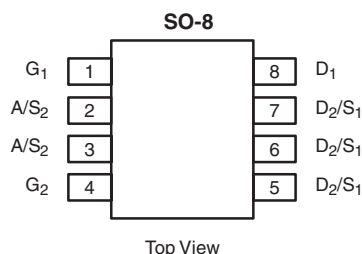


# Dual N-Channel 30-V (D-S) MOSFET with Schottky Diode

| PRODUCT SUMMARY |                     |                                   |                    |                       |
|-----------------|---------------------|-----------------------------------|--------------------|-----------------------|
|                 | V <sub>DS</sub> (V) | R <sub>DS(on)</sub> (Ω)           | I <sub>D</sub> (A) | Q <sub>g</sub> (Typ.) |
| Channel-1       | 30                  | 0.0185 at V <sub>GS</sub> = 10 V  | 6.8                | 7.8                   |
|                 |                     | 0.0225 at V <sub>GS</sub> = 4.5 V | 6.0                |                       |
| Channel-2       | 30                  | 0.0115 at V <sub>GS</sub> = 10 V  | 11.4               | 11.6                  |
|                 |                     | 0.016 at V <sub>GS</sub> = 4.5 V  | 9.5                |                       |

| SCHOTTKY PRODUCT SUMMARY |                                              |                    |
|--------------------------|----------------------------------------------|--------------------|
| V <sub>DS</sub> (V)      | V <sub>SD</sub> (V)<br>Diode Forward Voltage | I <sub>F</sub> (A) |
| 30                       | 0.50 V at 1.0 A                              | 2.0                |



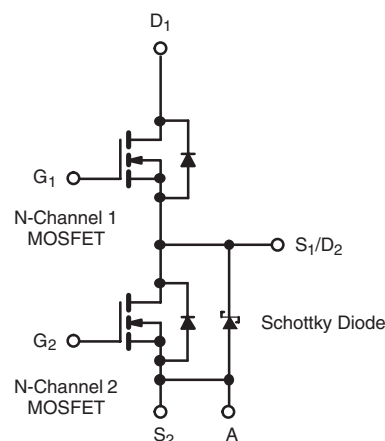
Ordering Information: Si4816BDY-T1-E3 (Lead (Pb)-free)  
Si4816BDY-T1-GE3 (Lead (Pb)-free and Halogen-free)

## FEATURES

- Halogen-free According to IEC 61249-2-21 Available
- LITTLE FOOT® Plus Power MOSFET
- 100 % R<sub>g</sub> Tested



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



| ABSOLUTE MAXIMUM RATINGS T <sub>A</sub> = 25 °C, unless otherwise noted |                        |                                   |             |              |           |              |      |
|-------------------------------------------------------------------------|------------------------|-----------------------------------|-------------|--------------|-----------|--------------|------|
| Parameter                                                               |                        | Symbol                            | Channel-1   |              | Channel-2 |              | Unit |
|                                                                         |                        |                                   | 10 s        | Steady State | 10 s      | Steady State |      |
| Drain-Source Voltage                                                    |                        | V <sub>DS</sub>                   | 30          |              |           |              | V    |
| Gate-Source Voltage                                                     |                        | V <sub>GS</sub>                   | 20          |              |           |              |      |
| Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>         | T <sub>A</sub> = 25 °C | I <sub>D</sub>                    | 6.8         | 5.8          | 11.4      | 8.2          | A    |
|                                                                         | T <sub>A</sub> = 70 °C |                                   | 5.5         | 4.6          | 9.0       | 6.5          |      |
| Pulsed Drain Current                                                    |                        | I <sub>DM</sub>                   | 30          |              | 40        |              |      |
| Continuous Source Current (Diode Conduction) <sup>a</sup>               |                        | I <sub>S</sub>                    | 1           | 0.9          | 2.2       | 1.15         |      |
| Single Pulse Avalanche Current                                          | L = 0.1 mH             | I <sub>AS</sub>                   | 10          |              | 20        |              | mJ   |
| Avalanche Energy                                                        |                        | E <sub>AS</sub>                   | 5           |              | 20        |              |      |
| Maximum Power Dissipation <sup>a</sup>                                  | T <sub>A</sub> = 25 °C | P <sub>D</sub>                    | 1.4         | 1.0          | 2.4       | 1.25         | W    |
|                                                                         | T <sub>A</sub> = 70 °C |                                   | 0.9         | 0.64         | 1.5       | 0.8          |      |
| Operating Junction and Storage Temperature Range                        |                        | T <sub>J</sub> , T <sub>stg</sub> | - 55 to 150 |              |           |              | °C   |

| THERMAL RESISTANCE RATINGS               |              |                   |           |      |           |      |          |      |      |
|------------------------------------------|--------------|-------------------|-----------|------|-----------|------|----------|------|------|
| Parameter                                |              | Symbol            | Channel-1 |      | Channel-2 |      | Schottky |      | Unit |
|                                          |              |                   | Typ.      | Max. | Typ.      | Max. | Typ.     | Max. |      |
| Maximum Junction-to-Ambient <sup>a</sup> | t ≤ 10 s     | R <sub>thJA</sub> | 72        | 90   | 43        | 53   | 48       | 60   | °C/W |
|                                          | Steady State |                   | 100       | 125  | 82        | 100  | 80       | 100  |      |
| Maximum Junction-to-Foot (Drain)         | Steady State | R <sub>thJF</sub> | 51        | 63   | 25        | 30   | 28       | 35   |      |

Notes:

a. Surface Mounted on 1" x 1" FR4 board.

