

MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



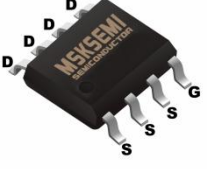
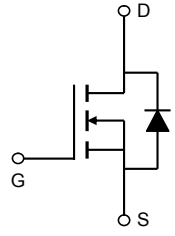

PLED

AO4402-MS

Product specification

Features

- $V_{DS} (V) = 20V$
- $I_D = 20 A (V_{GS} = 4.5V)$
- $R_{DS(ON)} < 5.5m \Omega (V_{GS} = 4.5V)$
- $R_{DS(ON)} < 7m \Omega (V_{GS} = 2.5V)$

| PACKAGE OUTLINE | N-Channel MOSFET | Marking |
|--|---|---|
|  SOP-8 |  |  |

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

| Parameter | | Symbol | Rating | Unit |
|---|-------------------|------------------|------------|---------------|
| Drain-Source Voltage | | V_{DS} | 20 | V |
| Gate-Source Voltage | | V_{GS} | ± 12 | |
| Continuous Drain Current | $T_A=25^{\circ}C$ | I_D | 20 | A |
| | $T_A=70^{\circ}C$ | | 16 | |
| Pulsed Drain Current | | I_{DM} | 140 | |
| Avalanche Current | | I_{AS}, I_{AR} | 57 | |
| Avalanche energy | $L=0.1mH$ | E_{AS}, E_{AR} | 162 | mJ |
| Power Dissipation | $T_A=25^{\circ}C$ | P_D | 3.1 | W |
| | $T_A=70^{\circ}C$ | | 2 | |
| Thermal Resistance.Junction- to-Ambient | $t \leq 10s$ | R_{thJA} | 40 | $^{\circ}C/W$ |
| | Steady-State | | 75 | |
| Thermal Resistance.Junction- to-Lead | | R_{thJL} | 24 | |
| Junction Temperature | | T_J | 150 | $^{\circ}C$ |
| Storage Temperature Range | | T_{stg} | -55 to 150 | |

Electrical Characteristics Ta = 25 °C

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---------------------------------------|---------------------|--|------|-----|-------|------|
| Drain-Source Breakdown Voltage | V _{DSS} | I _D =250 uA, V _{GS} =0V | 20 | | | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =20V, V _{GS} =0V | | | 1 | uA |
| | | V _{DS} =20V, V _{GS} =0V, T _J =55°C | | | 5 | |
| Gate-Body Leakage Current | I _{GSS} | V _{DS} =0V, V _{GS} = ± 12V | | | ± 100 | nA |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250uA | 0.5 | | 1.6 | V |
| Static Drain-Source On-Resistance | R _{DS(on)} | V _{GS} =4.5V, I _D =20A | | | 5.5 | m Ω |
| | | V _{GS} =4.5V, I _D =20A T _J =125°C | | | 7 | |
| | | V _{GS} =2.5V, I _D =18A | | | 7 | |
| On State Drain Current | I _{D(ON)} | V _{GS} =10V, V _{DS} =5V | 140 | | | A |
| Forward Transconductance | g _{FS} | V _{DS} =5V, I _D =20A | | 105 | | S |
| Input Capacitance | C _{iss} | V _{GS} =0V, V _{DS} =10V, f=1MHz | 3080 | | 4630 | pF |
| Output Capacitance | C _{oss} | | 520 | | 960 | |
| Reverse Transfer Capacitance | C _{rss} | | 350 | | 810 | |
| Gate Resistance | R _g | V _{GS} =0V, V _{DS} =0V, f=1MHz | 0.6 | | 2.1 | Ω |
| Total Gate Charge | Q _g | V _{GS} =10V, V _{DS} =10V, I _D =20A | 28 | | 43 | nC |
| Gate Source Charge | Q _{gs} | | 7 | | 11 | |
| Gate Drain Charge | Q _{gd} | | 7 | | 17 | |
| Turn-On DelayTime | t _{d(on)} | V _{GS} =10V, V _{DS} =10V, R _L =0.5Ω , R _{GEN} =3Ω | | 7 | | ns |
| Turn-On Rise Time | t _r | | | 8 | | |
| Turn-Off DelayTime | t _{d(off)} | | | 70 | | |
| Turn-Off Fall Time | t _f | | | 18 | | |
| Body Diode Reverse Recovery Time | t _{rr} | I _F = 20A, di/dt= 500A/us | 13 | | 20 | nC |
| Body Diode Reverse Recovery Charge | Q _{rr} | | 29 | | 43 | |
| Maximum Body-Diode Continuous Current | I _S | | | | 4 | A |
| Diode Forward Voltage | V _{SD} | I _S =1A, V _{GS} =0V | | | 1 | V |

