

N-Channel Enhancement Mode Power MOSFET

Description

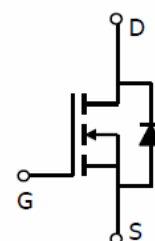
The HM4264B uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

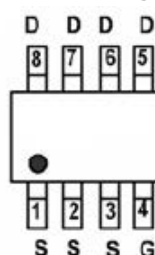
- $V_{DS} = 50V, I_D = 1A$
 $R_{DS(ON)} < 7.6m\Omega @ V_{GS}=10V$ (Typ:5.7m Ω)
 $R_{DS(ON)} < 8.0m\Omega @ V_{GS}=4.5V$ (Typ:6.3m Ω)
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Low gate to drain charge to reduce switching losses

Application

- Power switching application
- Load switch



Schematic diagram



Marking and pin assignment



SOP-8 top view

Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|---------|----------------|-----------|------------|------------|
| HM4264B | HM4264B | SOP-8 | Ø330mm | 12mm | 2500 units |

Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|---|--------------------------|------------|------------------|
| Drain-Source Voltage | V_{DS} | 50 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous | I_D | 1A | A |
| Drain Current-Continuous($T_C=100^\circ\text{C}$) | $I_D(100^\circ\text{C})$ | 0.5 | A |
| Pulsed Drain Current | I_{DM} | 1 | A |
| Maximum Power Dissipation | P_D | 3 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 150 | $^\circ\text{C}$ |

Thermal Characteristic

| | | | |
|--|-----------------|----|--------------------|
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 42 | $^\circ\text{C/W}$ |
|--|-----------------|----|--------------------|

Electrical Characteristics (TC=25°C unless otherwise noted)

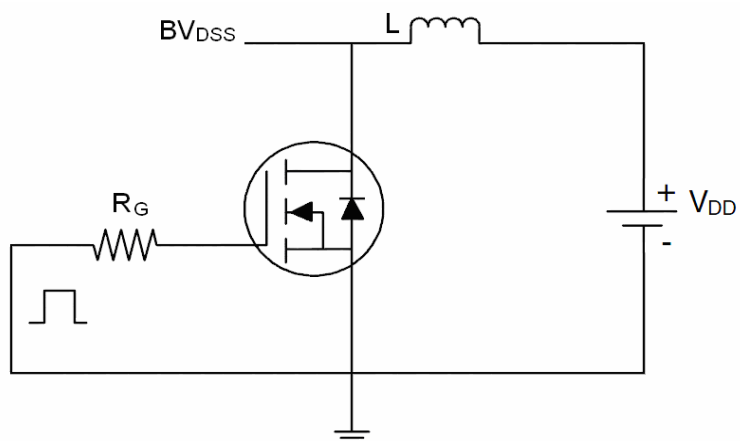
| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---------------------|--|-----|------|------|------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V I _D =250μA | 50 | | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =50V, 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 | 0.9 | 1.2 | 1.8 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =10V, I _D =1⅐ A | - | 5.7 | 7.6 | mΩ |
| | | V _{GS} =4.5V, I _D =6A | - | 6.3 | 8.0 | mΩ |
| Forward Transconductance | g _{FS} | V _{DS} =5V, I _D =1⅐ A | 40 | - | - | S |
| Dynamic Characteristics ^(Note4) | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =30V, V _{GS} =0V, F=1.0MHz | - | 4100 | - | PF |
| Output Capacitance | C _{oss} | | - | 298 | - | PF |
| Reverse Transfer Capacitance | C _{rss} | | - | 229 | - | PF |
| Switching Characteristics ^(Note 4) | | | | | | |
| Turn-on Delay Time | t _{d(on)} | V _{DD} =30V, R _L =1Ω V _{GS} =10V, R _{GEN} =3Ω | - | 8.5 | - | nS |
| Turn-on Rise Time | t _r | | - | 7 | - | nS |
| Turn-Off Delay Time | t _{d(off)} | | - | 40 | - | nS |
| Turn-Off Fall Time | t _f | | - | 15 | - | nS |
| Total Gate Charge | Q _g | V _{DS} =30V, I _D =1⅐ A, V _{GS} =10V | - | 93 | - | nC |
| Gate-Source Charge | Q _{gs} | | - | 9.7 | - | nC |
| Gate-Drain Charge | Q _{gd} | | - | 20 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage ^(Note 3) | V _{SD} | V _{GS} =0V, I _S =1⅐ A | - | - | 1.2 | V |
| Diode Forward Current ^(Note 2) | I _S | | - | - | 1⅐ | A |
| Reverse Recovery Time | t _{rr} | TJ = 25°C, IF=1⅐ A | - | 32 | - | nS |
| Reverse Recovery Charge | Q _{rr} | di/dt = 100A/μs ^(Note3) | - | 45 | - | nC |