| MOSFET SPECIFICATIONS T <sub>J</sub> = 25 °C, unless otherwise noted |                     |                                                                                                                                   |                                           |      |                   |        |      |
|----------------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|------|-------------------|--------|------|
| Parameter                                                            | Symbol              | Test Conditions                                                                                                                   |                                           | Min. | Typ. <sup>a</sup> | Max.   | Unit |
| Static                                                               |                     |                                                                                                                                   |                                           |      |                   |        |      |
| Gate Threshold Voltage                                               | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA                                                                       | Ch-1                                      | 1.0  |                   | 3.0    | V    |
|                                                                      |                     |                                                                                                                                   | Ch-2                                      | 1.0  |                   | 3.0    |      |
| Gate-Body Leakage                                                    | I <sub>GSS</sub>    | V <sub>DS</sub> = 0 V, V <sub>GS</sub> = 20 V                                                                                     | Ch-1                                      |      |                   | 100    | nA   |
|                                                                      |                     |                                                                                                                                   | Ch-2                                      |      |                   | 100    |      |
| Zero Gate Voltage Drain Current                                      | I <sub>DSS</sub>    | V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V                                                                                     | Ch-1                                      |      |                   | 1      | μA   |
|                                                                      |                     |                                                                                                                                   | Ch-2                                      |      |                   | 100    |      |
|                                                                      |                     | V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 85 °C                                                             | Ch-1                                      |      |                   | 15     |      |
|                                                                      |                     |                                                                                                                                   | Ch-2                                      |      |                   | 2000   |      |
| On-State Drain Current <sup>b</sup>                                  | I <sub>D(on)</sub>  | V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V                                                                                     | Ch-1                                      | 20   |                   |        | A    |
|                                                                      |                     |                                                                                                                                   | Ch-2                                      | 30   |                   |        |      |
| Drain-Source On-State Resistance <sup>b</sup>                        | R <sub>DS(on)</sub> | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 6.8 A                                                                                    | Ch-1                                      |      | 0.0155            | 0.0185 | Ω    |
|                                                                      |                     | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 11.4 A                                                                                   | Ch-2                                      |      | 0.0093            | 0.0115 |      |
|                                                                      |                     | V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 6.0 A                                                                                   | Ch-1                                      |      | 0.0185            | 0.0225 |      |
|                                                                      |                     | V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 9.5 A                                                                                   | Ch-2                                      |      | 0.013             | 0.016  |      |
| Forward Transconductance <sup>b</sup>                                | g <sub>fs</sub>     | V <sub>DS</sub> = 15 V, I <sub>D</sub> = 6.8 A                                                                                    | Ch-1                                      |      | 30                |        | S    |
|                                                                      |                     | V <sub>DS</sub> = 15 V, I <sub>D</sub> = 11.4 A                                                                                   | Ch-2                                      |      | 31                |        |      |
| Diode Forward Voltage <sup>b</sup>                                   | V <sub>SD</sub>     | I <sub>S</sub> = 1 A, V <sub>GS</sub> = 0 V                                                                                       | Ch-1                                      |      | 0.73              | 1.1    | V    |
|                                                                      |                     | I <sub>S</sub> = 1 A, V <sub>GS</sub> = 0 V                                                                                       | Ch-2                                      |      | 0.47              | 0.5    |      |
| Dynamic <sup>a</sup>                                                 |                     |                                                                                                                                   |                                           |      |                   |        |      |
| Total Gate Charge                                                    | Q <sub>g</sub>      | Channel-1<br>V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 5 V, I <sub>D</sub> = 6.8 A                                                | Ch-1                                      |      | 7.8               | 10     | nC   |
|                                                                      |                     |                                                                                                                                   | Ch-2                                      |      | 11.6              | 18     |      |
| Gate-Source Charge                                                   | Q <sub>gs</sub>     | Channel-2<br>V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 5 V, I <sub>D</sub> = - 11.4 A                                             | Ch-1                                      |      | 2.9               |        |      |
|                                                                      |                     |                                                                                                                                   | Ch-2                                      |      | 4.8               |        |      |
| Gate-Drain Charge                                                    | Q <sub>gd</sub>     |                                                                                                                                   | Ch-1                                      |      | 2.3               |        |      |
|                                                                      |                     |                                                                                                                                   | Ch-2                                      |      | 3.7               |        |      |
| Gate Resistance                                                      | R <sub>g</sub>      |                                                                                                                                   | Ch-1                                      | 1.5  | 3.0               | 4.5    | Ω    |
|                                                                      |                     |                                                                                                                                   | Ch-2                                      | 0.9  | 1.8               | 2.7    |      |
| Turn-On Delay Time                                                   | t <sub>d(on)</sub>  | Channel-1<br>V <sub>DD</sub> = 15 V, R <sub>L</sub> = 15 Ω<br>I <sub>D</sub> ≅ 1 A, V <sub>GEN</sub> = 10 V, R <sub>g</sub> = 6 Ω | Ch-1                                      |      | 11                | 17     | ns   |
|                                                                      |                     |                                                                                                                                   | Ch-2                                      |      | 13                | 20     |      |
| Rise Time                                                            | t <sub>r</sub>      |                                                                                                                                   | Ch-1                                      |      | 9                 | 15     |      |
|                                                                      |                     |                                                                                                                                   | Ch-2                                      |      | 9                 | 15     |      |
| Turn-Off Delay Time                                                  | t <sub>d(off)</sub> | Channel-2<br>V <sub>DD</sub> = 15 V, R <sub>L</sub> = 15 Ω<br>I <sub>D</sub> ≅ 1 A, V <sub>GEN</sub> = 10 V, R <sub>g</sub> = 6 Ω | Ch-1                                      |      | 24                | 40     |      |
|                                                                      |                     |                                                                                                                                   | Ch-2                                      |      | 31                | 50     |      |
| Fall Time                                                            | t <sub>f</sub>      |                                                                                                                                   | Ch-1                                      |      | 9                 | 15     |      |
|                                                                      |                     |                                                                                                                                   | Ch-2                                      |      | 11                | 17     |      |
| Source-Drain Reverse Recovery Time                                   | t <sub>rr</sub>     |                                                                                                                                   | I <sub>F</sub> = 1.3 A, dI/dt = 100 A/μs  | Ch-1 |                   | 20     | 35   |
|                                                                      |                     |                                                                                                                                   | I <sub>F</sub> = 2.2 A, dI/dt = 100 μA/μs | Ch-2 |                   | 25     | 40   |

Notes:

a. Guaranteed by design, not subject to production testing.

b. Pulse test; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .

