

N-Channel 80 V (D-S) MOSFET

| PRODUCT SUMMARY | | | |
|---------------------|---------------------------------|---------------------------------|-----------------------|
| V _{DS} (V) | R _{DS(on)} (Ω) | I _D (A) ^a | Q _g (Typ.) |
| 80 | 0.062 at V _{GS} = 10 V | 3.5 | 7.3 nC |

FEATURES

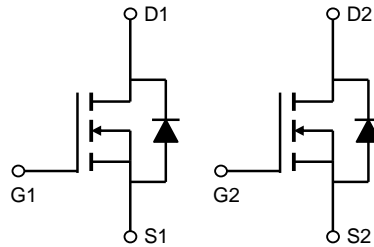
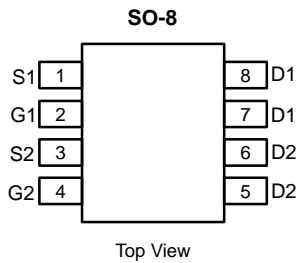
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFET
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- DC/DC Conversion
- Notebook System Power



| Absolute Maximum Ratings T _A =25°C unless otherwise noted | | | |
|--|-----------------------------------|----------------------|-------|
| Parameter | Symbol | Maximum | Units |
| Drain-Source Voltage | V _{DS} | 80 | V |
| Gate-Source Voltage | V _{GS} | ±30 | V |
| Continuous Drain Current | I _D | T _A =25°C | 3.5 |
| | | T _A =70°C | 2.9 |
| Pulsed Drain Current ^C | I _{DM} | 18 | A |
| Avalanche Current ^C | I _{AR} | 16 | A |
| Repetitive avalanche energy L=0.1mH ^C | E _{AR} | 12.8 | mJ |
| Power Dissipation ^B | P _D | T _A =25°C | 2 |
| | | T _A =70°C | 1.3 |
| Junction and Storage Temperature Range | T _J , T _{STG} | -55 to 150 | °C |

| Thermal Characteristics | | | | | |
|--|------------------|--------------|-----|-------|------|
| Parameter | Symbol | Typ | Max | Units | |
| Maximum Junction-to-Ambient ^A | R _{θJA} | t ≤ 10s | 48 | 62.5 | °C/W |
| Maximum Junction-to-Ambient ^{A,D} | | Steady-State | 74 | 90 | °C/W |
| Maximum Junction-to-Lead | R _{θJL} | Steady-State | 32 | 40 | °C/W |

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|-----------------------------|--|---|-------------------------------------|-------------|--------|-------|
| STATIC PARAMETERS | | | | | | |
| B _V DSS | Drain-Source Breakdown Voltage | I _D =250μA, V _{GS} =0V | 80 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =80V, V _{GS} =0V T _J =55°C | | | 1 5 | μA |
| I _{GSS} | Gate-Body leakage current | V _{DS} =0V, V _{GS} = ±30V | | | 100 | nA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} I _D =250μA | 3.5 | 4.2 | 5 | V |
| I _{D(ON)} | On state drain current | V _{GS} =10V, V _{DS} =5V | 18 | | | A |
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =10V, I _D =3.5A T _J =125°C | | 62 113.0 | | mΩ |
| g _{FS} | Forward Transconductance | V _{DS} =5V, I _D =3.5A | | 15 | | S |
| V _{SD} | Diode Forward Voltage | I _S =1A, V _{GS} =0V | | 0.77 | 1 | V |
| I _S | Maximum Body-Diode Continuous Current | | | | 2.5 | A |
| I _{SM} | Pulsed Body-diode Current ^c | | | | 18 | A |
| DYNAMIC PARAMETERS | | | | | | |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =40V, f=1MHz | 510 | 640 | 770 | pF |
| C _{oss} | Output Capacitance | | 28 | 40 | 52 | pF |
| C _{rss} | Reverse Transfer Capacitance | | 12 | 20 | 30 | pF |
| R _g | Gate resistance | V _{GS} =0V, V _{DS} =0V, f=1MHz | 0.9 | 1.8 | 2.7 | Ω |
| SWITCHING PARAMETERS | | | | | | |
| Q _{g(10V)} | Total Gate Charge | V _{GS} =10V, V _{DS} =40V, I _D =3.5A | 8 | 11 | 13 | nC |
| Q _{g(4.5V)} | Total Gate Charge | | 4 | 5.5 | 7 | |
| Q _{gs} | Gate Source Charge | | 4 | 5 | 6 | nC |
| Q _{gd} | Gate Drain Charge | | 0.7 | 1.2 | 1.7 | nC |
| t _{D(on)} | Turn-On DelayTime | V _{GS} =10V, V _{DS} =40V, R _L =8Ω, R _{GEN} =3Ω | | 7.2 | | ns |
| t _r | Turn-On Rise Time | | | 2.2 | | ns |
| t _{D(off)} | Turn-Off DelayTime | | | 17 | | ns |
| t _f | Turn-Off Fall Time | | | 2 | | ns |
| t _{rr} | Body Diode Reverse Recovery Time | | I _F =3.5A, dI/dt=300A/μs | 14 | 20 | 26 |
| Q _{rr} | Body Diode Reverse Recovery Charge | I _F =3.5A, dI/dt=300A/μs | 35 | 50 | 65 | 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 value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on T_{J(MAX)}=150°C, using ≤ 10s junction-to-ambient thermal resistance.