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

Typical Characteristics

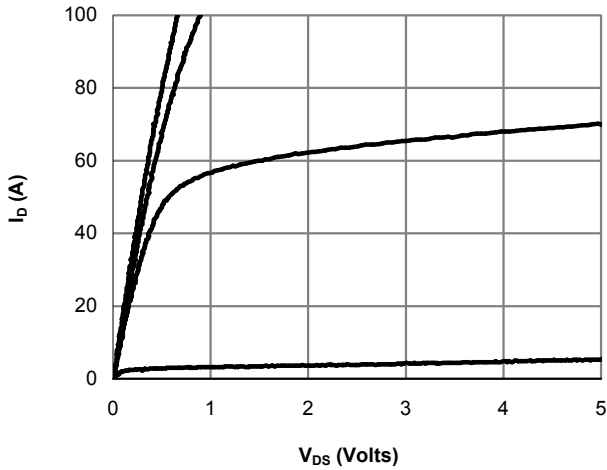


Fig 1: On-Region Characteristics (Note E)

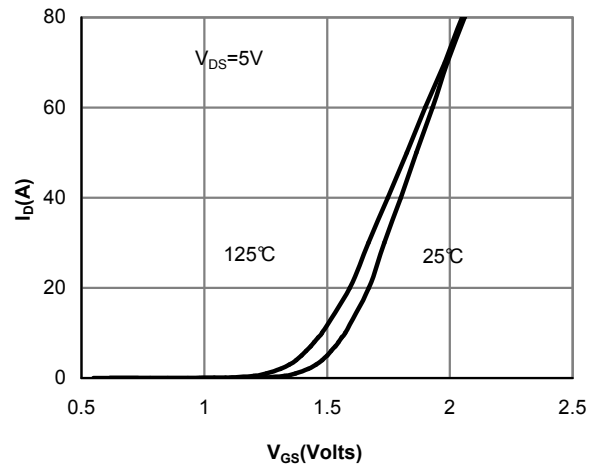


Figure 2: Transfer Characteristics (Note E)