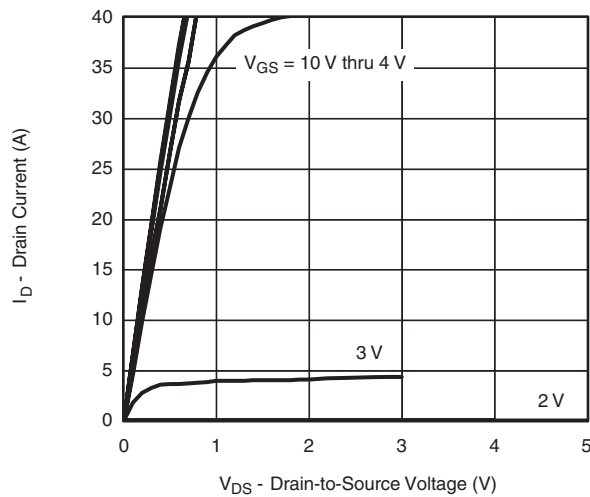


**SCHOTTKY SPECIFICATIONS**  $T_J = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted

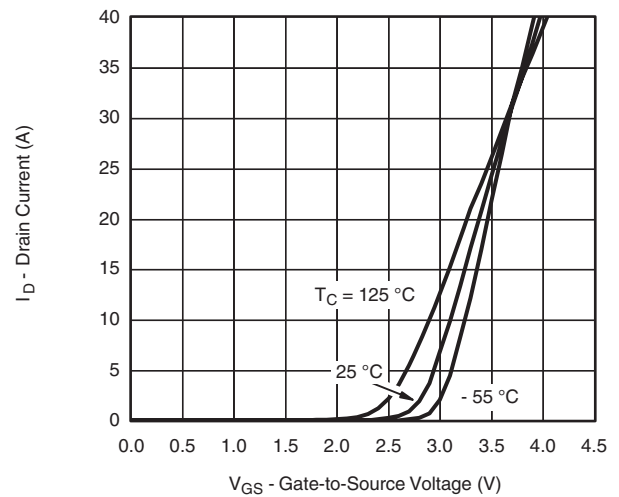
| Parameter                       | Symbol   | Test Conditions                                         | Min. | Typ.  | Max.  | Unit |
|---------------------------------|----------|---------------------------------------------------------|------|-------|-------|------|
| Forward Voltage Drop            | $V_F$    | $I_F = 1.0\text{ A}$                                    |      | 0.47  | 0.50  | V    |
|                                 |          | $I_F = 1.0\text{ A}, T_J = 125\text{ }^{\circ}\text{C}$ |      | 0.36  | 0.42  |      |
| Maximum Reverse Leakage Current | $I_{rm}$ | $V_R = 30\text{ V}$                                     |      | 0.004 | 0.100 | mA   |
|                                 |          | $V_R = 30\text{ V}, T_J = 100\text{ }^{\circ}\text{C}$  |      | 0.7   | 10    |      |
|                                 |          | $V_R = -30\text{ V}, T_J = 125\text{ }^{\circ}\text{C}$ |      | 3.0   | 20    |      |
| Junction Capacitance            | $C_T$    | $V_R = 10\text{ V}$                                     |      | 50    |       | pF   |

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

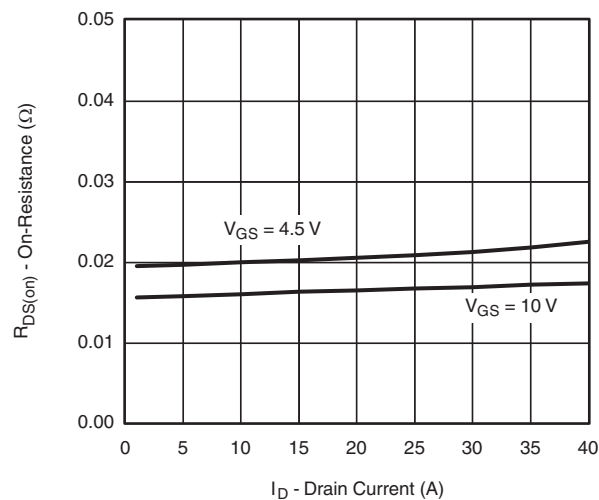
**CHANNEL-1 TYPICAL CHARACTERISTICS**  $25\text{ }^{\circ}\text{C}$ , unless otherwise noted



