



TGDN-Channel Enhancement Mode Power MOSFET

Description

The TGD8580D uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.

General Features

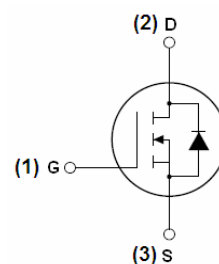
- $V_{DS} = 85V, I_D = 80A$
 $R_{DS(ON)} < 8.5m\Omega @ V_{GS} = 10V$ (Typ: 6.8mΩ)
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Special designed for convertors and power controls
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

Application

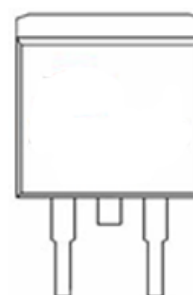
- Power switching application
- Hard switched and High frequency circuits
- Uninterruptible power supply

100% UIS TESTED!

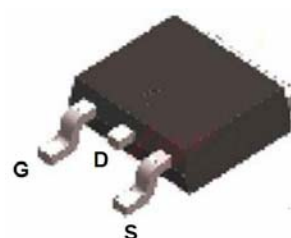
100% ΔV_{ds} TESTED!



Schematic diagram



pin assignment



TO-263-2L top view

Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|----------|----------------|-----------|------------|----------|
| TGD8580D | TGD8580D | TO-263-2L | - | - | - |

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|--|---------------------|------------|---------------|
| Drain-Source Voltage | V_{DS} | 85 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous | I_D | 80 | A |
| Drain Current-Continuous($T_C = 100^\circ C$) | $I_D (100^\circ C)$ | 60 | A |
| Pulsed Drain Current | I_{DM} | 320 | A |
| Maximum Power Dissipation | P_D | 170 | W |
| Peak diode recovery voltage | dv/dt | 15 | V/ns |
| Derating factor | | 1.13 | W/ $^\circ C$ |
| Single pulse avalanche energy (Note 5) | E_{AS} | 620 | mJ |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 175 | $^\circ C$ |

**Thermal Characteristic**

| | | | |
|--|-----------------|------|----------------------|
| Thermal Resistance, Junction-to-Case ^(Note 2) | $R_{\theta JC}$ | 0.88 | $^{\circ}\text{C/W}$ |
|--|-----------------|------|----------------------|

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

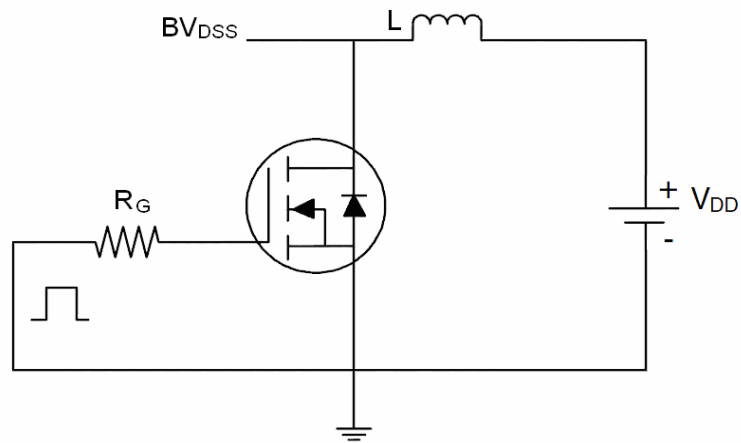
| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---------------------|--|-----|------|------|------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V I _D =250μA | 87 | 89 | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =85V, V _{GS} =0V | - | - | 1 | μA |
| Gate-Body Leakage Current | I _{GSS} | V _{GS} =±20V, V _{DS} =0V | - | - | ±100 | nA |
| On Characteristics ^(Note 3) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250μA | 2 | 2.85 | 4 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =10V, I _D =40A | - | 6.8 | 8.5 | mΩ |
| Forward Transconductance | g _{FS} | V _{DS} =25V, I _D =40A | 110 | - | - | S |
| Dynamic Characteristics ^(Note4) | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =25V, V _{GS} =0V, F=1.0MHz | - | 4400 | - | PF |
| Output Capacitance | C _{oss} | | - | 340 | - | PF |
| Reverse Transfer Capacitance | C _{rss} | | - | 260 | - | PF |
| Switching Characteristics ^(Note 4) | | | | | | |
| Turn-on Delay Time | t _{d(on)} | VDD=30V, ID=2A, RL=15Ω , RG=2.5Ω, VGS=10V | - | 18 | - | nS |
| Turn-on Rise Time | t _r | | - | 12 | - | nS |
| Turn-Off Delay Time | t _{d(off)} | | - | 56 | - | nS |
| Turn-Off Fall Time | t _f | | - | 15 | - | nS |
| Total Gate Charge | Q _g | V _{DS} =30V, I _D =30A, V _{GS} =10V | - | 100 | - | nC |
| Gate-Source Charge | Q _{gs} | | - | 20 | - | nC |
| Gate-Drain Charge | Q _{gd} | | - | 30 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage ^(Note 3) | V _{SD} | V _{GS} =0V, I _S =40A | - | - | 1.2 | V |
| Diode Forward Current ^(Note 2) | I _S | | - | - | 80 | A |
| Reverse Recovery Time | t _{rr} | T _j =25℃, I _F =75A di/dt=100A/μs ^(Note3) | - | | 36 | nS |
| Reverse Recovery Charge | Q _{rr} | | - | | 56 | nC |
| Forward Turn-On Time | t _{on} | Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD) | | | | |