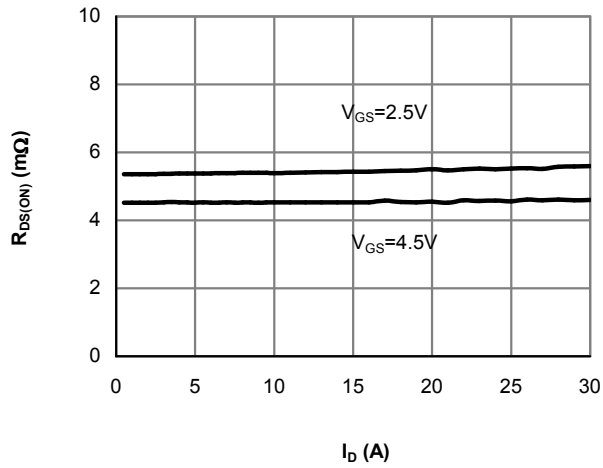


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

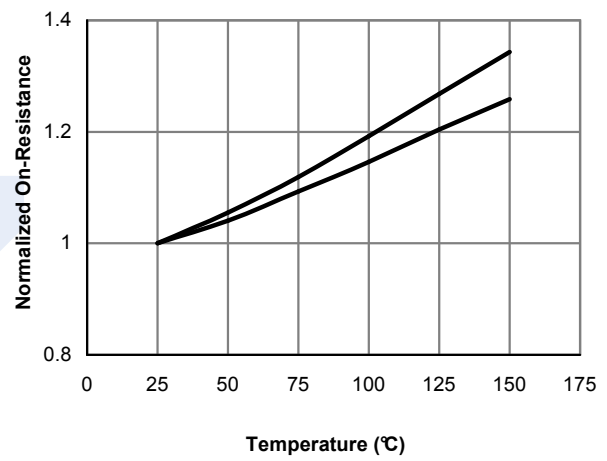


Figure 4: On-Resistance vs. Junction Temperature (Note E)

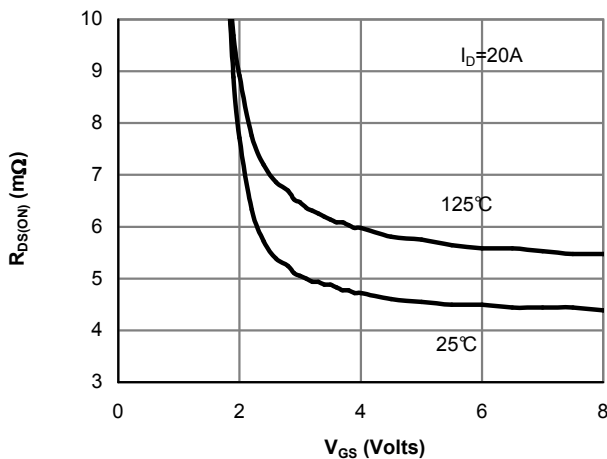


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

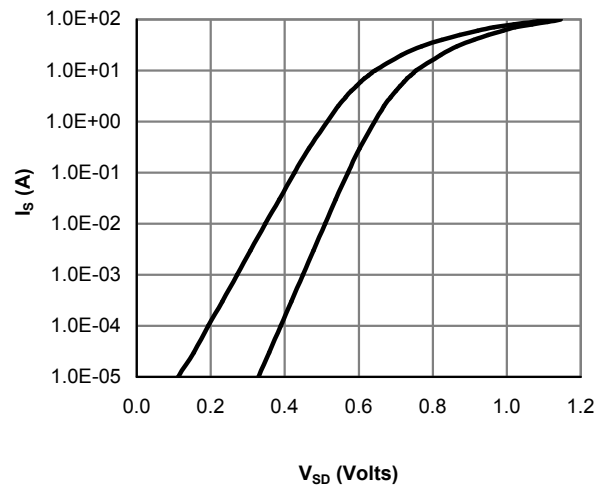


Figure 6: Body-Diode Characteristics (Note E)