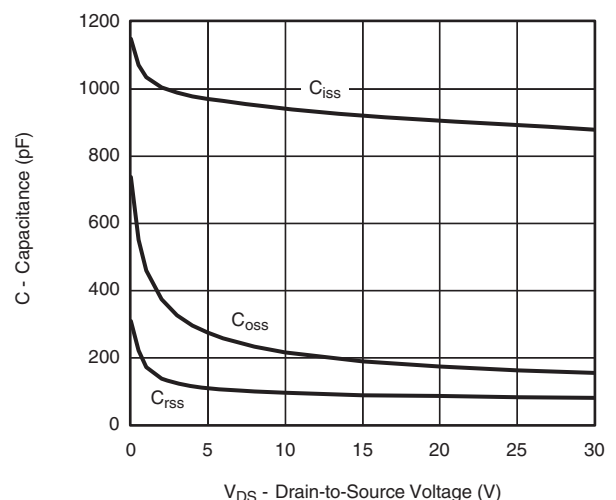
**Output Characteristics**



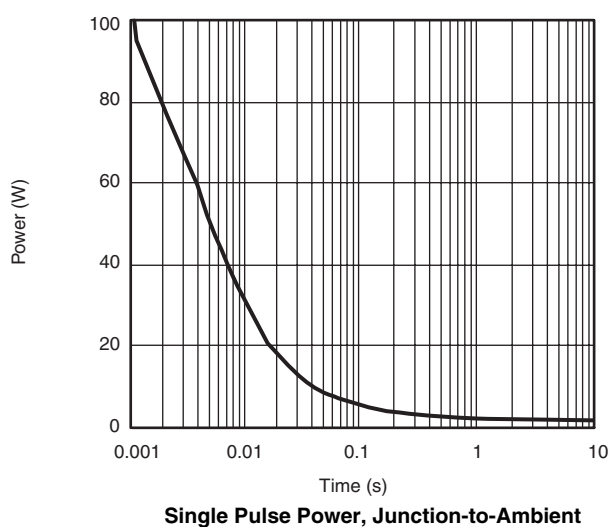
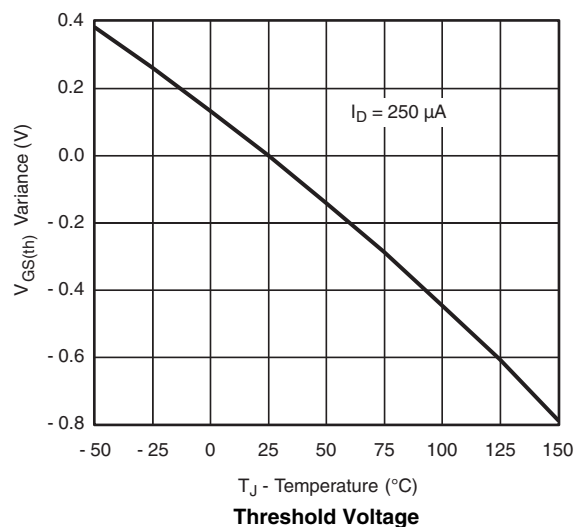
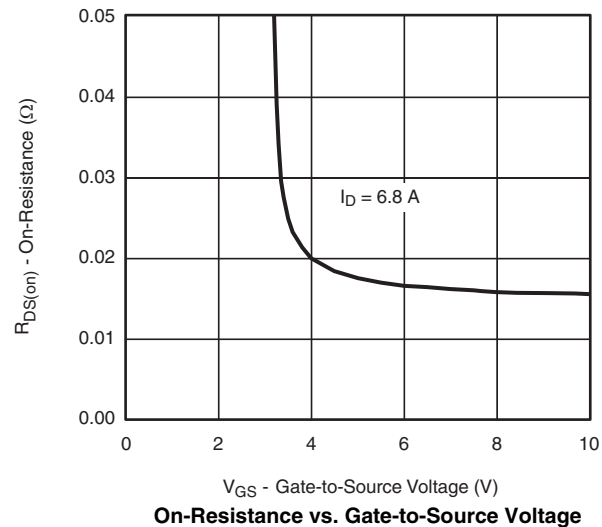
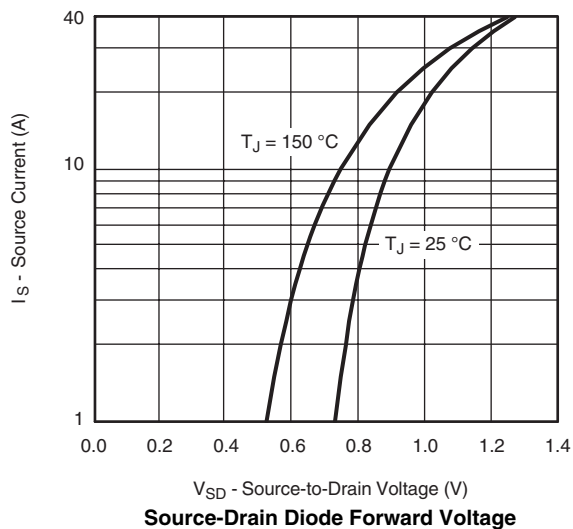
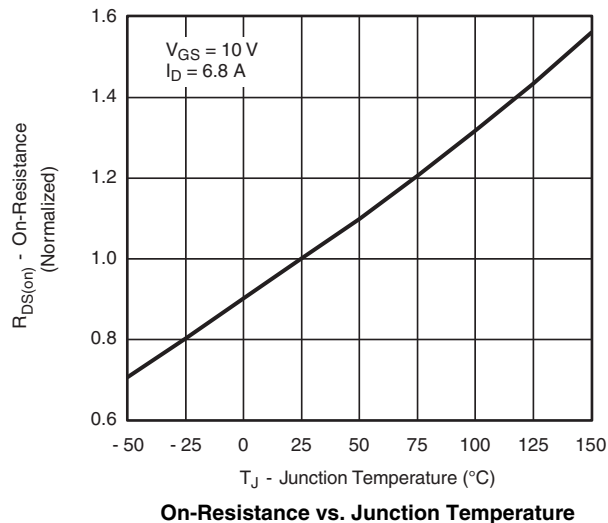
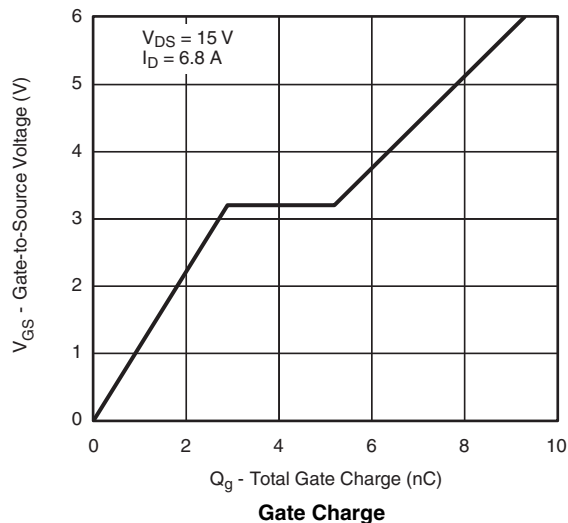
**Transfer Characteristics**



