



PIN Connection TO-247

Description

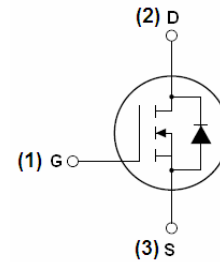
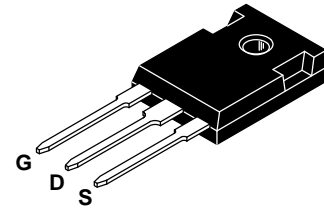
The FIR260N075ANFG uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in Automotive applications and a wide variety of other applications.

General Features

- $V_{DSS} = 75V, I_D = 260A$
 $R_{DS(ON)} < 3m\Omega @ V_{GS} = 10V$ (Typ: 2.3 m Ω)
- Good stability and uniformity with high E_{AS}
- Special process technology for high ESD capability
- High density cell design for ultra low R_{dson}
- Fully characterized Avalanche voltage and current
- Excellent package for good heat dissipation

Application

- Automotive applications
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply



Marking Diagram



- Y = Year
- A = Assembly Location
- WW = Work Week
- FIR260N075ANF = Specific Device Code

Package Marking And Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|----------------|----------------|-----------|------------|----------|
| FIR260N075ANF | FIR260N075ANFG | TO-247 | - | - | - |

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|--|--------------------|------------|------|
| Drain-Source Voltage | V_{DSS} | 75 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous | I_D | 260 | A |
| Drain Current-Continuous($T_C = 100^\circ C$) | $I_D(100^\circ C)$ | 200 | A |
| Pulsed Drain Current | I_{DM} | 1060 | A |
| Maximum Power Dissipation | P_D | 385 | W |
| Derating factor | | 2.57 | W/°C |
| Single pulse avalanche energy (Note 3) | E_{AS} | 2200 | mJ |
| Peak Diode Recovery dv/dt (Note 4) | dv/dt | 13 | V/ns |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 175 | °C |

**Thermal Characteristic**

| | | | |
|---|-----------------|------|---------------|
| Thermal Resistance, Junction-to-Case (Note 1) | $R_{\theta JC}$ | 0.39 | $^{\circ}C/W$ |
|---|-----------------|------|---------------|

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

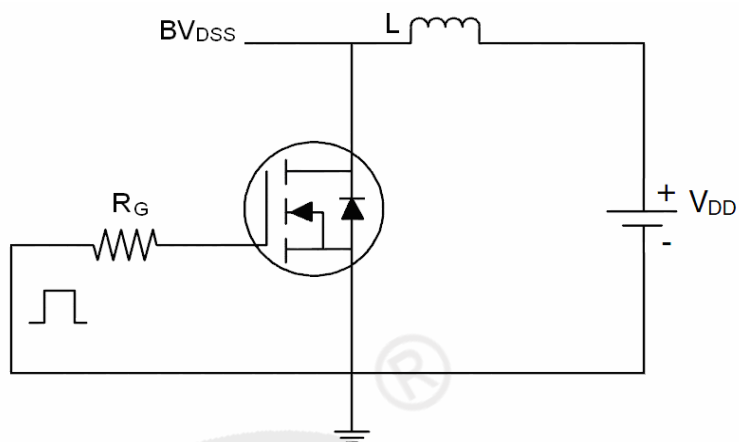
| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|--------------|--|-----|------|-----------|------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 75 | 86 | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=75V, V_{GS}=0V$ | - | - | 1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 200 | nA |
| On Characteristics | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 2 | 3 | 4 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=40A$ | - | 2.3 | 3 | m Ω |
| Forward Transconductance | g_{FS} | $V_{DS}=25V, I_D=40A$ | 260 | - | - | S |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=50V, V_{GS}=0V,$ $F=1.0MHz$ | - | 9000 | - | PF |
| Output Capacitance | C_{oss} | | - | 850 | - | PF |
| Reverse Transfer Capacitance | C_{riss} | | - | 400 | - | PF |
| Switching Characteristics | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=38V, I_D=40A$ $V_{GS}=10V, R_{GEN}=1.2\Omega$ (Note2) | - | 17 | - | nS |
| Turn-on Rise Time | t_r | | - | 80 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 100 | - | nS |
| Turn-Off Fall Time | t_f | | - | 62 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=38V, I_D=160A,$ $V_{GS}=10V$ (Note2) | - | 160 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 35 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 55 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=40A$ | - | - | 1.2 | V |
| Reverse Recovery Time | t_{rr} | $T_J = 25^{\circ}C, I_F = 40A$ | - | 52 | - | nS |
| Reverse Recovery Charge | Q_{rr} | $di/dt = 100A/\mu s$ (Note2) | - | 110 | - | nC |
| Forward Turn-On Time | t_{on} | Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD) | | | | |

