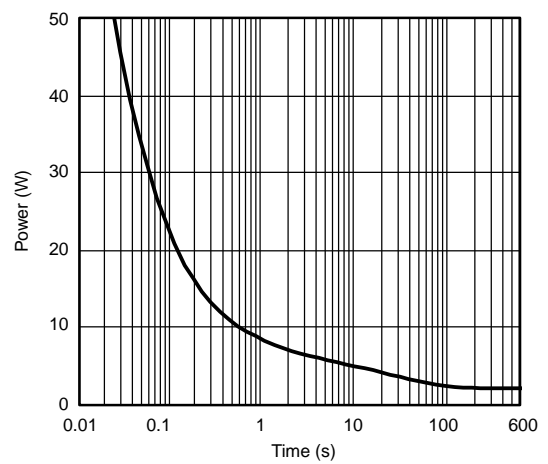
Gate Charge



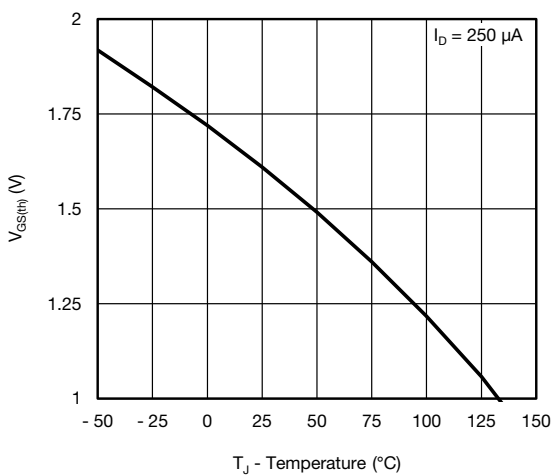
On-Resistance vs. Junction Temperature



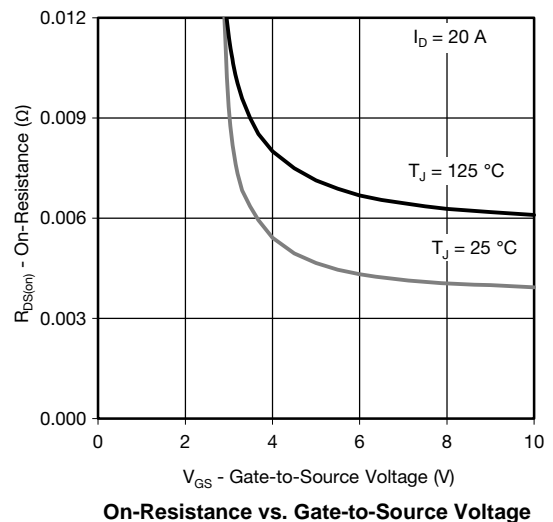
Source-Drain Diode Forward Voltage



Single Pulse Power (Junction-to-Ambient)