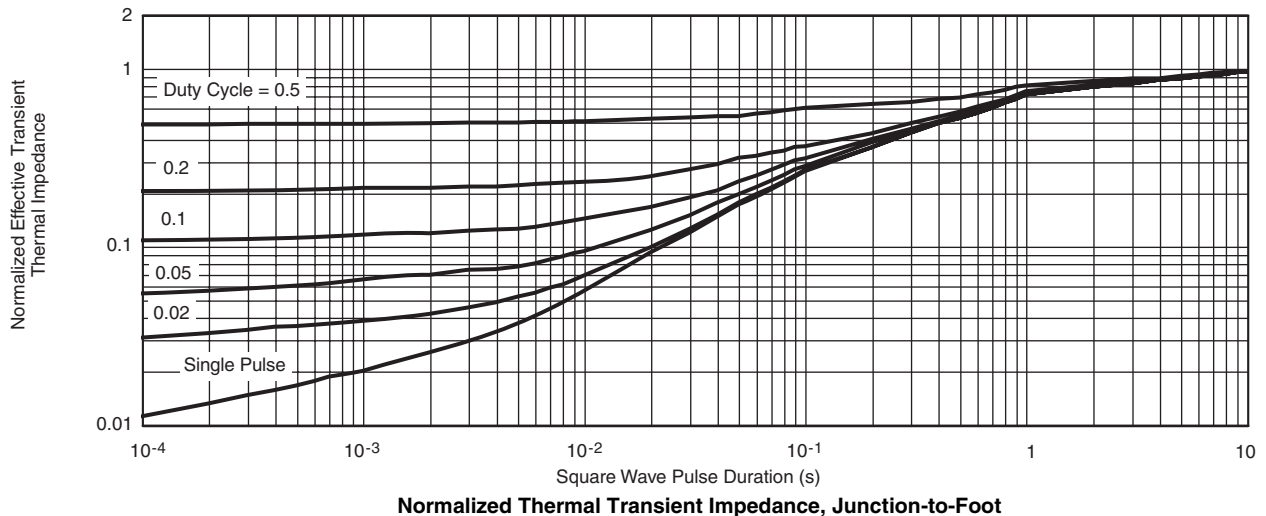
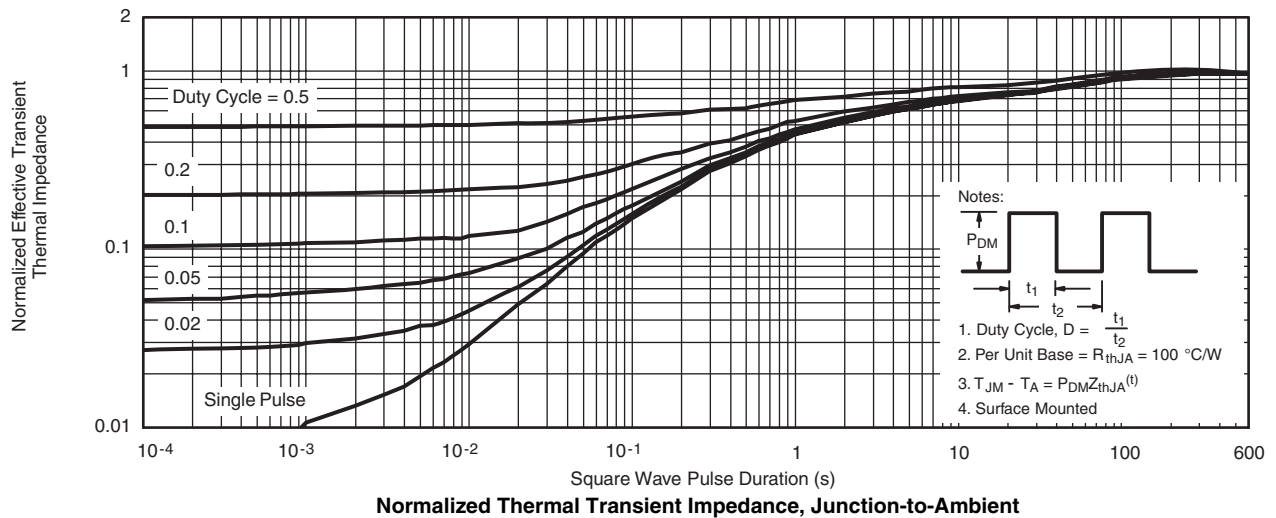
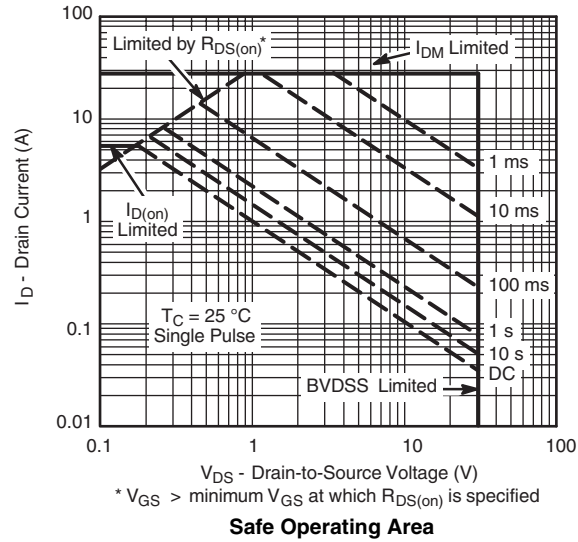
**On-Resistance vs. Drain Current**

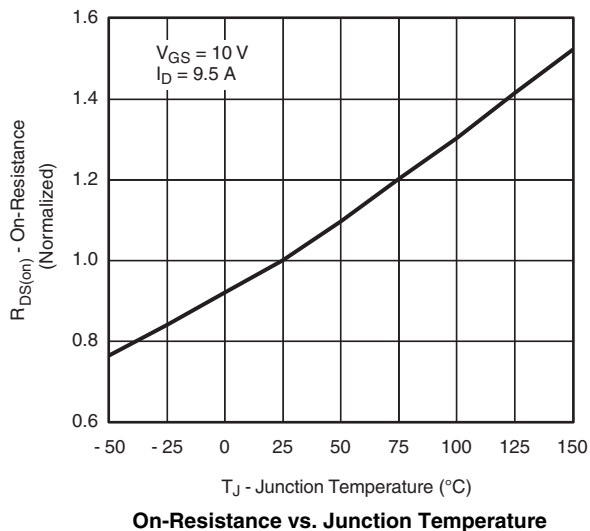
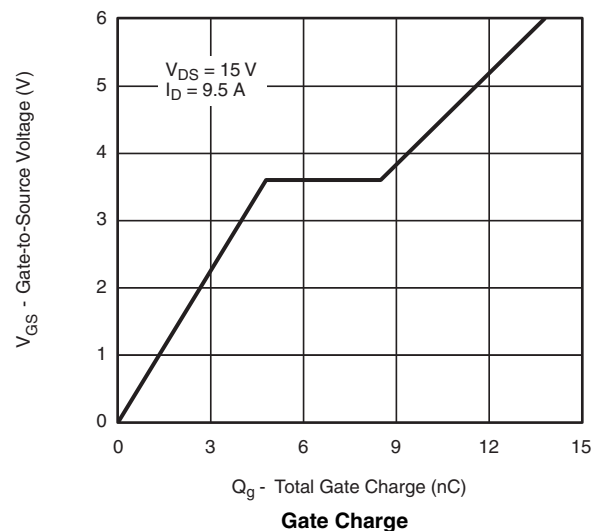
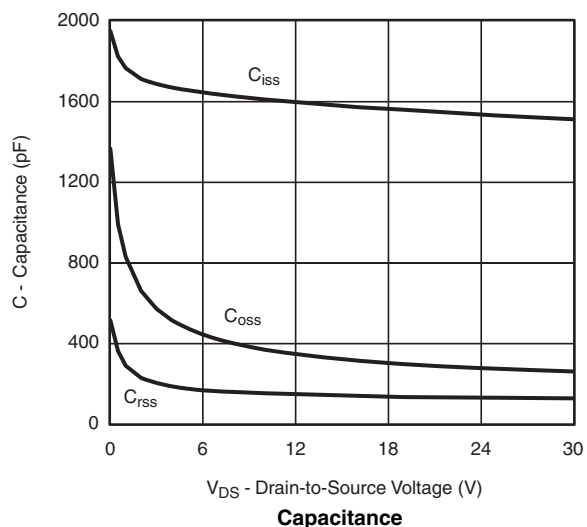
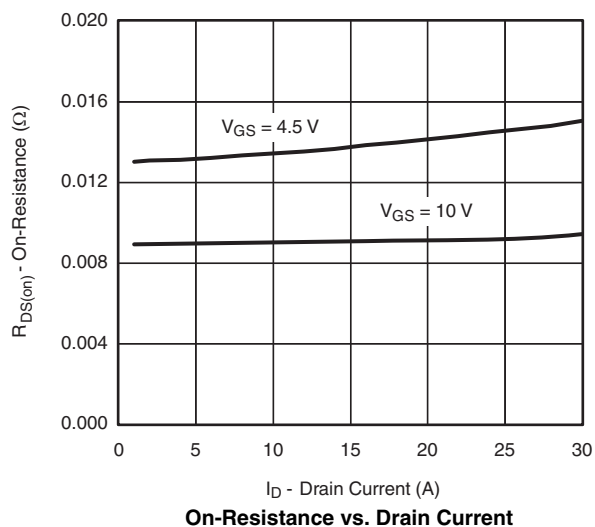
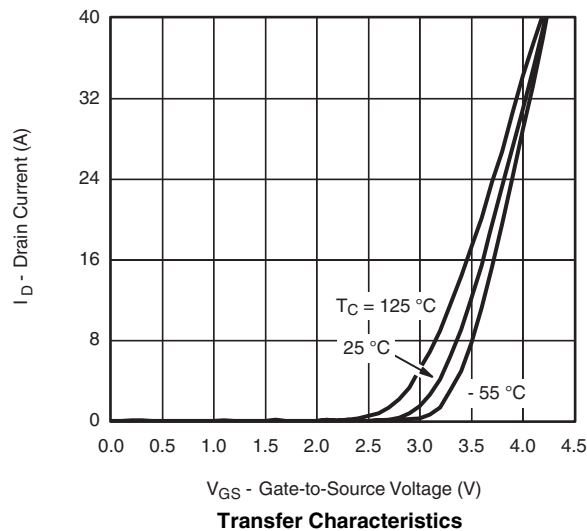
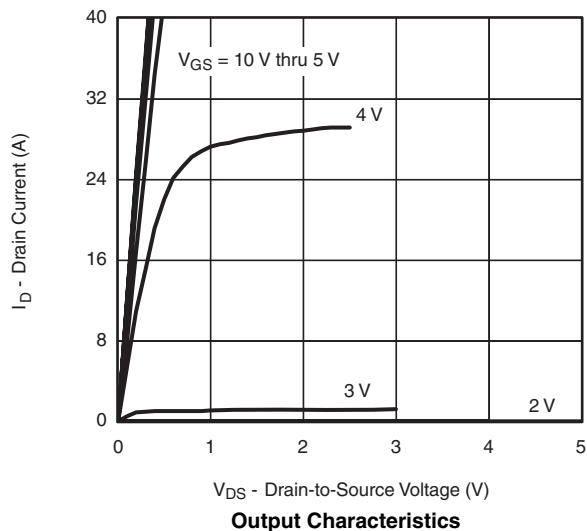