Typical Characteristics

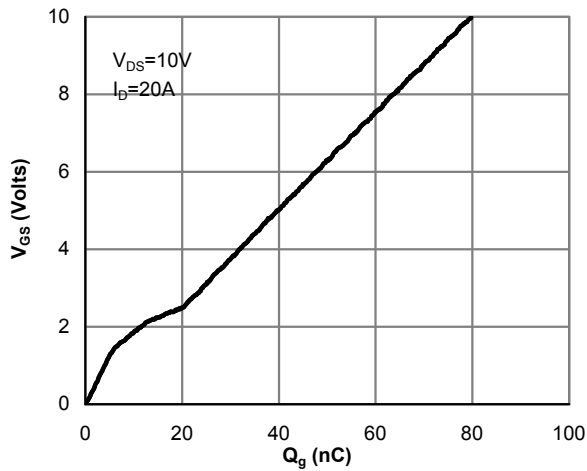


Figure 7: Gate-Charge Characteristics

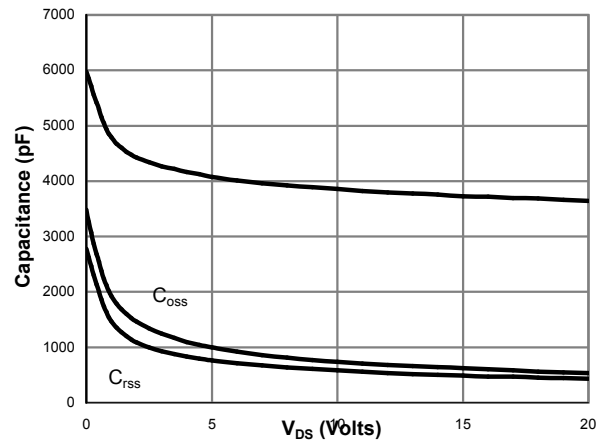


Figure 8: Capacitance Characteristics

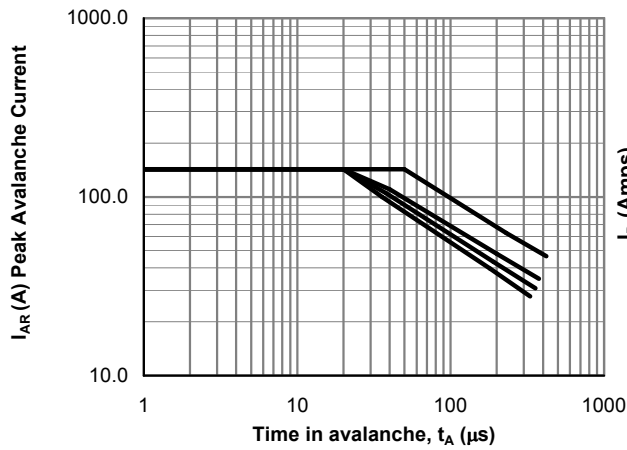


Figure 9: Single Pulse Avalanche capability (Note C)

