

SE4060A

N-Channel Enhancement-Mode MOSFET

Revision: A

General Description

Thigh Density Cell Design For Ultra Low On-Resistance Fully Characterized Avalanche Voltage and Current Improved Shoot-Through FOM

- I Simple Drive Requirement
- I Small Package Outline
- I Surface Mount Device

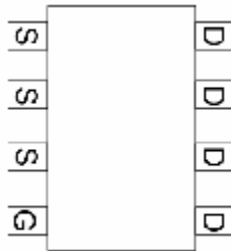
Features

For a single MOSFET

- I $V_{DS} = 40V$
- I $R_{DS(ON)} = 16m\Omega @ V_{GS}=10V$

Pin configurations

See Diagram below



Absolute Maximum Ratings

| Parameter | | Symbol | Rating | Units |
|--------------------------------------|------------|----------|------------|-------|
| Drain-Source Voltage | | V_{DS} | 40 | V |
| Gate-Source Voltage | | V_{GS} | ± 20 | V |
| Drain Current | Continuous | I_D | 60 | A |
| | Pulsed | | 200 | |
| Total Power Dissipation | @TA=25°C | P_D | 65 | W |
| Operating Junction Temperature Range | | T_J | -55 to 175 | °C |

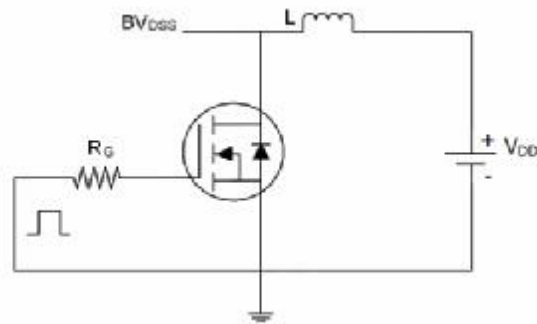
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| Electrical Characteristics (T _J =25°C unless otherwise noted) | | | | | | |
|--|---|--|-----|-------|-----|-------|
| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
| OFF CHARACTERISTICS (Note 2) | | | | | | |
| B _V DSS | Drain-Source Breakdown Voltage | I _D =250μA, V _{GS} =0 V | 40 | 45 | | V |
| I _{DSS} | Drain to Source Leakage Current | V _{DS} = 40V, V _{GS} =0V | | | 1 | μA |
| I _{GSS} | Gate-Body Leakage Current | V _{GS} =20 V | | | 100 | nA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} = V _{GS} , I _D =250μA | 1.2 | 1.6 | 2.5 | V |
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =10V, I _D =20A | - | 16 | 20 | mΩ |
| g _{FS} | Forward Transconductance | V _{DS} =10V, I _D =20A | 15 | | | S |
| DYNAMIC PARAMETERS | | | | | | |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =20V, f=1MHz | | 1800 | | pF |
| C _{oss} | Output Capacitance | | | 280 | | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 190 | | pF |
| SWITCHING PARAMETERS | | | | | | |
| t _{d(on)} | Turn-On Delay Time | V _{DD} =20V, R _L =1Ω R _G =3Ω | | 6.4 | | ns |
| t _{d(off)} | Turn-Off Delay Time | | | 29.6 | | ns |
| t _{d(r)} | Turn-On Rise Time | | | 17.2 | | ns |
| t _{d(f)} | Turn-Off Fall Time | | | 16.8 | | ns |
| Thermal Resistance | | | | | | |
| Symbol | Parameter | Typ | Max | Units | | |
| R _{θJA} | Junction to Ambient (each bin with recommended lands) | - | 2.3 | °C/W | | |

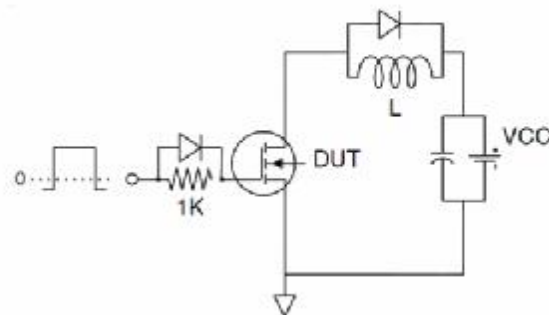
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Test Circuit