**Capacitance**

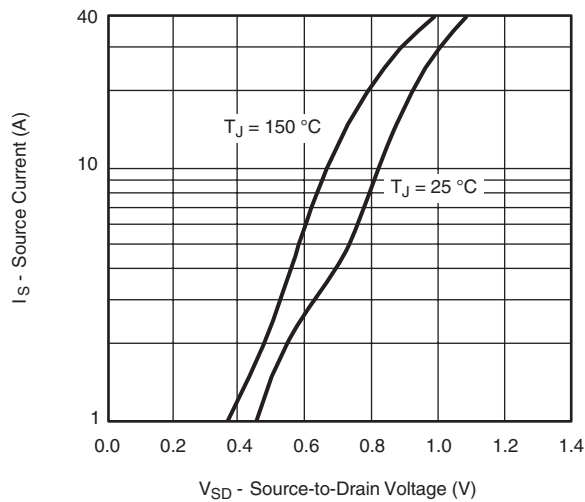
**CHANNEL-1 TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

## CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

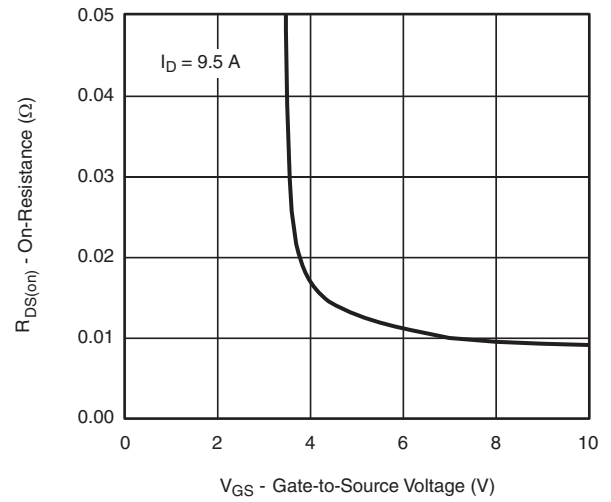


**CHANNEL-2 TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

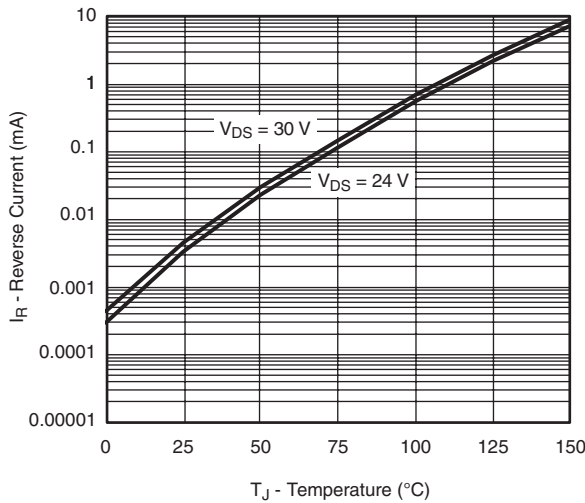
## CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



