

## Dual N-Channel 60 V (D-S) 175 °C MOSFET

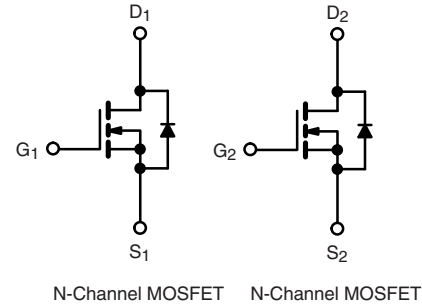
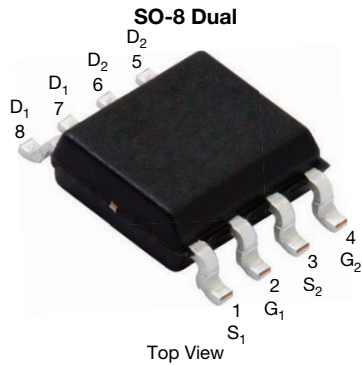
| PRODUCT SUMMARY                                    |       |
|--|-------|
| V <sub>DS</sub> (V)                                | 60    |
| R <sub>DS(on)</sub> (Ω) at V <sub>GS</sub> = 10 V  | 0.040 |
| R <sub>DS(on)</sub> (Ω) at V <sub>GS</sub> = 4.5 V | 0.055 |
| I <sub>D</sub> (A) per leg                         | 7     |
| Configuration                                      | Dual  |

### FEATURES

- TrenchFET® power MOSFET
- 100 % R<sub>G</sub> and UIS tested



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**



| ABSOLUTE MAXIMUM RATINGS (T <sub>C</sub> = 25 °C, unless otherwise noted) |                                   |                         |      |
|---|-----------------------------------|-------------------------|------|
| PARAMETER   | SYMBOL                            | LIMIT                   | UNIT |
| Drain-Source Voltage  | V <sub>DS</sub>                   | 60                      | V    |
| Gate-Source Voltage   | V <sub>GS</sub>                   | ± 20                    |      |
| Continuous Drain Current  | I <sub>D</sub>                    | T <sub>C</sub> = 25 °C  | 7    |
|   |                                   | T <sub>C</sub> = 125 °C | 4    |
| Continuous Source Current (Diode Conduction) <sup>a</sup>                 | I <sub>S</sub>                    | 3.6                     | A    |
| Pulsed Drain Current <sup>b</sup>   | I <sub>DM</sub>                   | 28                      |      |
| Single Pulse Avalanche Current  | I <sub>AS</sub>                   | 18                      |      |
| Single Pulse Avalanche Energy   | E <sub>AS</sub>                   | 16.2                    | mJ   |
| Maximum Power Dissipation <sup>b</sup>                                    | P <sub>D</sub>                    | T <sub>C</sub> = 25 °C  | 4    |
|   |                                   | T <sub>C</sub> = 125 °C | 1.3  |
| Operating Junction and Storage Temperature Range                          | T <sub>J</sub> , T <sub>stg</sub> | -55 to +175             | °C   |

| THERMAL RESISTANCE RATINGS |                   |       |      |
|----------------------------|-------------------|-------|------|
| PARAMETER                  | SYMBOL            | LIMIT | UNIT |
| Junction-to-Ambient        | R <sub>thJA</sub> | 110   | °C/W |
| Junction-to-Foot (Drain)   | R <sub>thJF</sub> | 34    |      |

### Notes

- Package limited.
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- When mounted on 1" square PCB (FR4 material).