Notes:

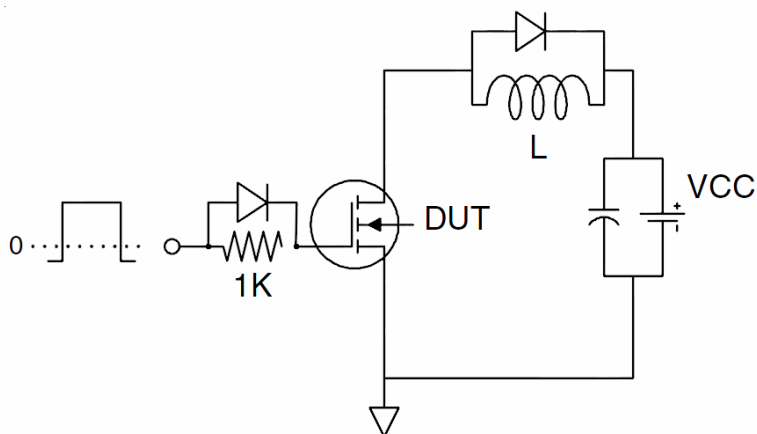
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Test Circuit

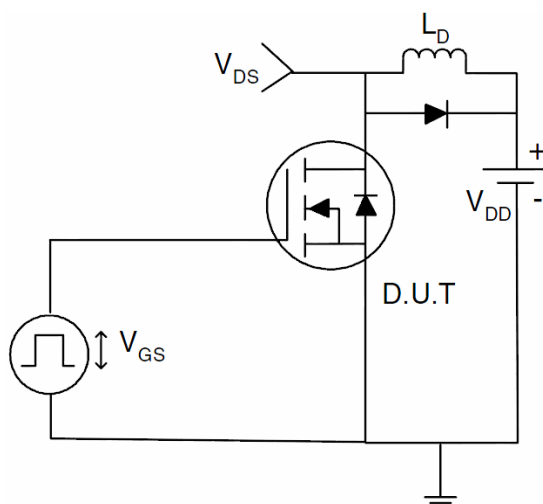
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics (Curves)