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 R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

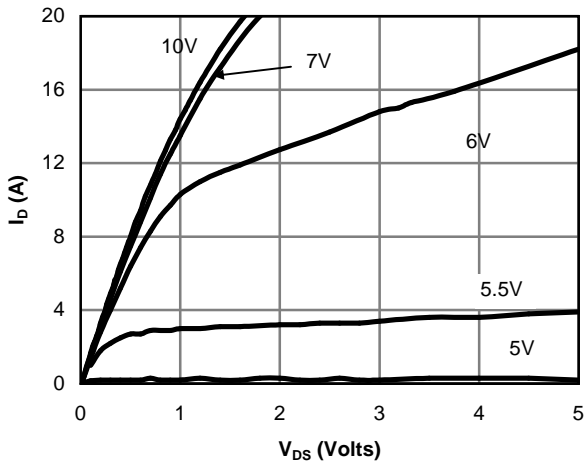


Fig 1: On-Region Characteristics (Note E)

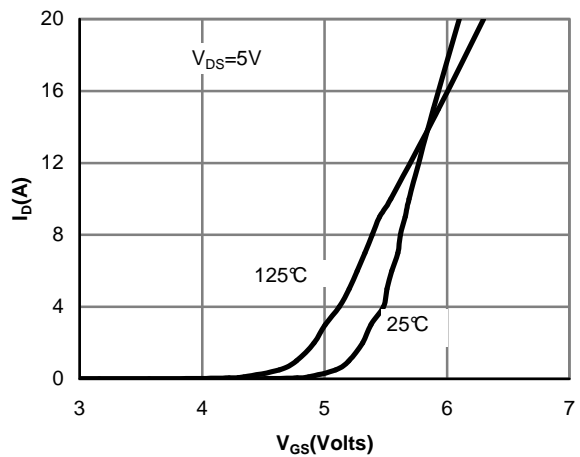


Figure 2: Transfer Characteristics (Note E)