| SPECIFICATIONS ( $T_C = 25\text{ }^\circ\text{C}$ , unless otherwise noted) |              |  |  |      |       |           |               |
|---|--------------|--|--|------|-------|-----------|---------------|
| PARAMETER   | SYMBOL       | TEST CONDITIONS  |  | MIN. | TYP.  | MAX.      | UNIT          |
| <b>Static</b>   |              |  |  |      |       |           |               |
| Drain-Source Breakdown Voltage  | $V_{DS}$     | $V_{GS} = 0\text{ V}$ , $I_D = 250\text{ }\mu\text{A}$   |  | 60   | -     | -         | V             |
| Gate-Source Threshold Voltage   | $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250\text{ }\mu\text{A}$   |  | 1.5  | 2.0   | 2.5       |               |
| Gate-Source Leakage   | $I_{GSS}$    | $V_{DS} = 0\text{ V}$ , $V_{GS} = \pm 20\text{ V}$   |  | -    | -     | $\pm 100$ | nA            |
| Zero Gate Voltage Drain Current   | $I_{DSS}$    | $V_{GS} = 0\text{ V}$  | $V_{DS} = 60\text{ V}$                                     | -    | -     | 1         | $\mu\text{A}$ |
|   |              | $V_{GS} = 0\text{ V}$  | $V_{DS} = 60\text{ V}$ , $T_J = 125\text{ }^\circ\text{C}$ | -    | -     | 50        |               |
|   |              | $V_{GS} = 0\text{ V}$  | $V_{DS} = 60\text{ V}$ , $T_J = 175\text{ }^\circ\text{C}$ | -    | -     | 150       |               |
| On-State Drain Current <sup>a</sup>   | $I_{D(on)}$  | $V_{GS} = 10\text{ V}$   | $V_{DS} \geq 5\text{ V}$                                   | 20   | -     | -         | A             |
| Drain-Source On-State Resistance <sup>a</sup>                               | $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$   | $I_D = 4.5\text{ A}$                                       | -    | 0.028 | 0.0402    | $\Omega$      |
|   |              | $V_{GS} = 10\text{ V}$   | $I_D = 4.5\text{ A}$ , $T_J = 125\text{ }^\circ\text{C}$   | -    | -     | 0.066     |               |
|   |              | $V_{GS} = 10\text{ V}$   | $I_D = 4.5\text{ A}$ , $T_J = 175\text{ }^\circ\text{C}$   | -    | -     | 0.081     |               |
|   |              | $V_{GS} = 4.5\text{ V}$  | $I_D = 4\text{ A}$   | -    | 0.030 | 0.055     |               |
| Forward Transconductance <sup>f</sup>                                       | $g_{fs}$     | $V_{DS} = 15\text{ V}$ , $I_D = 4.5\text{ A}$  |  | -    | 15    | -         | S             |
| <b>Dynamic <sup>b</sup></b>   |              |  |  |      |       |           |               |
| Input Capacitance   | $C_{iss}$    | $V_{GS} = 0\text{ V}$  | $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                | -    | 600   | 750       | $\text{pF}$   |
| Output Capacitance  | $C_{oss}$    |  |  | -    | 110   | 140       |               |
| Reverse Transfer Capacitance  | $C_{rss}$    |  |  | -    | 50    | 62        |               |
| Total Gate Charge <sup>c</sup>  | $Q_g$        | $V_{GS} = 10\text{ V}$   | $V_{DS} = 30\text{ V}$ , $I_D = 5.3\text{ A}$              | -    | 11.7  | 18        | nC            |
| Gate-Source Charge <sup>c</sup>   | $Q_{gs}$     |  |  | -    | 1.8   | 2.7       |               |
| Gate-Drain Charge <sup>c</sup>  | $Q_{gd}$     |  |  | -    | 2.8   | 4.2       |               |
| Gate Resistance   | $R_g$        | $f = 1\text{ MHz}$   |  | 1.3  | -     | 6         | $\Omega$      |
| Turn-On Delay Time <sup>c</sup>   | $t_{d(on)}$  | $V_{DD} = 30\text{ V}$ , $R_L = 6.8\text{ }\Omega$<br>$I_D \cong 4.4\text{ A}$ , $V_{GEN} = 10\text{ V}$ , $R_g = 1\text{ }\Omega$ |  | -    | 7     | 11        | ns            |
| Rise Time <sup>c</sup>  | $t_r$        |  |  | -    | 3.3   | 5         |               |
| Turn-Off Delay Time <sup>c</sup>  | $t_{d(off)}$ |  |  | -    | 22.4  | 33.5      |               |
| Fall Time <sup>c</sup>  | $t_f$        |  |  | -    | 2.1   | 3.2       |               |
| <b>Source-Drain Diode Ratings and Characteristics <sup>b</sup></b>          |              |  |  |      |       |           |               |
| Pulsed Current <sup>a</sup>   | $I_{SM}$     |  |  | -    | -     | 28        | A             |
| Forward Voltage   | $V_{SD}$     | $I_F = 2\text{ A}$ , $V_{GS} = 0\text{ V}$   |  | -    | 0.75  | 1.1       | V             |