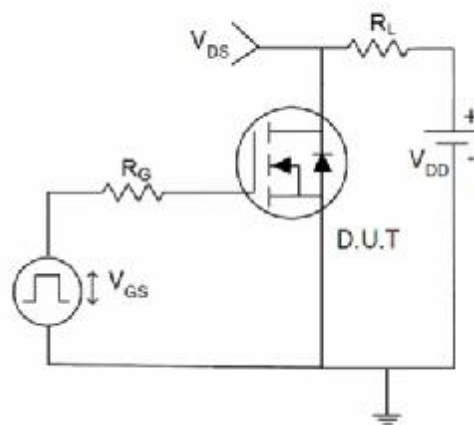
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



Typical Characteristics

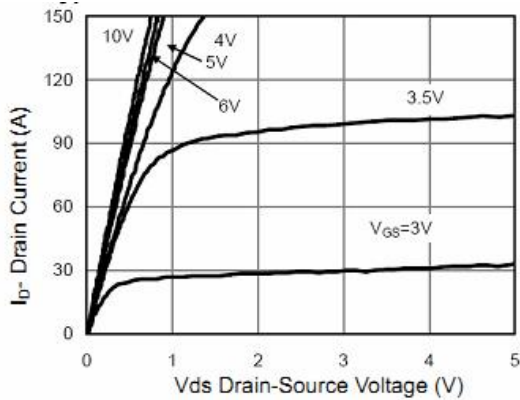


Figure 1 Output Characteristics

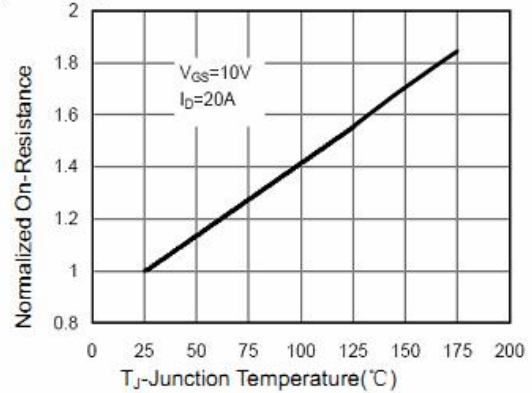


Figure 4 R_{dson} -Junction Temperature

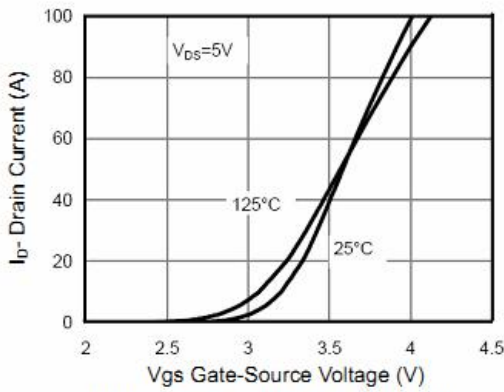


Figure 2 Transfer Characteristics

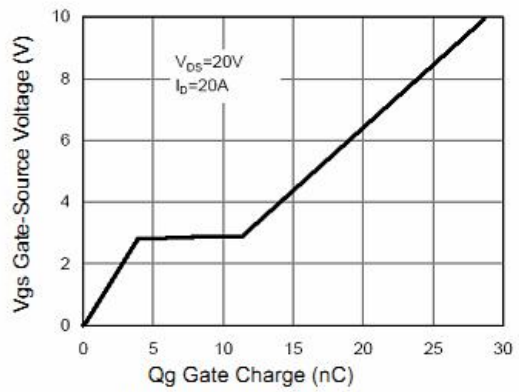


Figure 5 Gate Charge

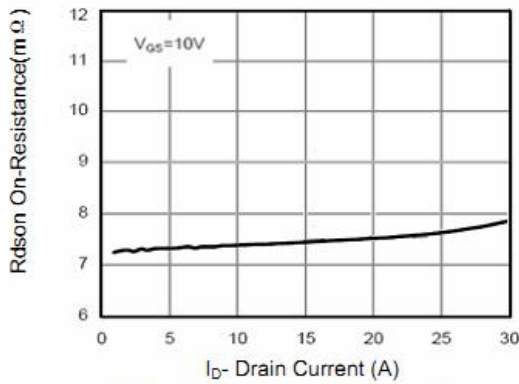


Figure 3 R_{dson} - Drain Current

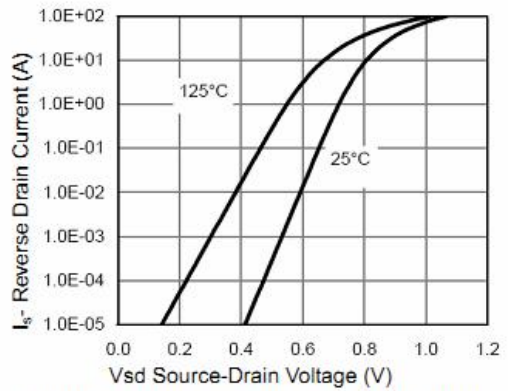


Figure 6 Source- Drain Diode Forward

Typical Characteristics

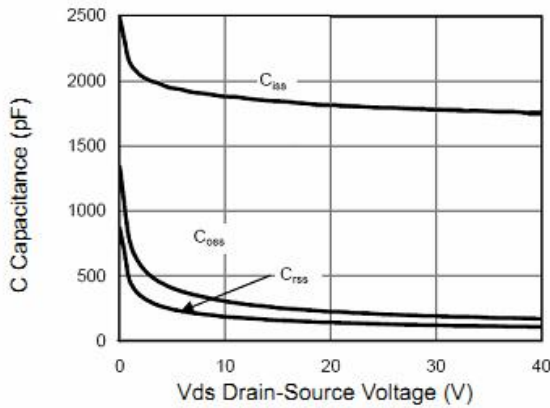


Figure 7 Capacitance vs Vds

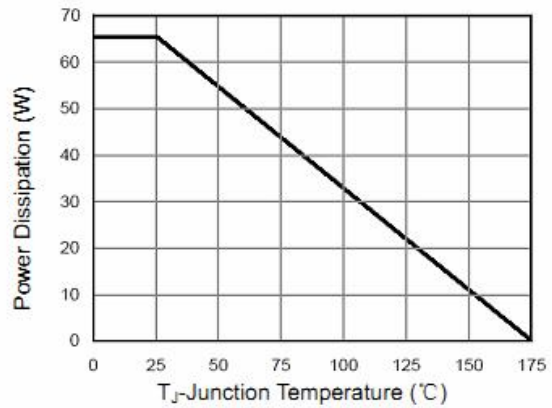


Figure 9 Power De-rating