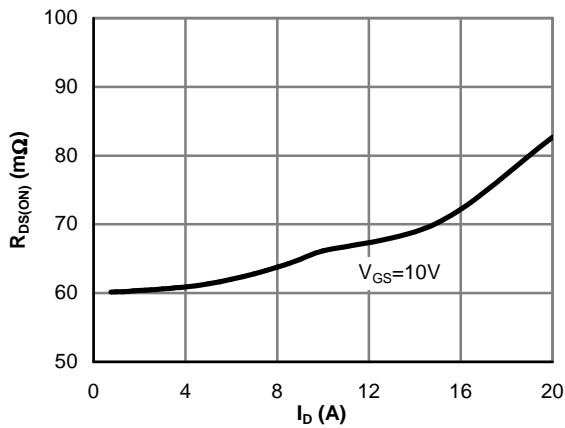


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

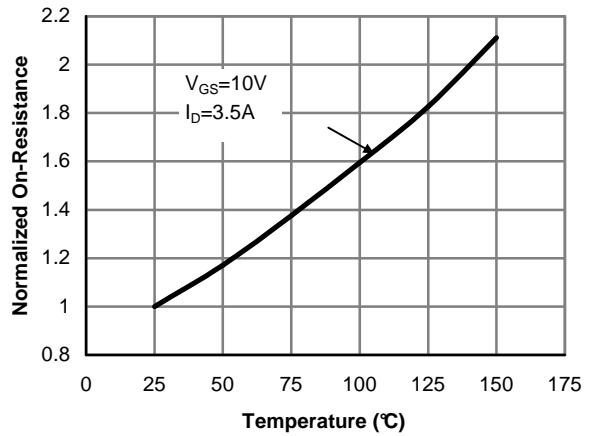


Figure 4: On-Resistance vs. Junction Temperature (Note E)