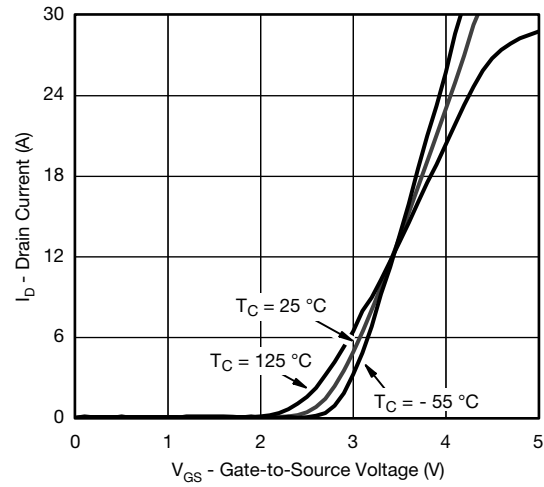
**Notes**

- Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

**TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)



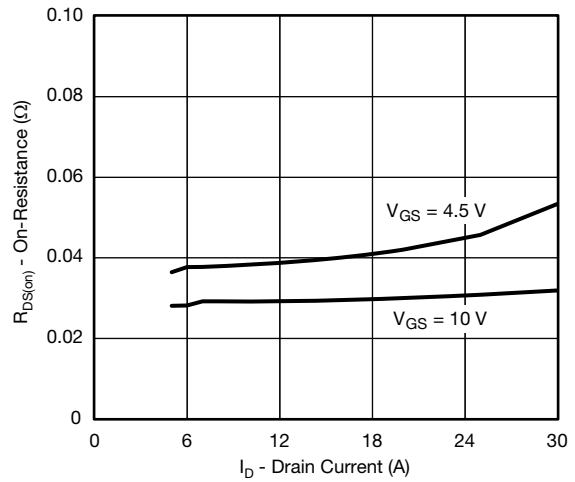
**Output Characteristics**



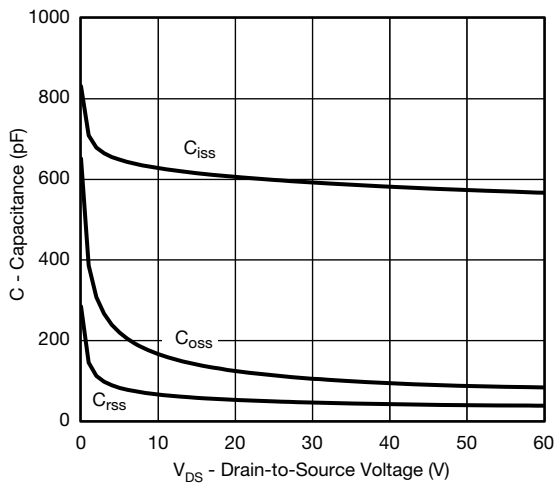
**Transfer Characteristics**



**Transconductance**



**On-Resistance vs. Drain Current**



**Capacitance**



**Gate Charge**

**TYPICAL CHARACTERISTICS** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)



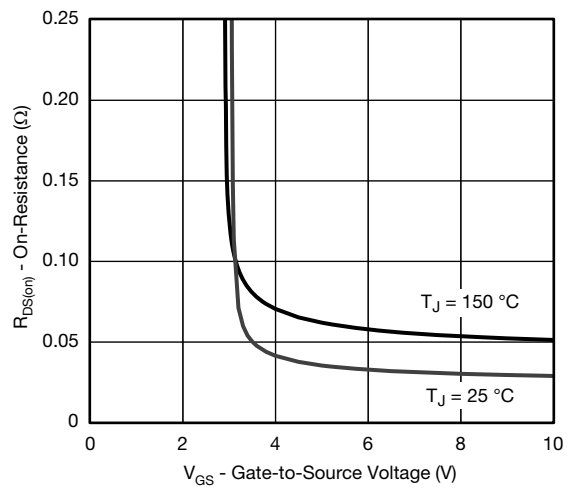
**On-Resistance vs. Junction Temperature**