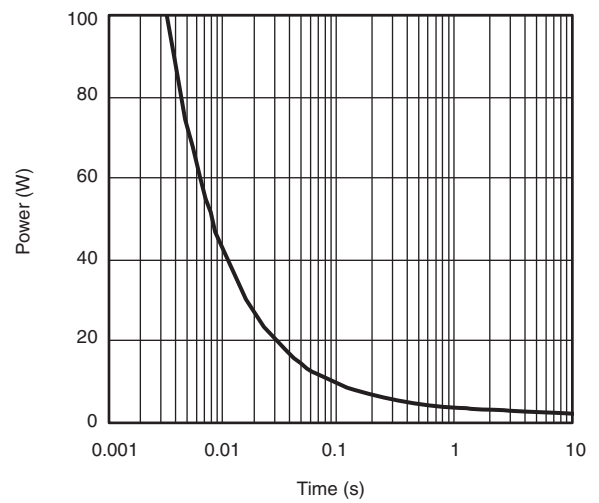
Source-Drain Diode Forward Voltage



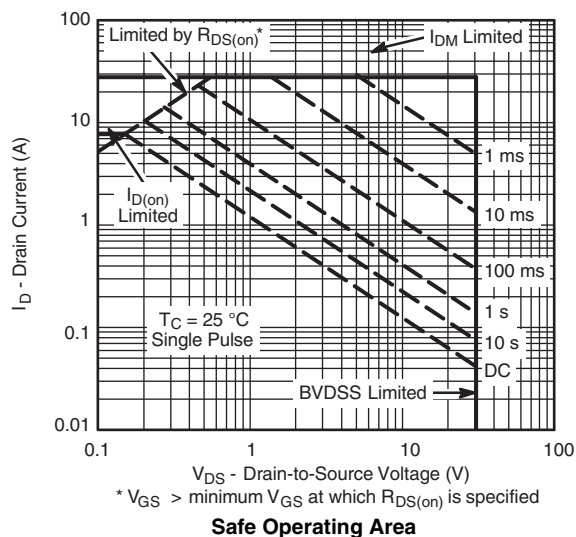
On-Resistance vs. Gate-to-Source Voltage



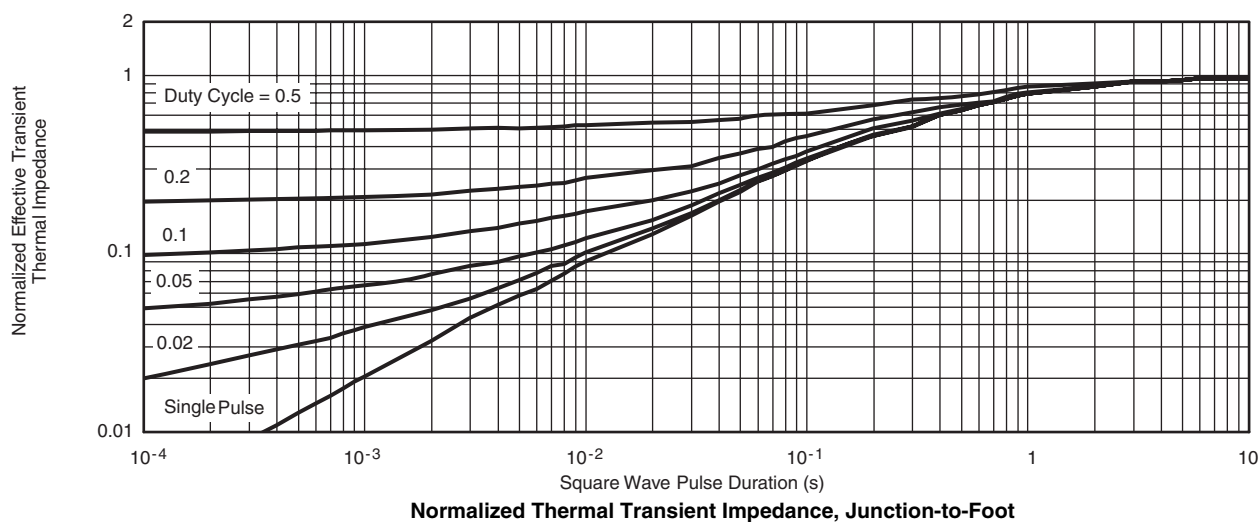
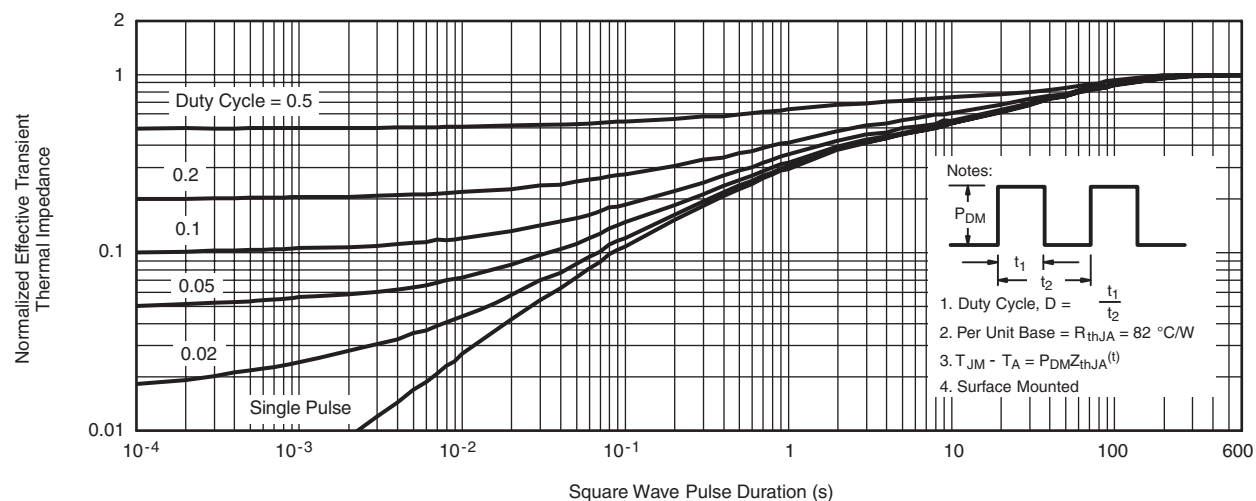
Reverse Current vs. Junction Temperature