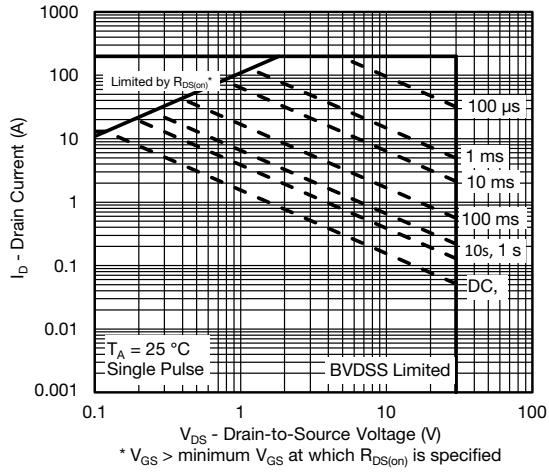


Threshold Voltage

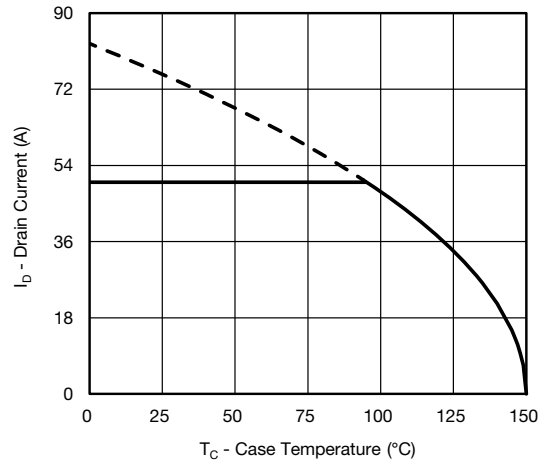


On-Resistance vs. Gate-to-Source Voltage

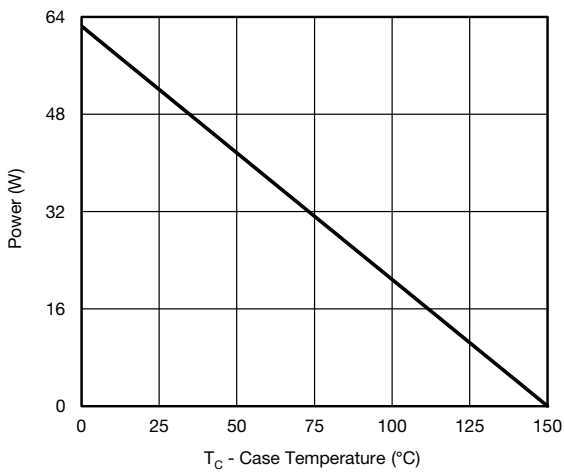
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