**Drain Source Breakdown vs. Junction Temperature**



**Source Drain Diode Forward Voltage**

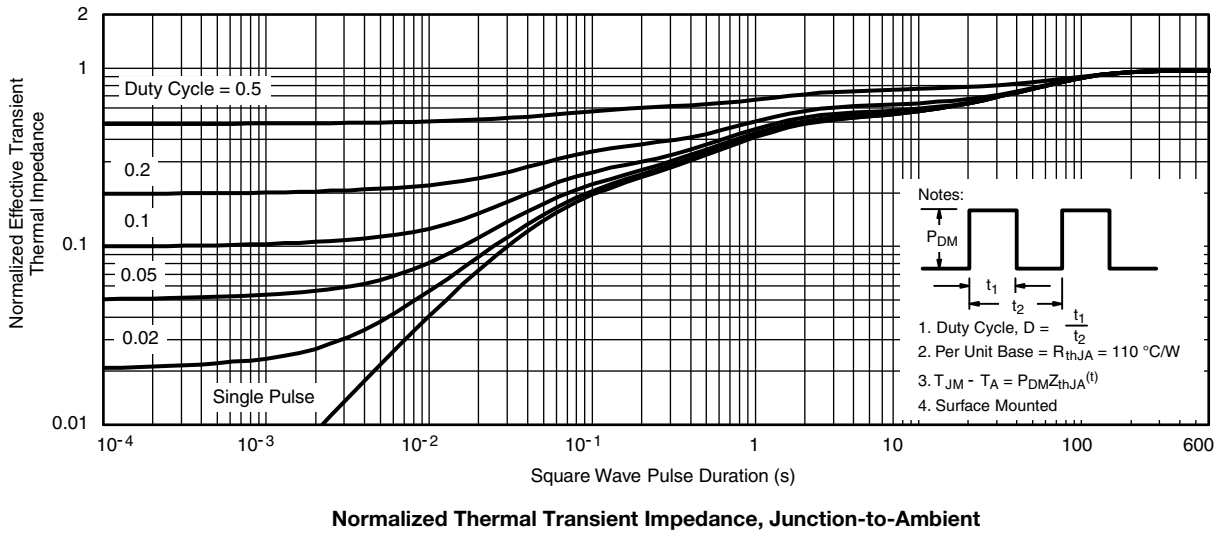
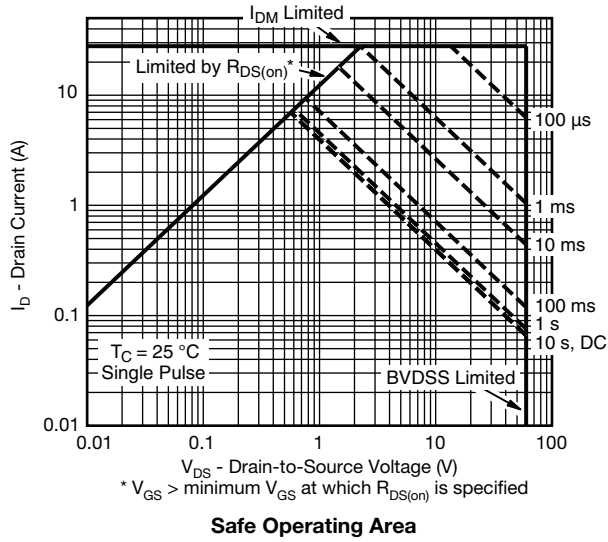