Notes:

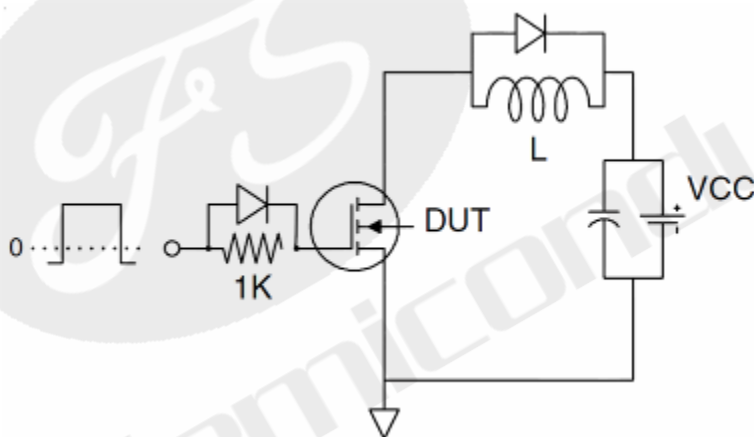
1. Surface Mounted on FR4 Board, $t \leq 10$ sec.
2. Pulse Test: Pulse Width $\leq 400\mu s$, Duty Cycle $\leq 2\%$.
3. EAS condition: $T_J=25^{\circ}C, V_{DD}=37.5V, V_G=10V, L=2mH, R_g=25\Omega, I_{AS}=37A$
4. $I_{SD} \leq 125A, di/dt \leq 260A/\mu s, V_{DD} \leq V_{(BR)DSS}, T_J \leq 175^{\circ}C$

Test circuit

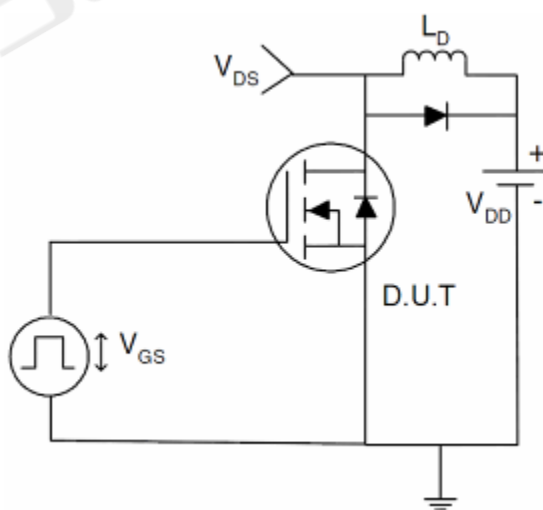
1) E_{AS} test Circuits



2) Gate charge test Circuit:

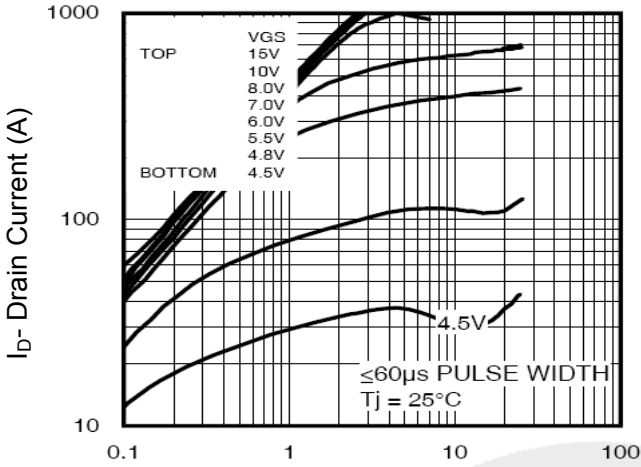


3) Switch Time Test Circuit:

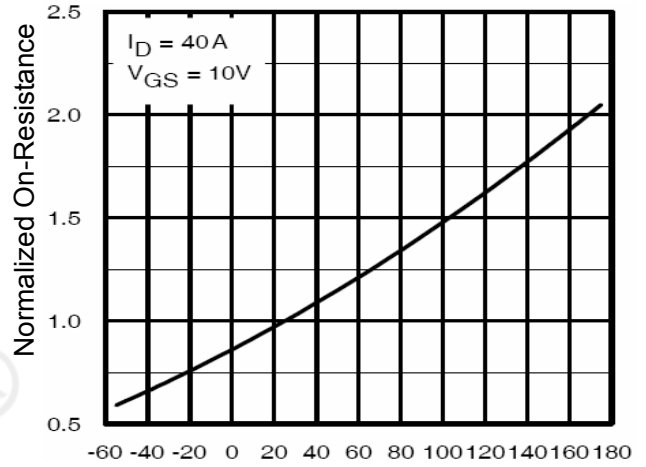




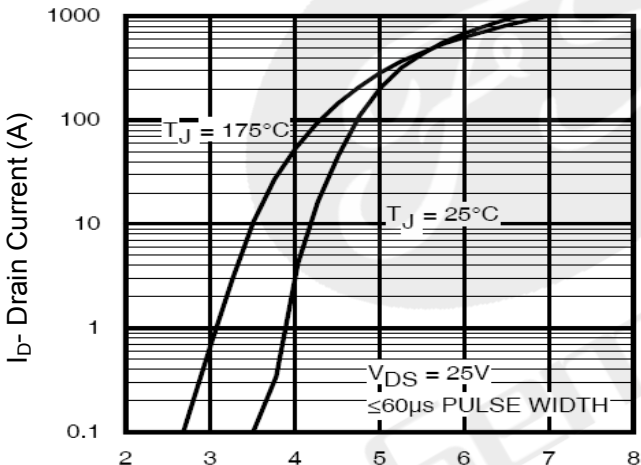
Typical Electrical And Thermal Characteristics(Curves)



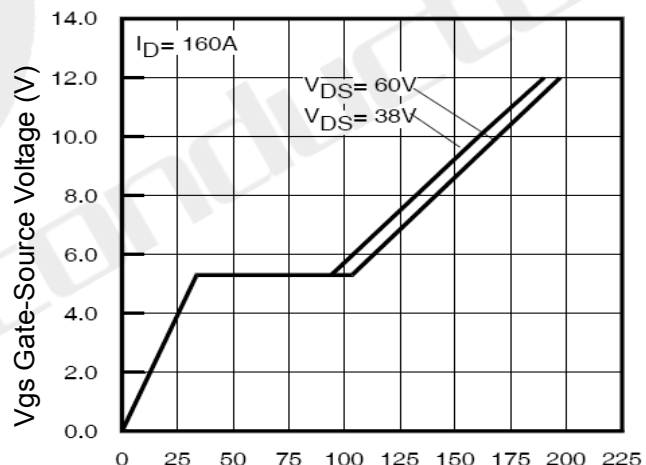
Vds Drain-Source Voltage (V)
Figure 1 Output Characteristics



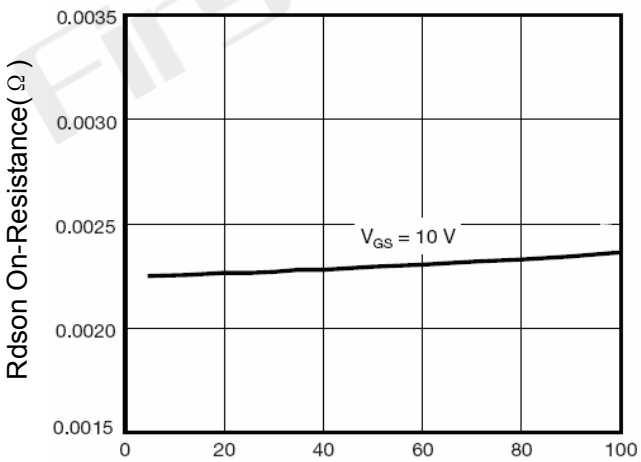
T_J-Junction Temperature(°C)
Figure 4 Rdson-Junction Temperature