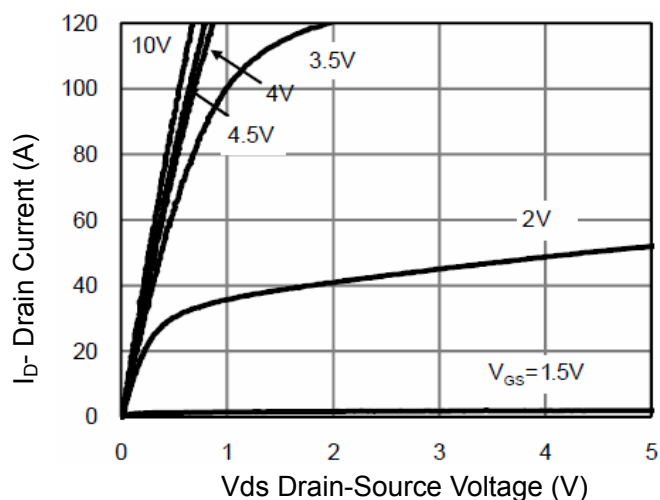


Figure 1 Output Characteristics

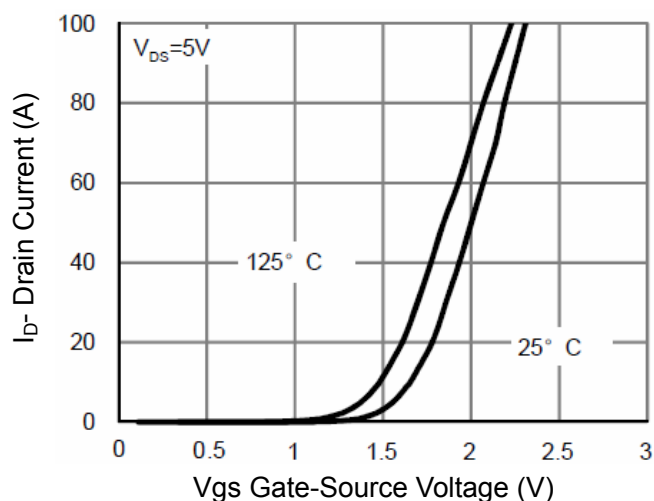


Figure 2 Transfer Characteristics

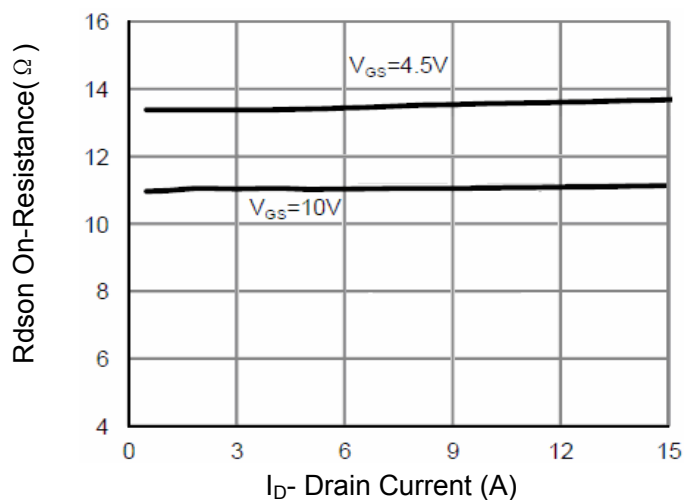


Figure 3 Rdson- Drain Current

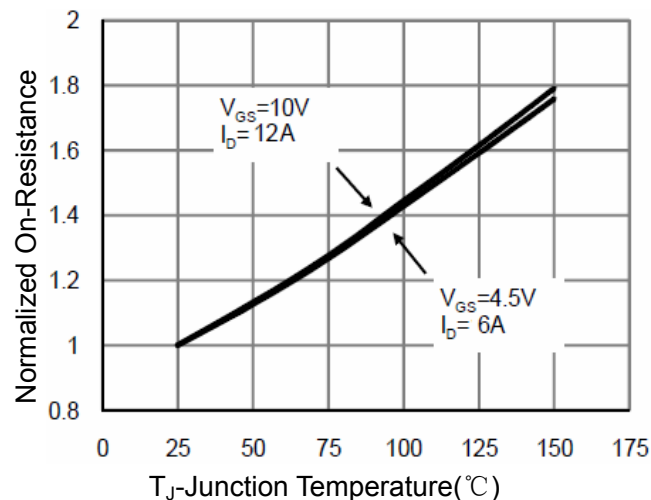


Figure 4 Rdson-Junction Temperature

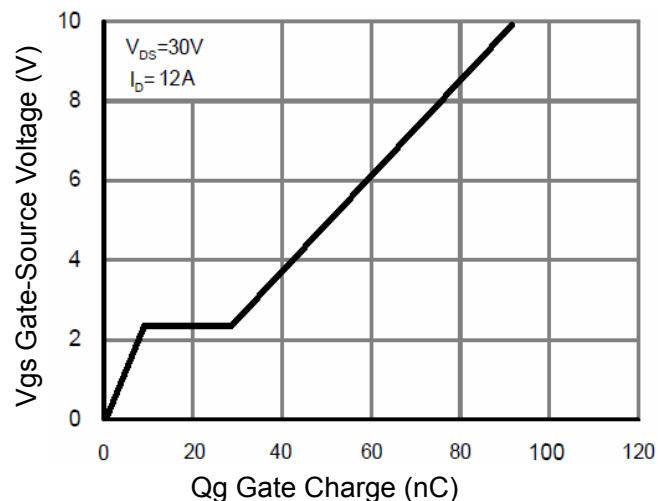