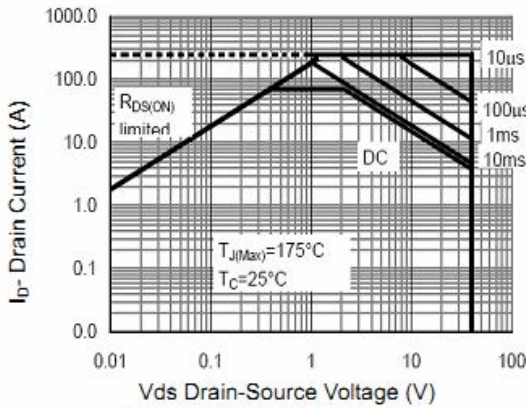


Figure 8 Safe Operation Area

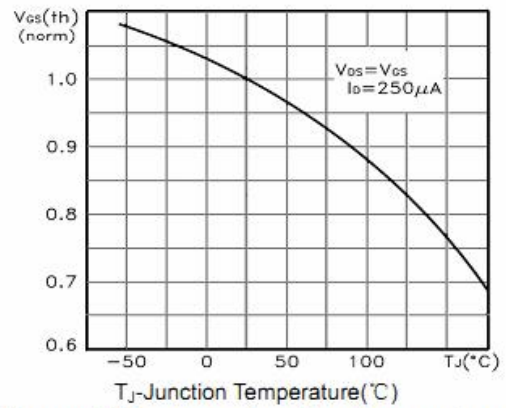


Figure 10 $V_{GS(th)}$ vs Junction Temperature

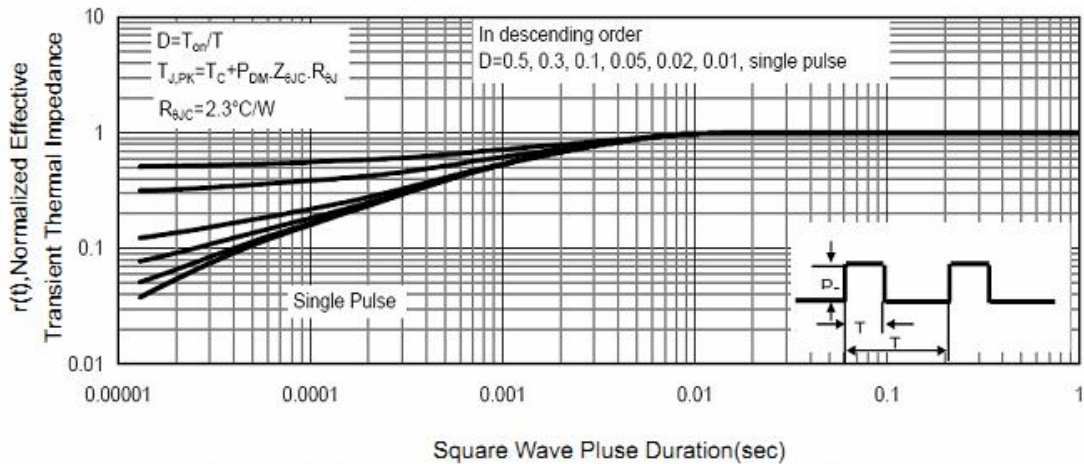
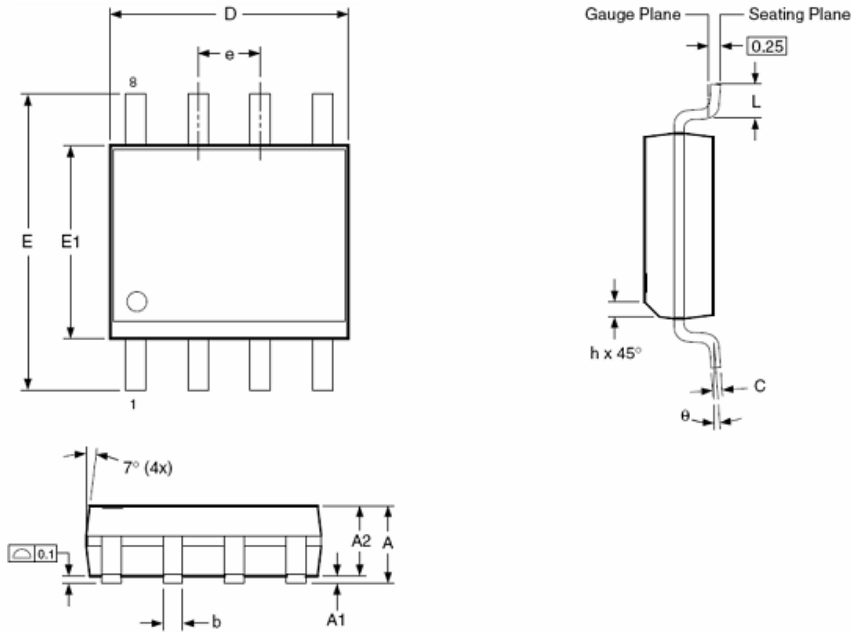


Figure 11 Normalized Maximum Transient Thermal Impedance

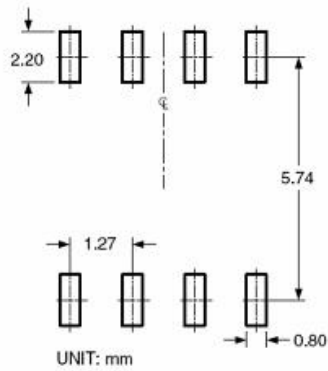
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Package Outline Dimension

SOP-8



RECOMMENDED LAND PATTERN



Dimensions in millimeters

| Symbols | Min. | Nom. | Max. |
|---------|----------|------|------|
| A | 1.35 | 1.65 | 1.75 |
| A1 | 0.10 | — | 0.25 |
| A2 | 1.25 | 1.50 | 1.65 |
| b | 0.31 | — | 0.51 |
| c | 0.17 | — | 0.25 |
| D | 4.80 | 4.90 | 5.00 |
| E1 | 3.80 | 3.90 | 4.00 |
| e | 1.27 BSC | | |
| E | 5.80 | 6.00 | 6.20 |
| h | 0.25 | — | 0.50 |
| L | 0.40 | — | 1.27 |
| θ | 0° | — | 8° |

Dimensions in inches

| Symbols | Min. | Nom. | Max. |
|---------|-----------|-------|-------|
| A | 0.053 | 0.065 | 0.069 |
| A1 | 0.004 | — | 0.010 |
| A2 | 0.049 | 0.059 | 0.065 |
| b | 0.012 | — | 0.020 |
| c | 0.007 | — | 0.010 |
| D | 0.189 | 0.193 | 0.197 |
| E1 | 0.150 | 0.154 | 0.157 |
| e | 0.050 BSC | | |
| E | 0.228 | 0.236 | 0.244 |
| h | 0.010 | — | 0.020 |
| L | 0.016 | — | 0.050 |
| θ | 0° | — | 8° |

NOTES:

1. Dimensions are inclusive of plating
2. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 6 mils.
3. Dimension L is measured in gauge plane.
4. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

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