Notes:

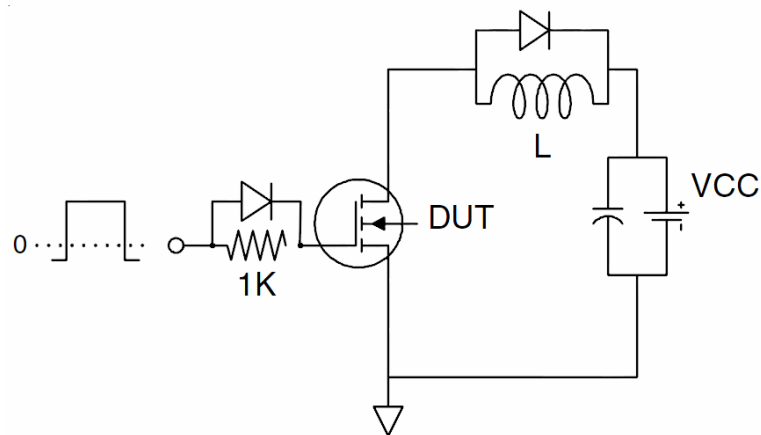
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=40V, V_G=10V, L=0.5mH, R_g=25\Omega$

Test Circuit

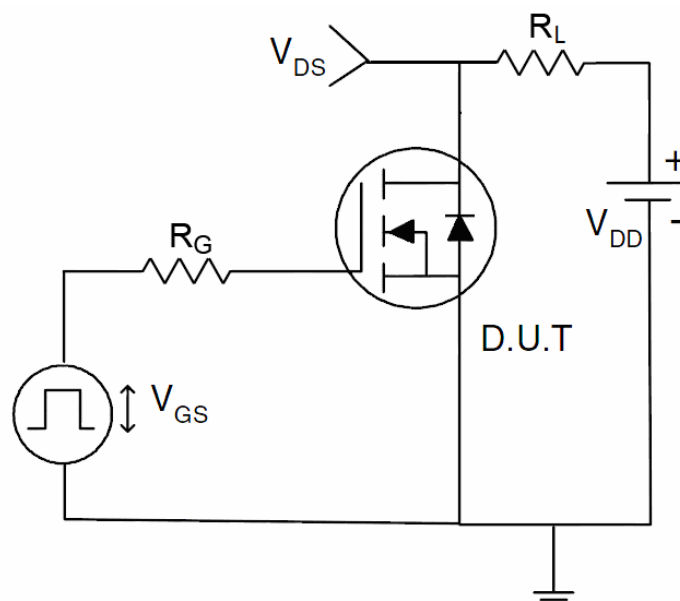
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