Figure 5 Gate Charge

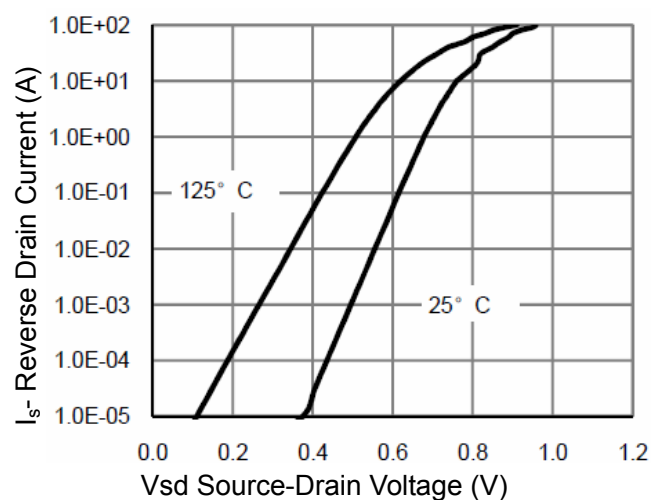


Figure 6 Source- Drain Diode Forward

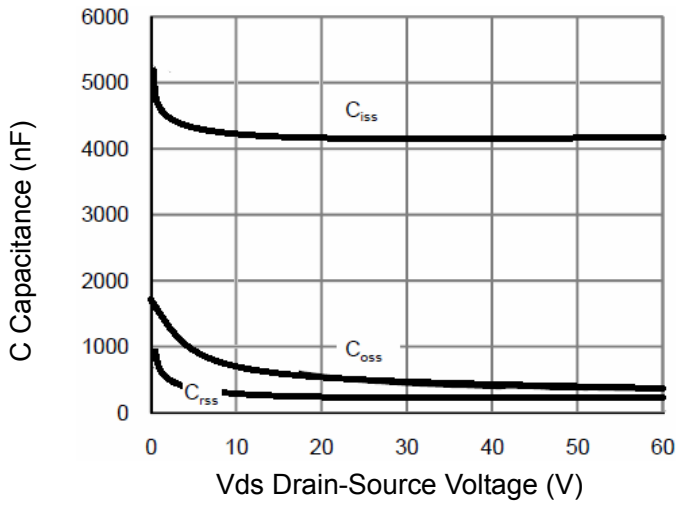


Figure 7 Capacitance vs Vds

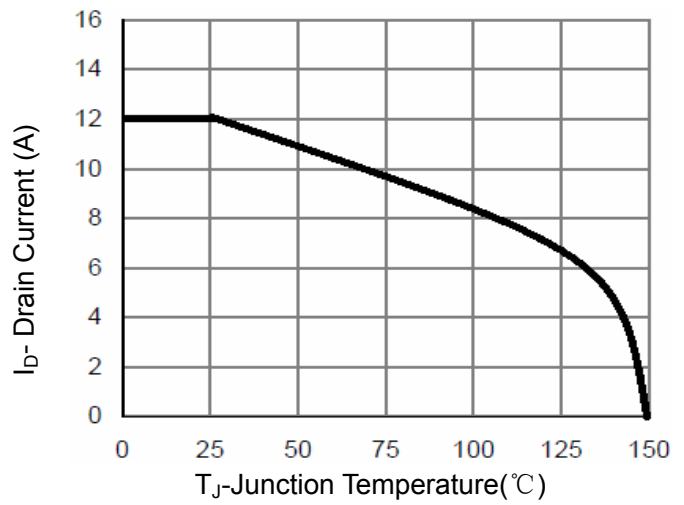


Figure 9 Current De-rating

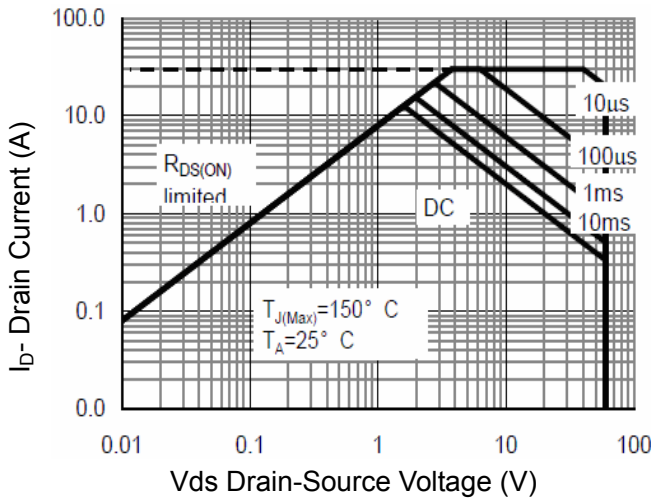


Figure 8 Safe Operation Area