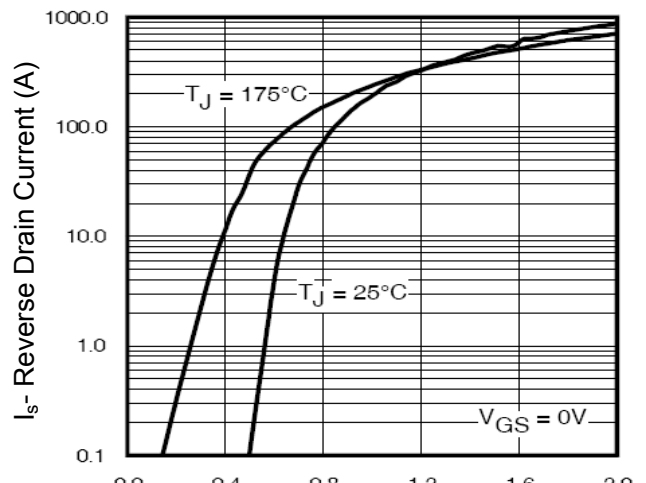
Vgs Gate-Source Voltage (V)
Figure 2 Transfer Characteristics



Qg Gate Charge (nC)
Figure 5 Gate Charge



ID- Drain Current (A)
Figure 3 Rdson- Drain Current



Vsd Source-Drain Voltage (V)
Figure 6 Source- Drain Diode Forward

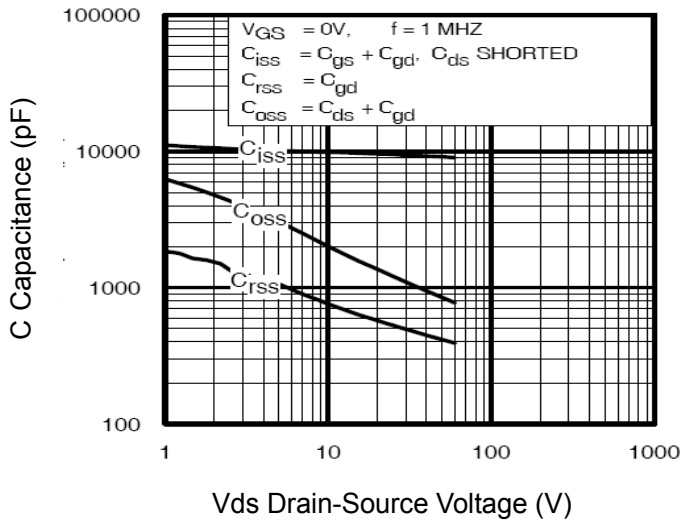


Figure 7 Capacitance vs Vds

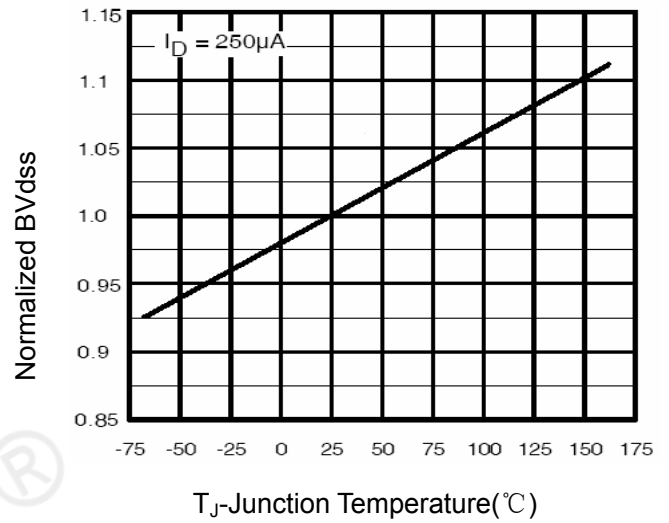


Figure 9 BV_{DSS} vs Junction Temperature

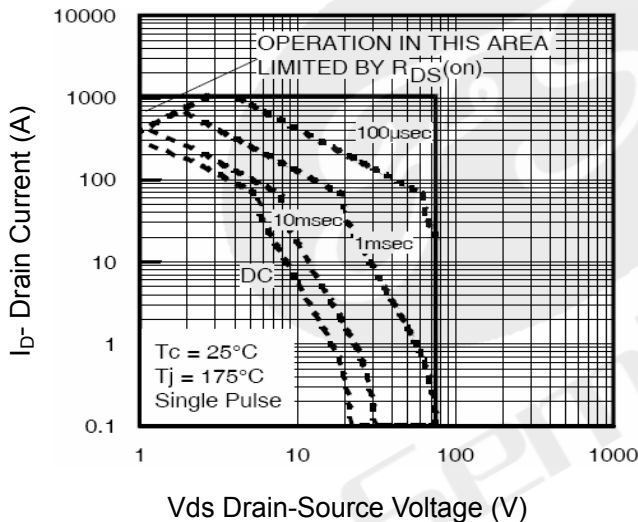


Figure 8 Safe Operation Area

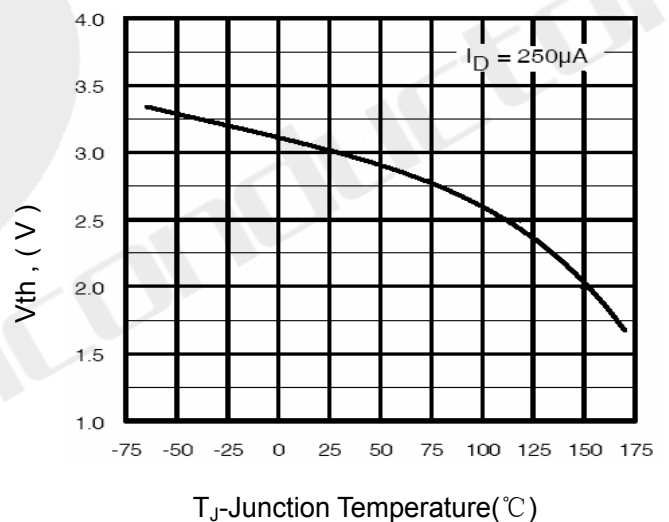


Figure 10 $V_{GS(th)}$ vs Junction Temperature

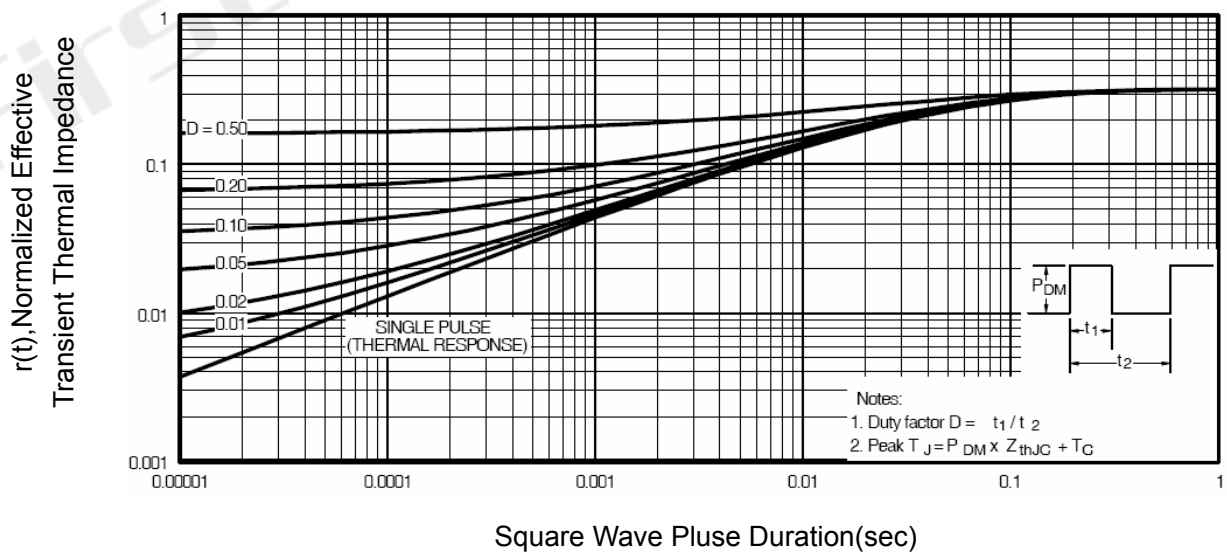
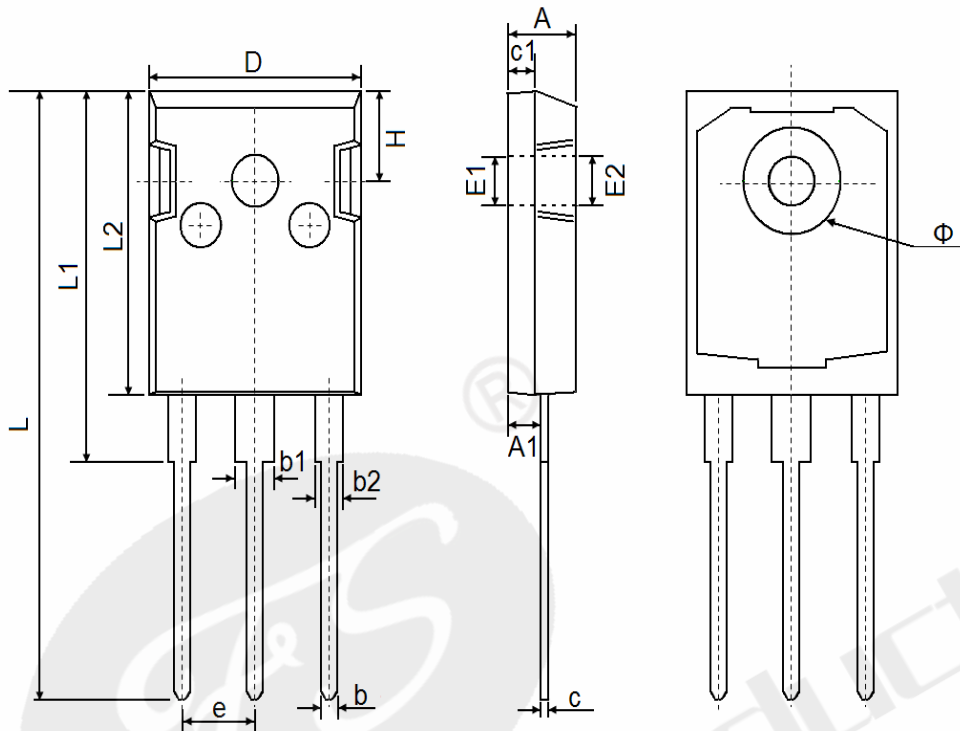


Figure 11 Normalized Maximum Transient Thermal Impedance

Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.850 | 5.150 | 0.191 | 0.200 |