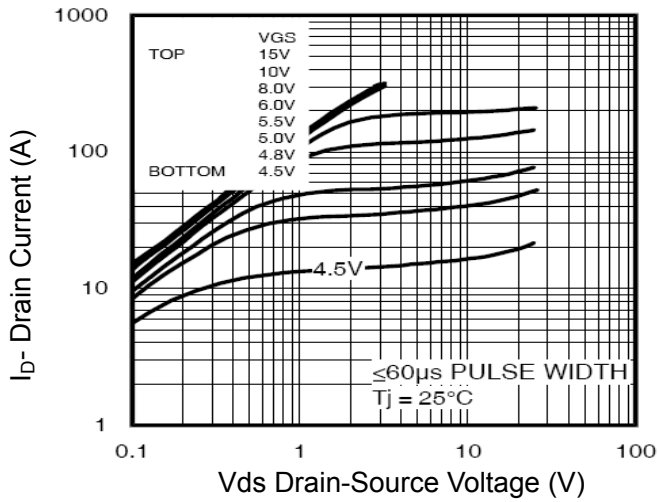


Figure 1 Output Characteristics

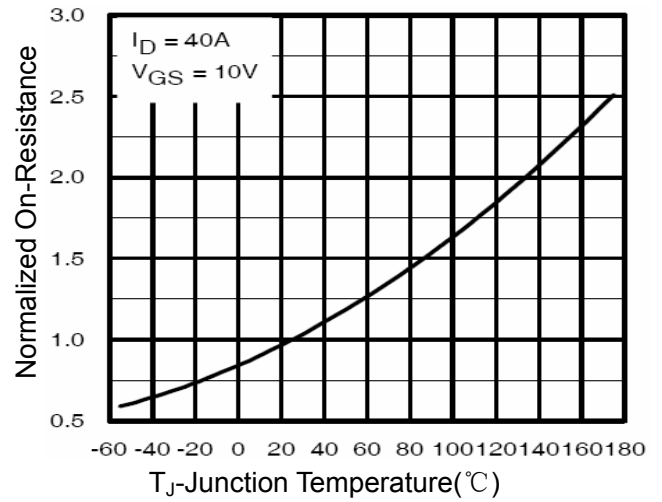


Figure 4 Rdson-Junction Temperature

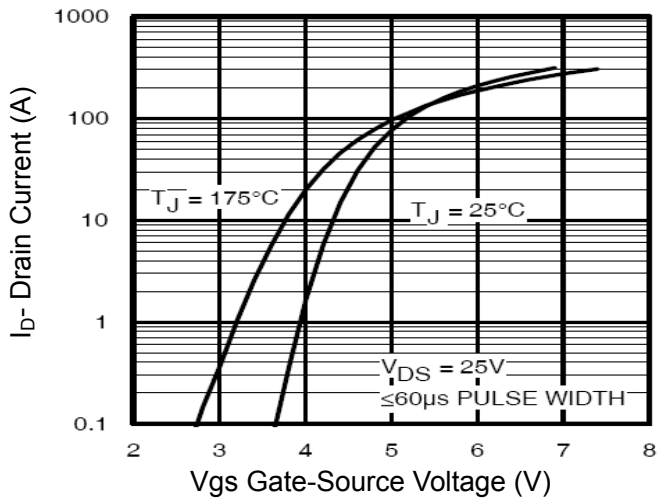


Figure 2 Transfer Characteristics

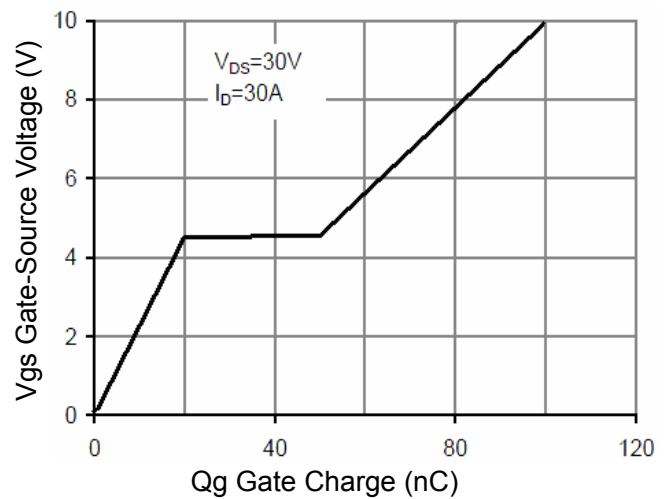


Figure 5 Gate Charge