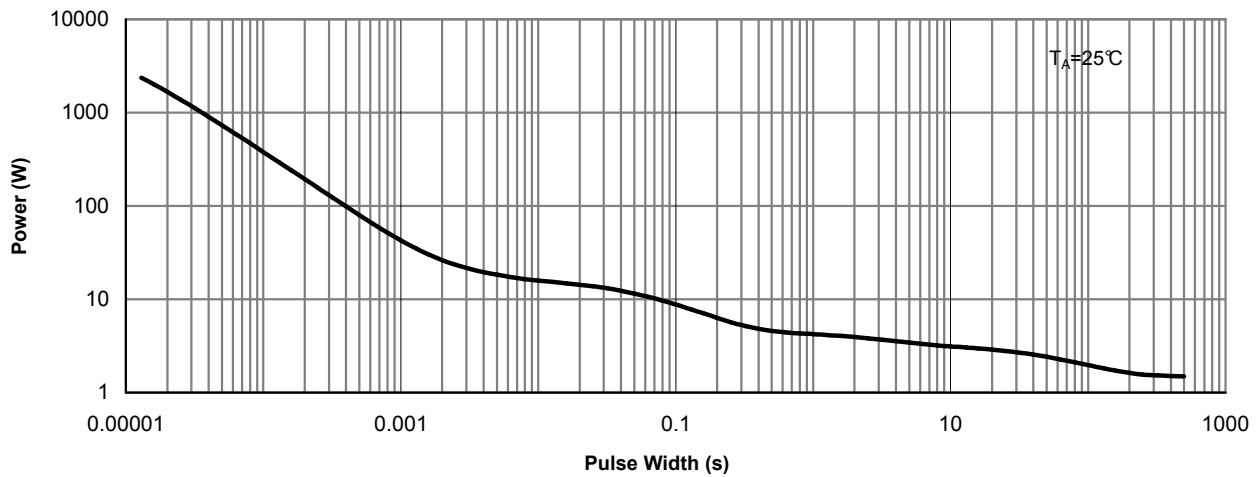
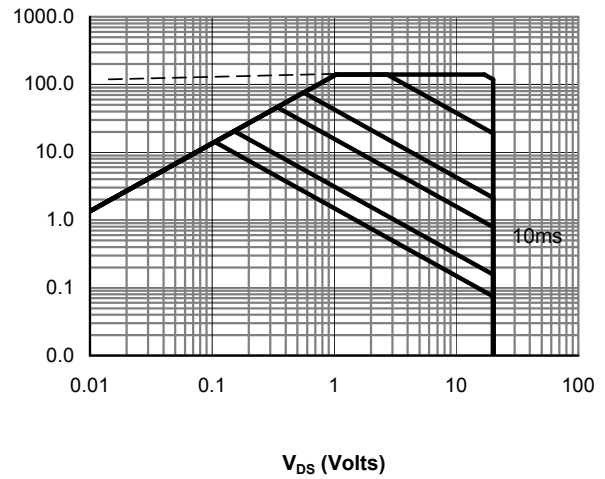
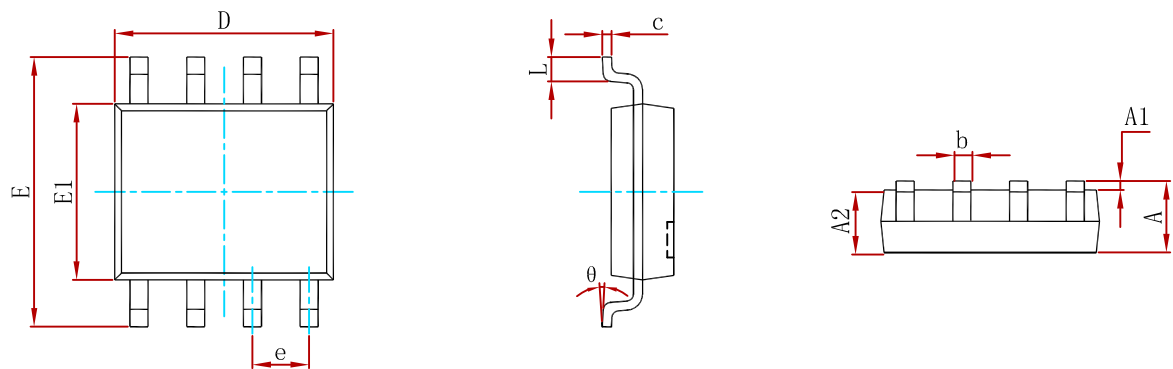


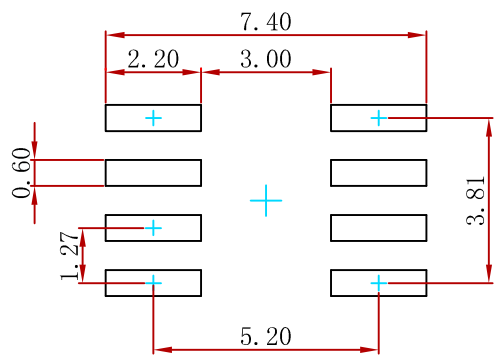
Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)

PACKAGE MECHANICAL DATA



| 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 | 0.007 | 0.010 |
| D | 4.800 | 5.000 | 0.189 | 0.197 |
| e | 1.270 (BSC) | | 0.050 (BSC) | |
| E | 5.800 | 6.200 | 0.228 | 0.244 |
| E1 | 3.800 | 4.000 | 0.150 | 0.157 |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |

Suggested Pad Layout



Note:
1. Controlling dimension; in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

REEL SPECIFICATION

| P/N | PKG | QTY |
|-----------|-------|------|
| AO4402-MS | SOP-8 | 3000 |

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