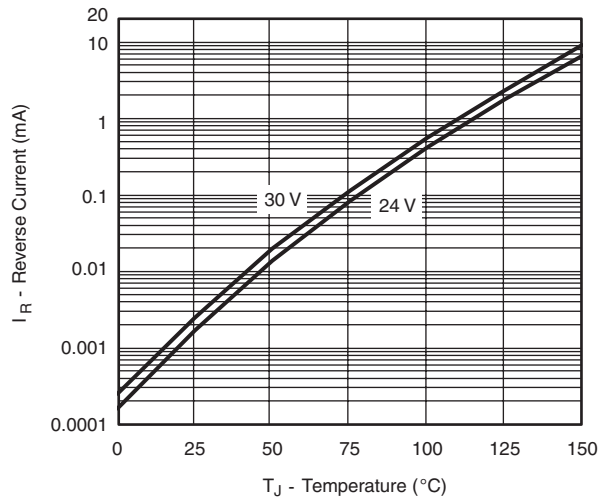
Single Pulse Power, Junction-to-Ambient



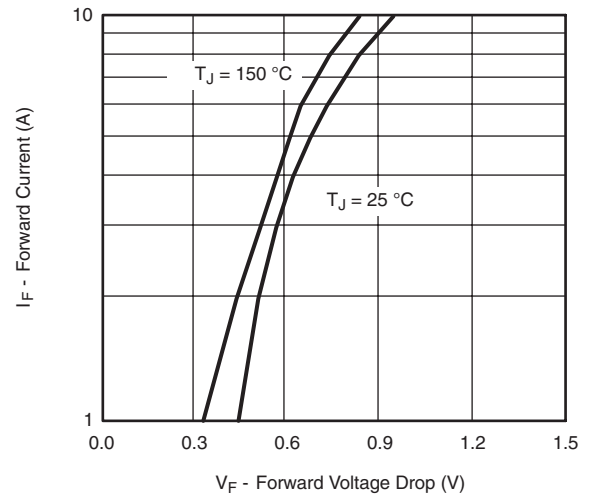
\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

**CHANNEL-2 TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

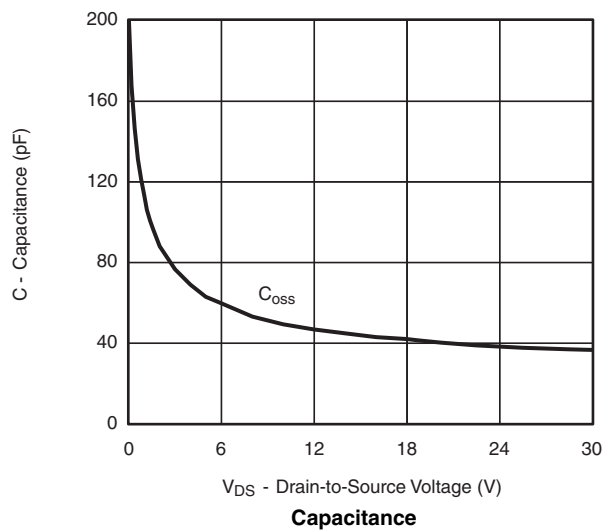
## SCHOTTKY TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Reverse Current vs. Junction Temperature



Forward Voltage Drop

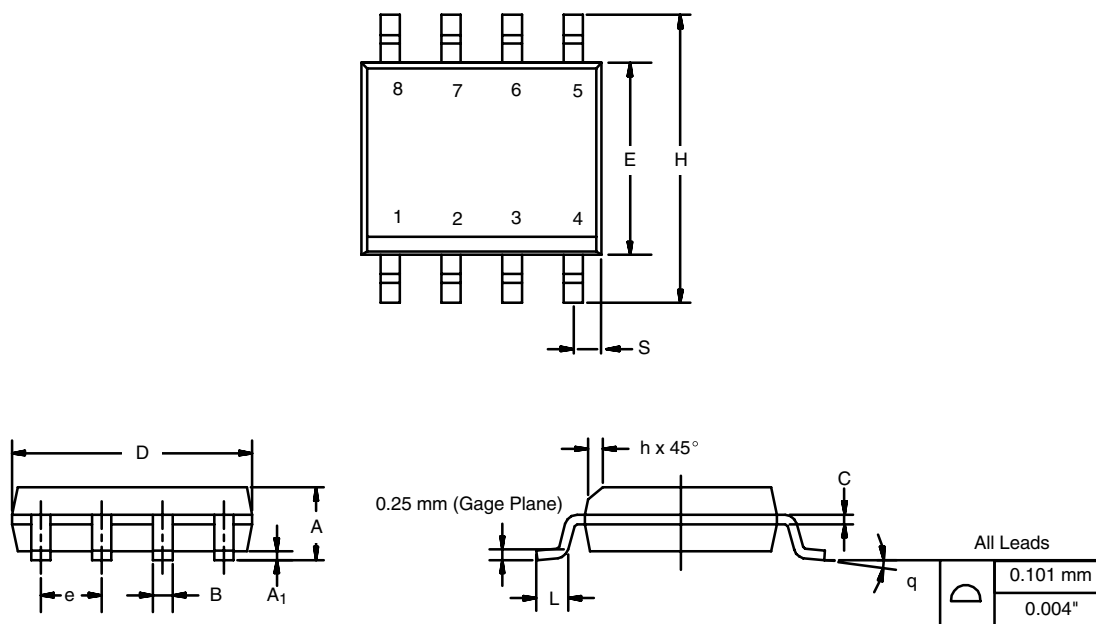


Capacitance

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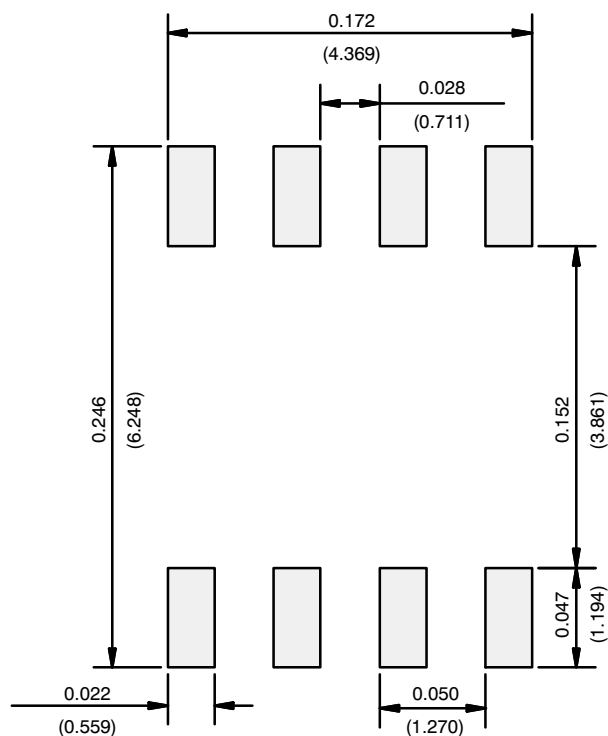
## SOIC (NARROW): 8-LEAD

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 |             |      |           |       |
| DWG: 5498                      |             |      |           |       |

## RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads  
Dimensions in Inches/(mm)

[Return to Index](#)



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