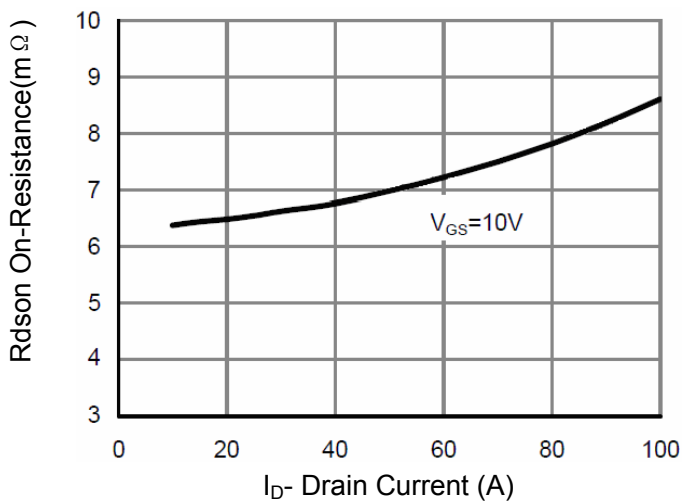


Figure 3 Rdson- Drain Current

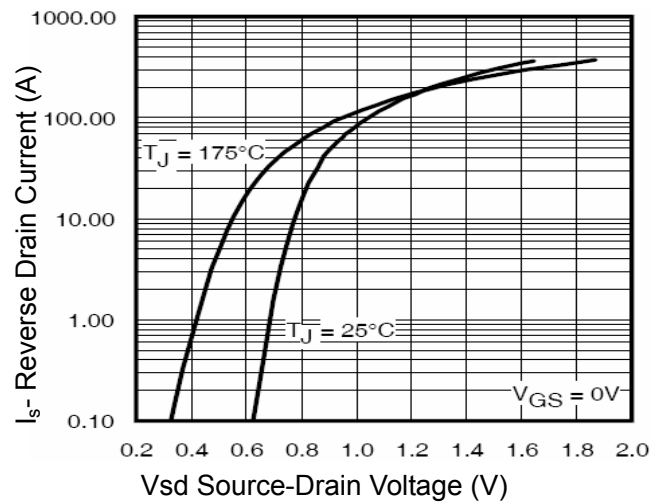


Figure 6 Source- Drain Diode Forward

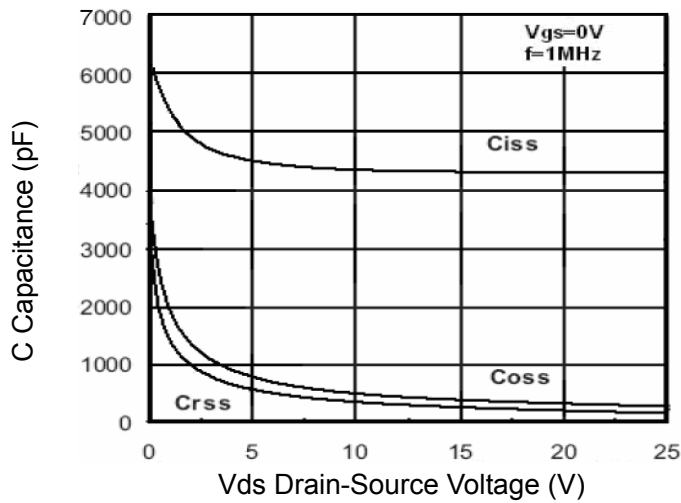


Figure 7 Capacitance vs Vds

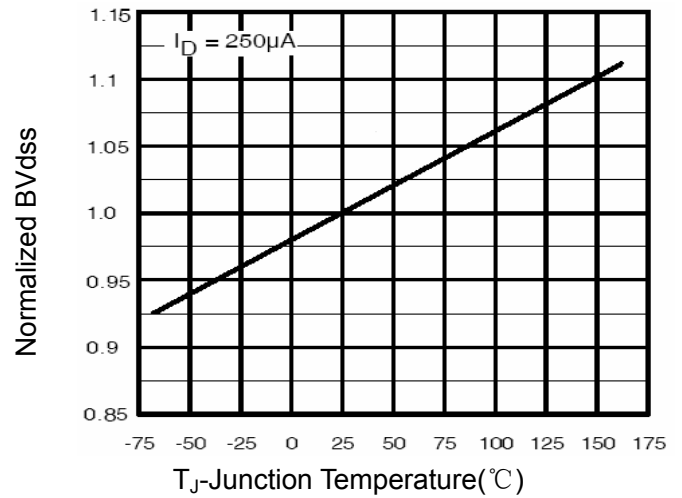
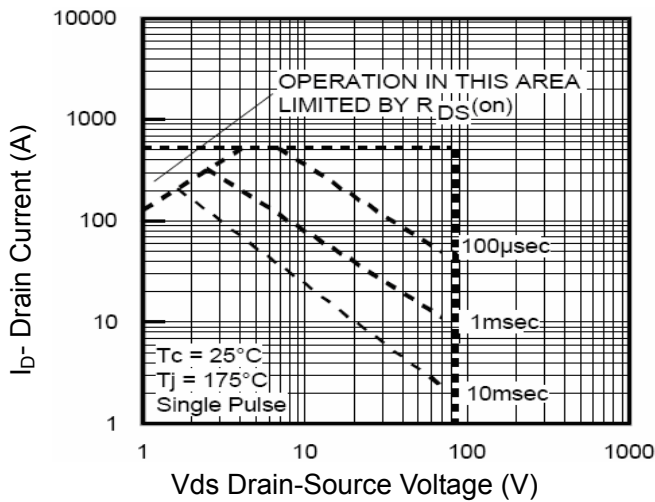