**On-Resistance vs. Gate-to-Source Voltage**

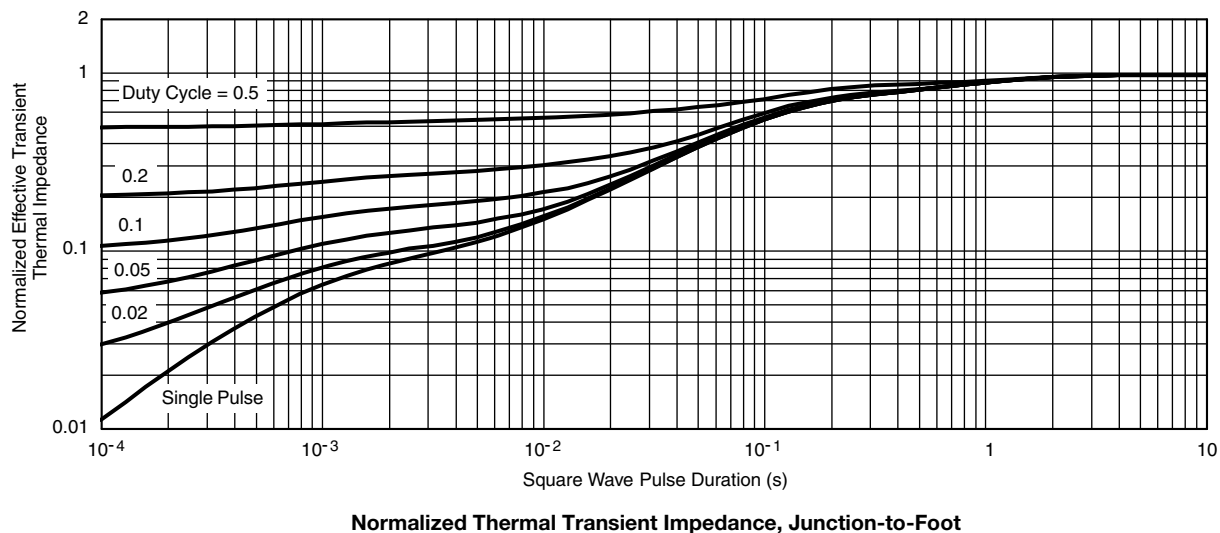


**Threshold Voltage**

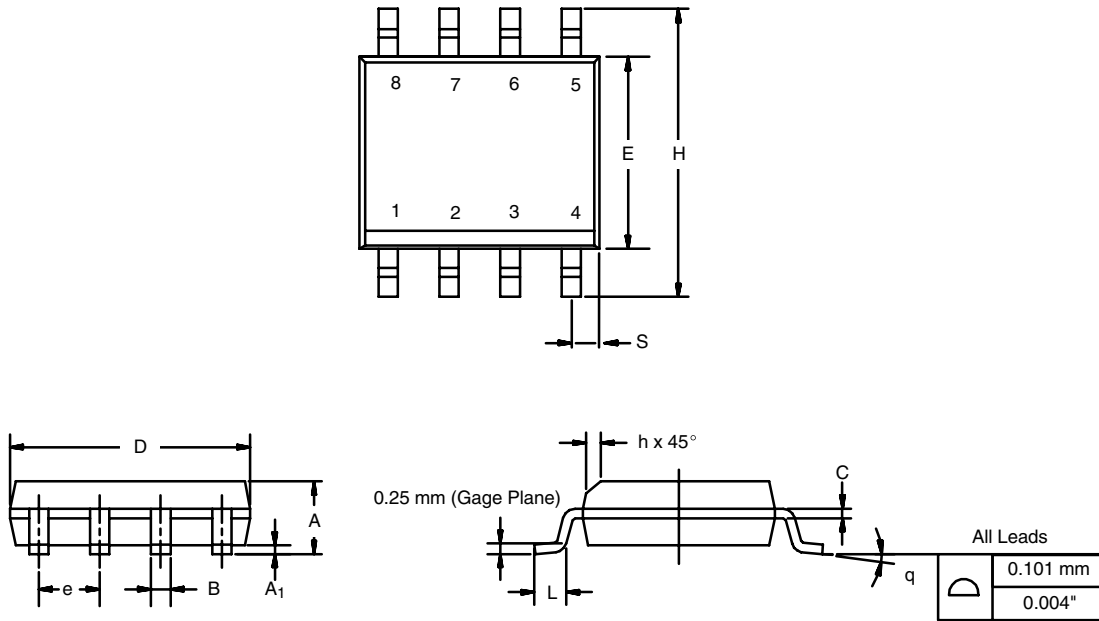
**THERMAL RATINGS** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)



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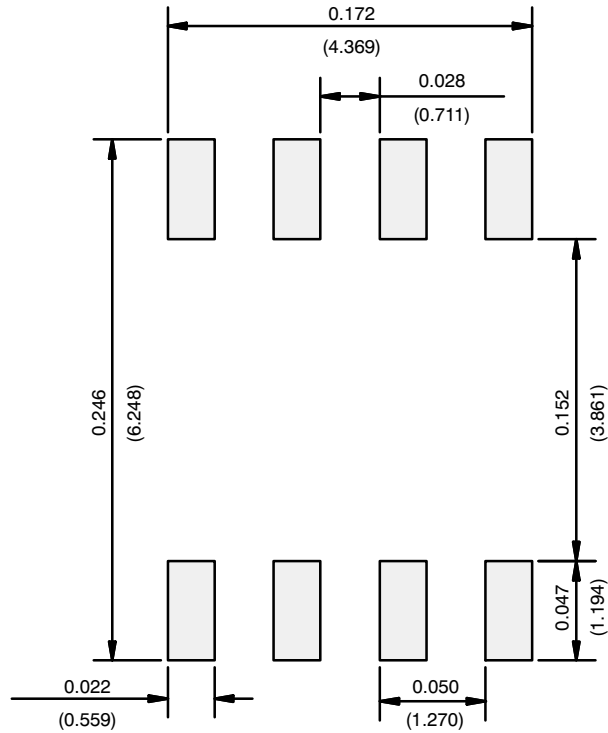


**SOIC (NARROW): 8-LEAD**  
JEDEC Part Number: MS-012



| DIM   | MILLIMETERS |      | INCHES    |       |
|---|-------------|------|-----------|-------|
|   | Min         | Max  | Min       | Max   |
| A   | 1.35        | 1.75 | 0.053     | 0.069 |
| A <sub>1</sub>                              | 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<br>DWG: 5498 |             |      |           |       |

RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads  
Dimensions in Inches/(mm)



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