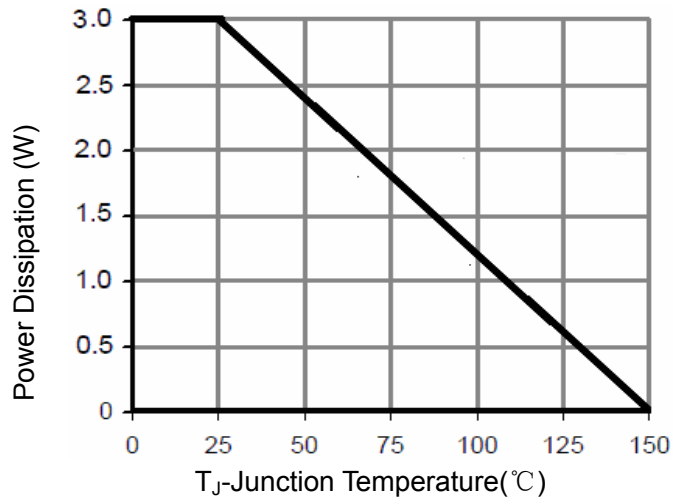


Figure 10 Power De-rating

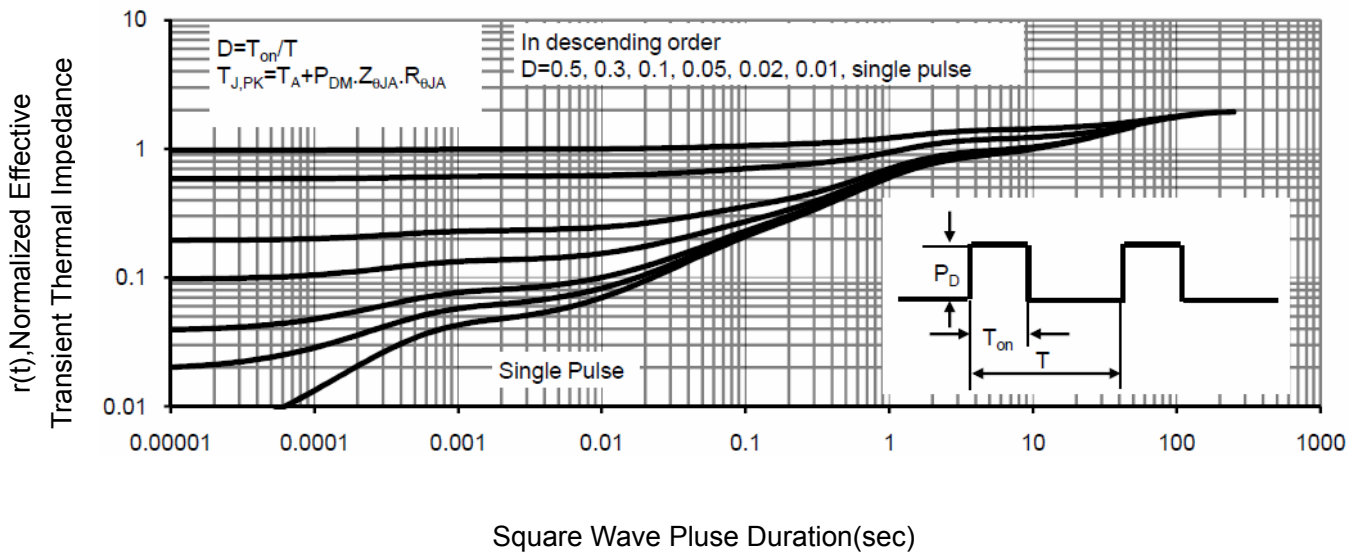
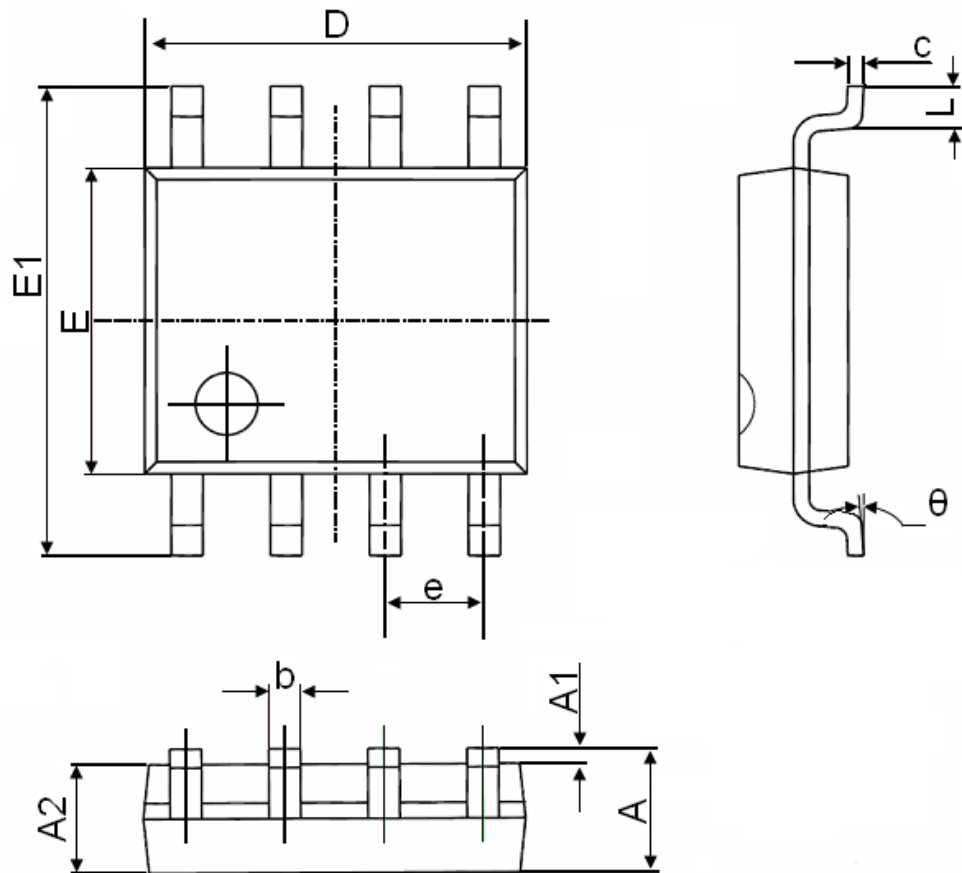


Figure 11 Normalized Maximum Transient Thermal Impedance

SOP-8 Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 1.350 | 1.750 | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | 0.013 | 0.020 |
| c | 0.170 | 0.250 | 0.006 | 0.010 |
| D | 4.700 | 5.100 | 0.185 | 0.200 |
| E | 3.800 | 4.000 | 0.150 | 0.157 |
| E1 | 5.800 | 6.200 | 0.228 | 0.244 |
| e | 1.270(BSC) | | 0.050(BSC) | |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |

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