Figure 9 BV_{DSS} vs Junction Temperature


Figure 8 Safe Operation Area

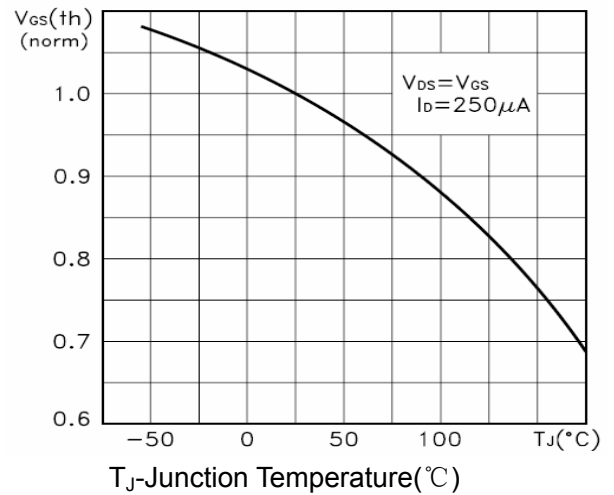
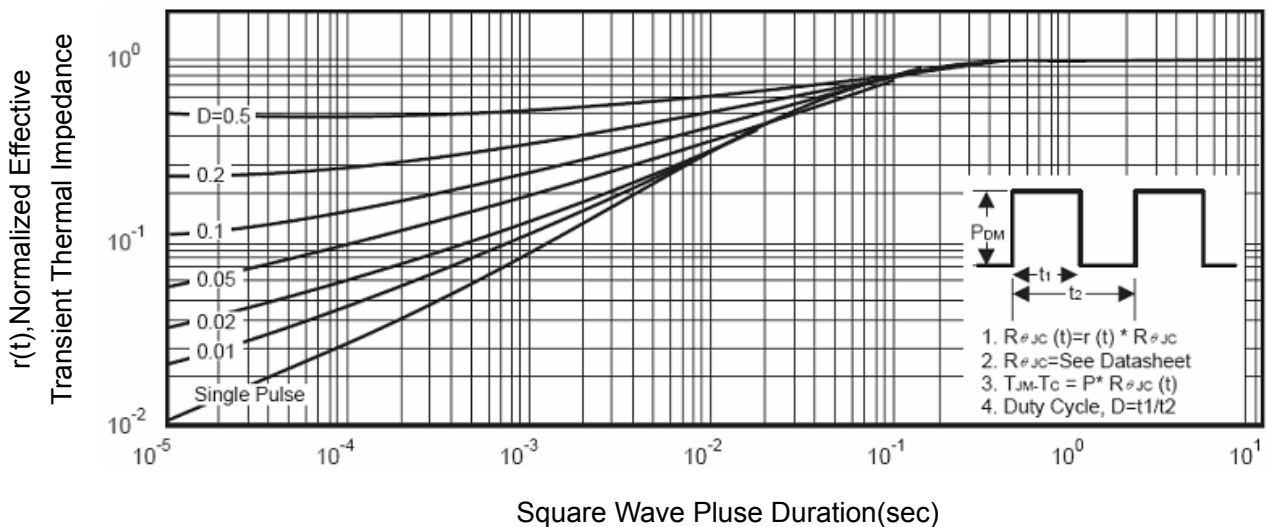
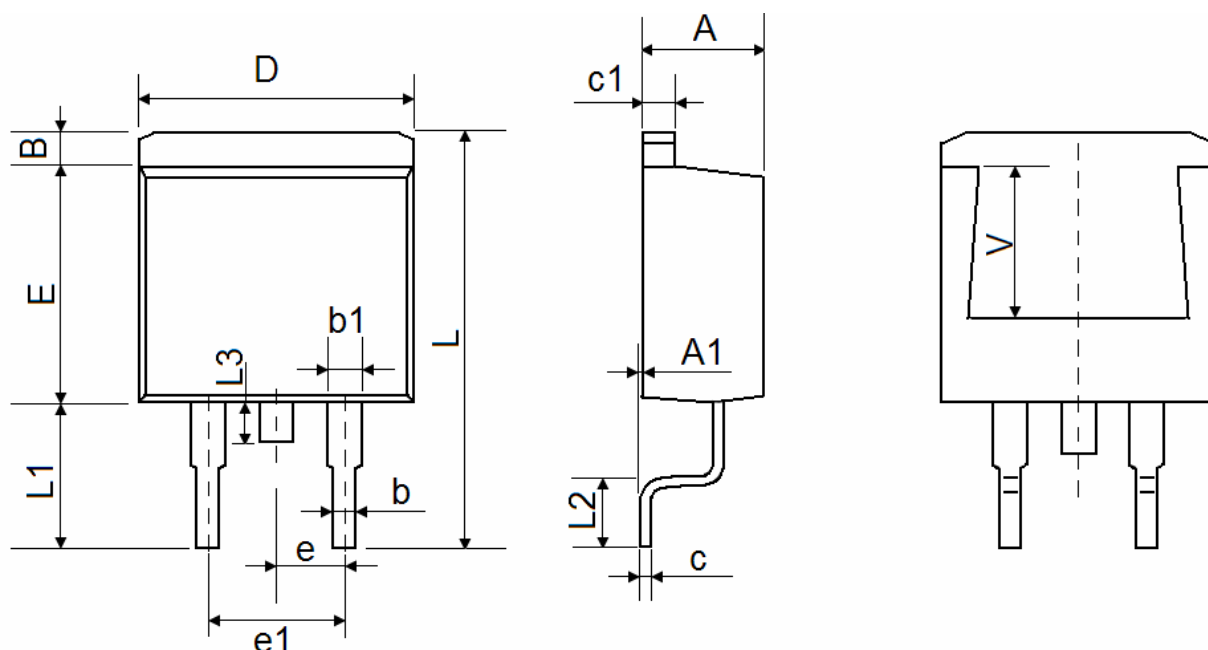

Figure 10 $V_{GS(th)}$ vs Junction Temperature


Figure 11 Normalized Maximum Transient Thermal Impedance



TO-263-2L Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.470 | 4.670 | 0.176 | 0.184 |
| A1 | 0.000 | 0.150 | 0.000 | 0.006 |
| B | 1.170 | 1.370 | 0.046 | 0.054 |
| b | 0.710 | 0.910 | 0.028 | 0.036 |
| b1 | 1.170 | 1.370 | 0.046 | 0.054 |
| c | 0.310 | 0.530 | 0.012 | 0.021 |
| c1 | 1.170 | 1.370 | 0.046 | 0.054 |
| D | 10.010 | 10.310 | 0.394 | 0.406 |
| E | 8.500 | 8.900 | 0.335 | 0.350 |
| e | 2.540 TYP. | | 0.100 TYP. | |
| e1 | 4.980 | 5.180 | 0.196 | 0.204 |
| L | 15.050 | 15.450 | 0.593 | 0.608 |
| L1 | 5.080 | 5.480 | 0.200 | 0.216 |
| L2 | 2.340 | 2.740 | 0.092 | 0.108 |
| L3 | 1.300 | 1.700 | 0.051 | 0.067 |
| V | 5.600 REF | | 0.220 REF | |