| A1 | 2.200 | 2.600 | 0.087 | 0.102 |
| b | 1.000 | 1.400 | 0.039 | 0.055 |
| b1 | 2.800 | 3.200 | 0.110 | 0.126 |
| b2 | 1.800 | 2.200 | 0.071 | 0.087 |
| c | 0.500 | 0.700 | 0.020 | 0.028 |
| c1 | 1.900 | 2.100 | 0.075 | 0.083 |
| D | 15.450 | 15.750 | 0.608 | 0.620 |
| E1 | 3.500 REF | | 0.138 REF | |
| E2 | 3.600 REF | | 0.142 REF | |
| L | 40.900 | 41.300 | 1.610 | 1.626 |
| L1 | 24.800 | 25.100 | 0.976 | 0.988 |
| L2 | 20.300 | 20.600 | 0.799 | 0.811 |
| Φ | 7.100 | 7.300 | 0.280 | 0.287 |
| e | 5.450 TYP | | 0.215 TYP | |
| H | 5.980 REF | | 0.235 REF | |



Declaration

- FIRST reserves the right to change the specifications, the same specifications of products due to different packaging line mold, the size of the appearance will be slightly different, shipped in kind, without notice! Customers should obtain the latest version information before ordering, and verify whether the relevant information is complete and up-to-date.
- Any semiconductor product under certain conditions has the possibility of failure or failure, The buyer has the responsibility to comply with safety standards and take safety measures when using FIRST products for system design and manufacturing, To avoid To avoid potential failure risks, which may cause personal injury or property damage!
- Product promotion endless, our company will wholeheartedly provide customers with better products!

ATTACHMENT

Revision History

| Date | REV | Description | Page |
|------------|-----|-----------------|------|
| 2018.01.01 | 1.0 | Initial release | |