Safe Operating Area, Junction-to-Ambient



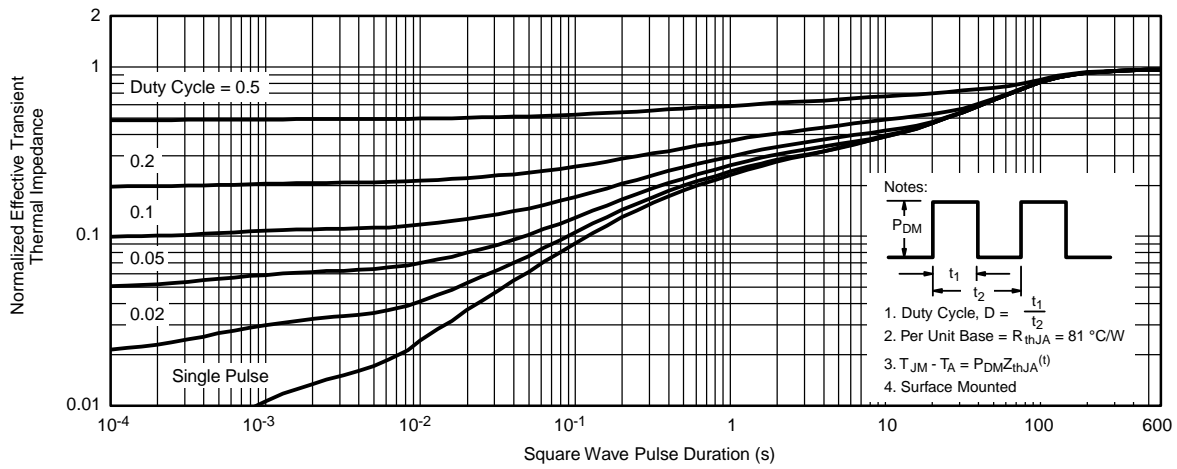
Current Derating*



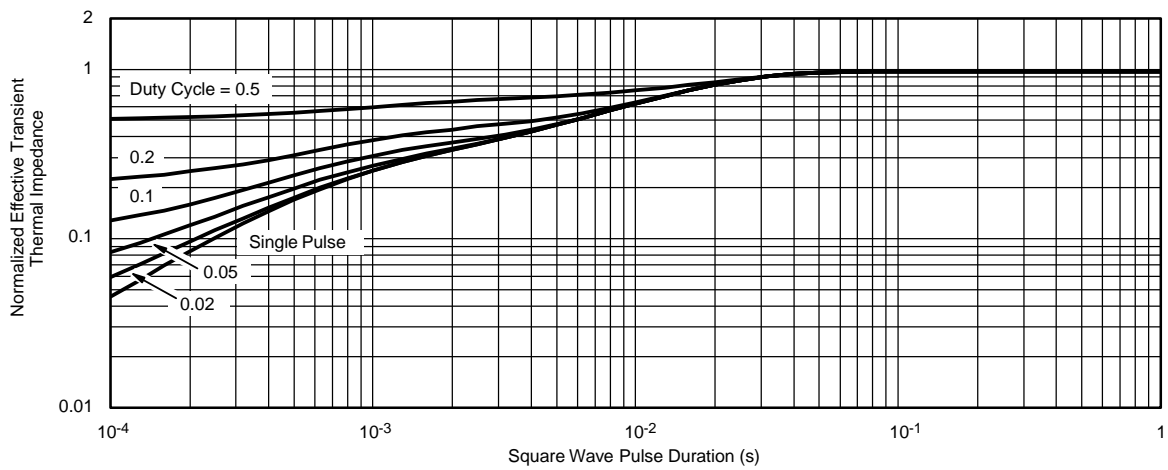
Power Junction-to-Case

* The power dissipation P_D is based on $T_{J(max.)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

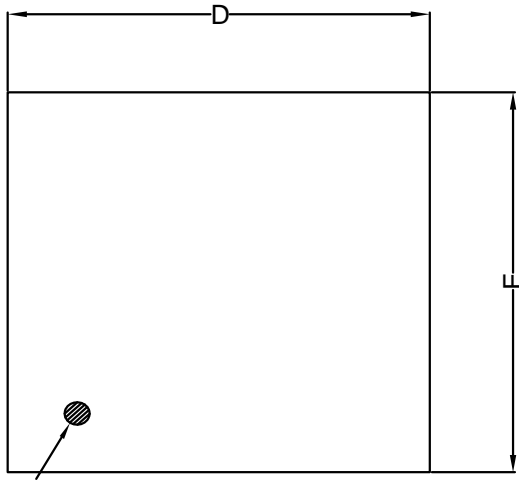


Normalized Thermal Transient Impedance, Junction-to-Ambient



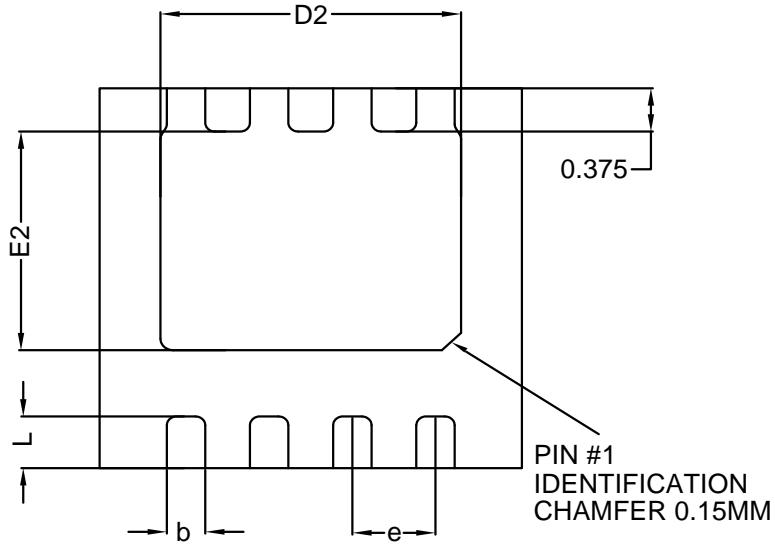
Normalized Thermal Transient Impedance, Junction-to-Case

DFN3x3 Package Information

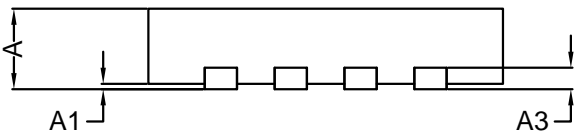


PIN 1 DOT BY MARKING

TOP VIEW



BOTTOM VIEW



SIDE VIEW

| COMMON DIMENSIONS(MM) | | | |
|-----------------------|---------------|------|------|
| PKG. | UT:ULTRA THIN | | |
| REF. | MIN. | NOM. | MAX |
| A | 0.70 | 0.75 | 0.80 |
| A1 | 0.00 | - | 0.05 |
| A3 | 0.20 REF. | | |
| D | 3.25 | 3.30 | 3.35 |
| E | 3.25 | 3.30 | 3.35 |
| D2 | 2.30 | 2.35 | 2.40 |
| E2 | 1.85 | 1.90 | 1.95 |
| b | 0.25 | 0.30 | 0.35 |
| L | 0.35 | 0.45 | 0.55 |
| e | 0.65 BSC | | |