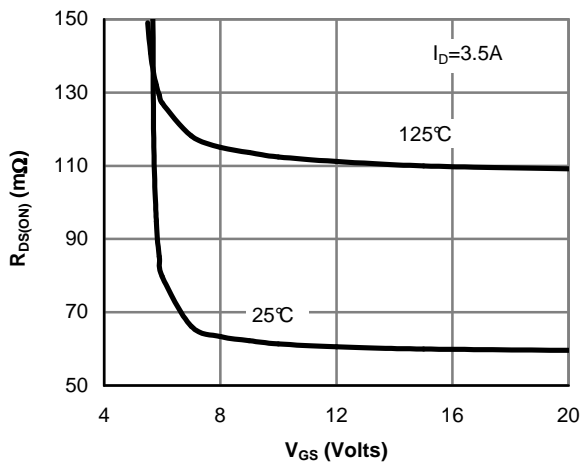


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

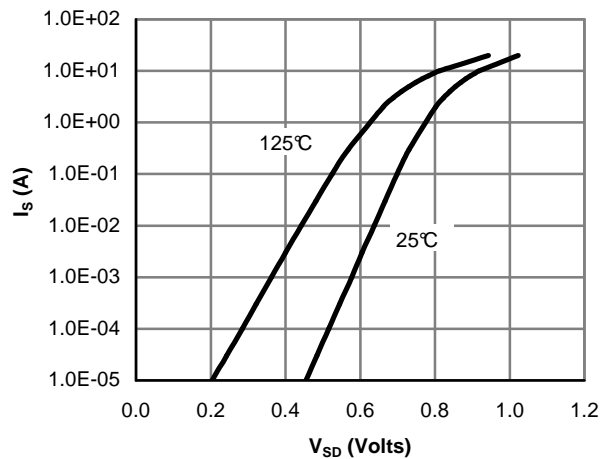


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

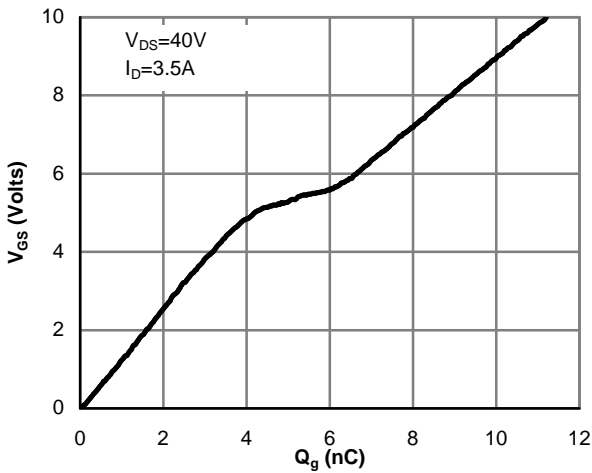


Figure 7: Gate-Charge Characteristics

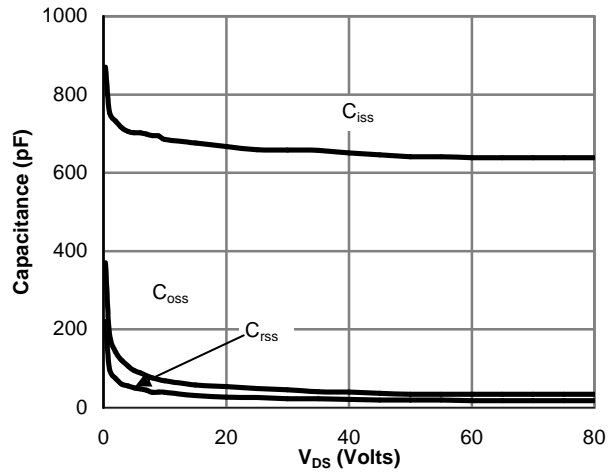


Figure 8: Capacitance Characteristics

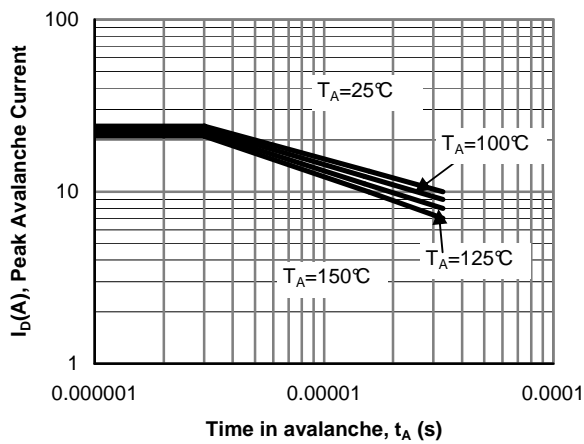


Figure 12: Single Pulse Avalanche capability

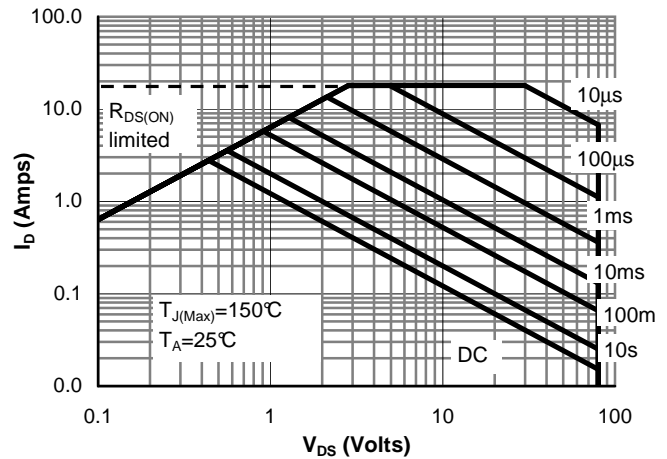


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

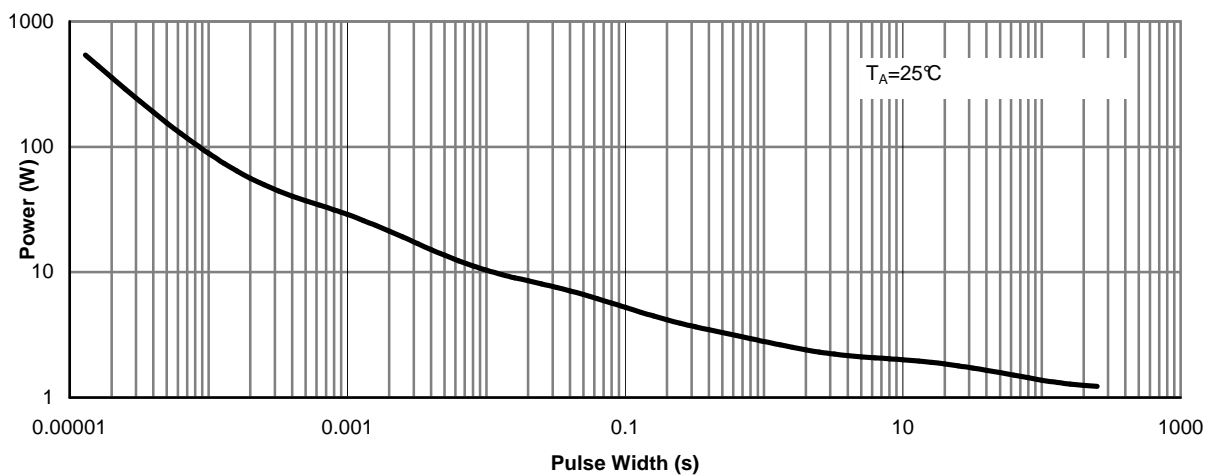


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

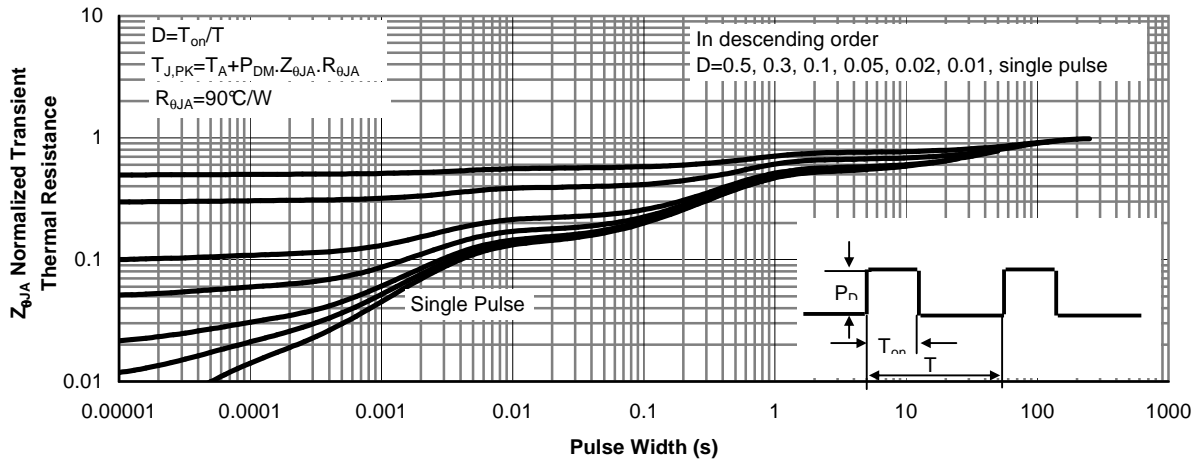
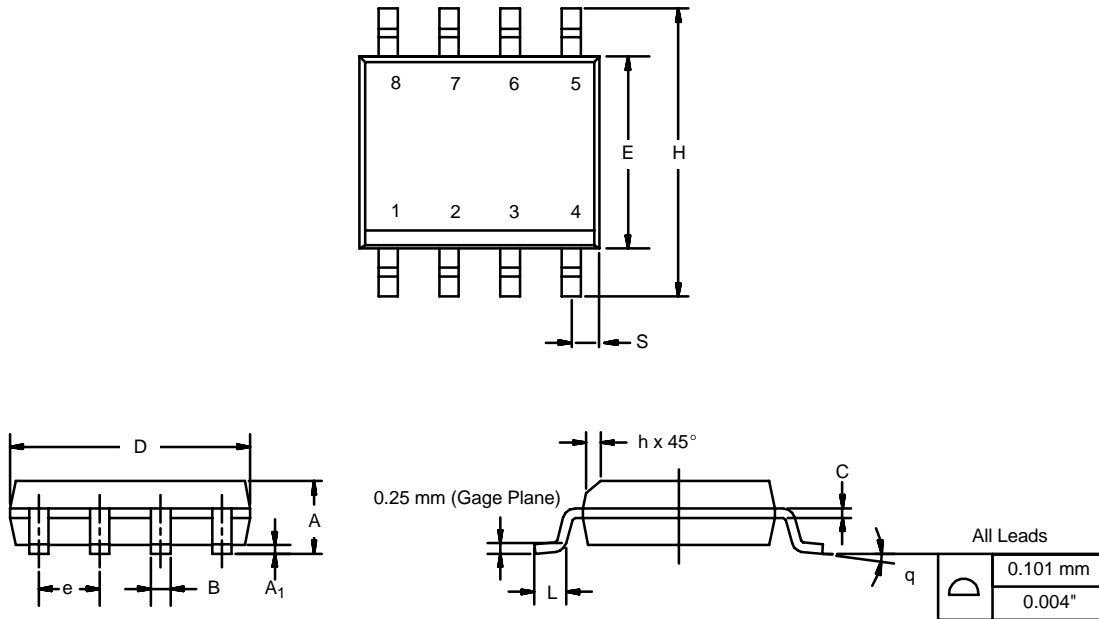


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

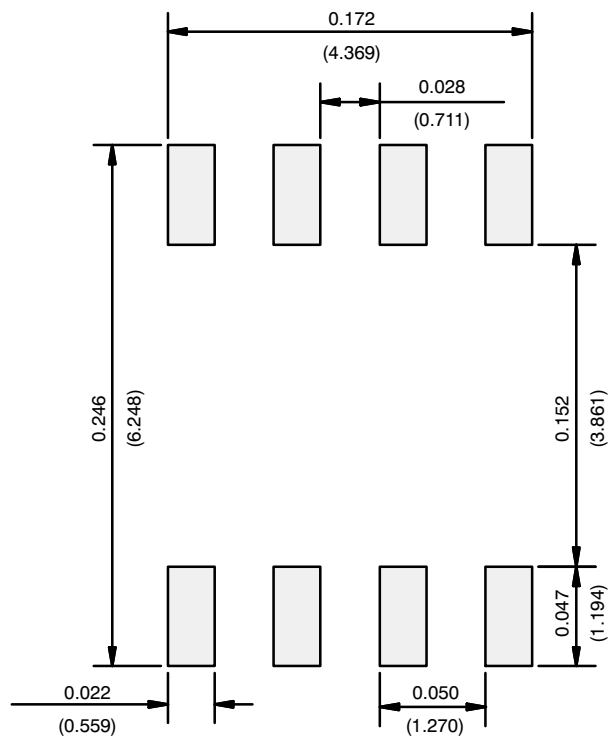
SOIC (NARROW): 8-LEAD

JEDEC Part Number: MS-012



| DIM | MILLIMETERS | | INCHES | |
|--------------------------------|-------------|------|-----------|-------|
| | Min | Max | Min | Max |
| A | 1.35 | 1.75 | 0.053 | 0.069 |
| A ₁ | 0.10 | 0.20 | 0.004 | 0.008 |
| B | 0.35 | 0.51 | 0.014 | 0.020 |
| C | 0.19 | 0.25 | 0.0075 | 0.010 |
| D | 4.80 | 5.00 | 0.189 | 0.196 |
| E | 3.80 | 4.00 | 0.150 | 0.157 |
| e | 1.27 BSC | | 0.050 BSC | |
| H | 5.80 | 6.20 | 0.228 | 0.244 |
| h | 0.25 | 0.50 | 0.010 | 0.020 |
| L | 0.50 | 0.93 | 0.020 | 0.037 |
| q | 0° | 8° | 0° | 8° |
| S | 0.44 | 0.64 | 0.018 | 0.026 |
| ECN: C-06527-Rev. I, 11-Sep-06 | | | | |
| DWG: 5498 | | | | |

RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads
Dimensions in Inches/(mm)

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APPLICATION NOTE

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