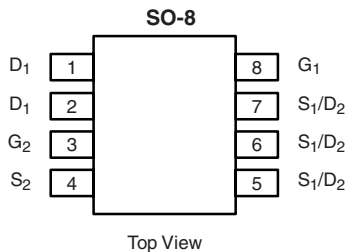


Dual N-Channel 30-V (D-S) MOSFET with Schottky Diode

| PRODUCT SUMMARY | | | | |
|-----------------|---------------------|----------------------------------|---------------------------------|-----------------------|
| | V _{DS} (V) | R _{DS(on)} (Ω) | I _D (A) ^a | Q _g (Typ.) |
| Channel-1 | 30 | 0.018 at V _{GS} = 10 V | 10 | 6.6 |
| | | 0.023 at V _{GS} = 4.5 V | 8.5 | |
| Channel-2 | | 0.018 at V _{GS} = 10 V | 10.5 | 8.9 |
| | | 0.022 at V _{GS} = 4.5 V | 9.3 | |

| SCHOTTKY PRODUCT SUMMARY | | |
|--------------------------|--|--------------------|
| V _{DS} (V) | V _{SD} (V) Diode Forward Voltage | I _F (A) |
| 30 | 0.50 V at 1.0 A | 2.0 |



Ordering Information: Si4916DY-T1-E3 (Lead (Pb)-free)
Si4916DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

FEATURES

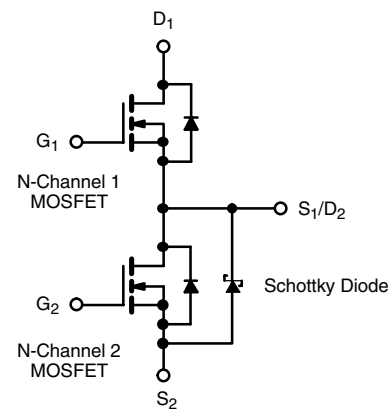
- Halogen-free According to IEC 61249-2-21 Available
- LITTLE FOOT[®] Plus Integrated Schottky
- 100 % R_g Tested

APPLICATIONS

- DC/DC Converters
- Notebook



RoHS
COMPLIANT
HALOGEN
FREE
Available



| ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted | | | | | |
|---|-----------------------------------|------------------------|------------------------|------------------------|-----|
| Parameter | Symbol | Channel-1 | Channel-2 | Unit | |
| Drain-Source Voltage | V _{DS} | 30 | | V | |
| Gate-Source Voltage | V _{GS} | 20 | | | |
| Continuous Drain Current (T _J = 150 °C) ^{a, b} | I _D | T _C = 25 °C | 10 | 10.5 | A |
| | | T _C = 70 °C | 8 | 8.3 | |
| | | T _A = 25 °C | 7.5 ^{a, b, c} | 7.8 ^{a, b, c} | |
| | | T _A = 70 °C | 6 ^{a, b, c} | 6.3 ^{a, b, c} | |
| Pulsed Drain Current (10 μs Pulse Width) | I _{DM} | 40 | 40 | A | |
| Continuous Source-Drain Diode Current | I _S | T _C = 25 °C | 3 | | 3.2 |
| | | T _A = 25 °C | 1.7 ^{a, b, c} | 1.8 ^{a, b, c} | |
| PulseD Source-Drain Current | I _{SM} | 40 | 40 | A | |
| Single-Pulse Avalanche Current | I _{AS} | 15 | | | |
| Single-Pulse Avalanche Energy | E _{AS} | 11.2 | | mJ | |
| Maximum Power Dissipation ^{a, b} | P _D | T _C = 25 °C | 3.3 | 3.5 | W |
| | | T _C = 70 °C | 2.1 | 2.2 | |
| | | T _A = 25 °C | 1.9 ^{a, b, c} | 2.0 ^{a, b, c} | |
| | | T _A = 70 °C | 1.2 ^{a, b, c} | 1.3 ^{a, b, c} | |
| Operating Junction and Storage Temperature Range | T _J , T _{stg} | - 55 to 150 | | °C | |

Notes:

a. Based on T_C = 25 °C.

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

c. t = 10 s.

THERMAL RESISTANCE RATINGS

| Parameter | | Symbol | Channel-1 | | Channel-2 | | Unit |
|--|---------------|------------|-----------|------|-----------|------|------|
| | | | Typ. | Max. | Typ. | Max. | |
| Maximum Junction-to-Ambient ^a | $t \leq 10$ s | R_{thJA} | 54 | 65 | 47 | 60 | °C/W |
| Maximum Junction-to-Foot (Drain) | Steady State | R_{thJF} | 32 | 38 | 30 | 35 | |

Notes:

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

b. Maximum under Steady State conditions is 112 °C/W for Channel 1 and 107 °C/W for Channel 2.

MOSFET SPECIFICATIONS $T_J = 25$ °C, unless otherwise noted

| Parameter | Symbol | Test Conditions | Min. | Typ. ^a | Max. | Unit | |
|---|-------------------------|---|--------------------------|-------------------|------------|------------|----------|
| Static | | | | | | | |
| Drain-Source Breakdown Voltage | V_{DS} | $V_{GS} = 0$ V, $I_D = 250$ μ A | Ch-1 30 Ch-2 30 | | | V | |
| V_{DS} Temperature Coefficient | $\Delta V_{DS}/T_J$ | $I_D = 250$ μ A | Ch-1 Ch-2 | 24 25 | | mV/°C | |
| $V_{GS(th)}$ Temperature Coefficient | $\Delta V_{GS(th)}/T_J$ | | Ch-1 Ch-2 | -6 -6 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 250$ μ A | Ch-1 Ch-2 | 1.5 1.5 | 3.0 2.7 | | |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0$ V, $V_{GS} = 20$ V | Ch-1 Ch-2 | | 100 100 | nA | |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 30$ V, $V_{GS} = 0$ V | Ch-1 Ch-2 | | 1 100 | μ A | |
| | | $V_{DS} = 30$ V, $V_{GS} = 0$ V, $T_J = 85$ °C | Ch-1 Ch-2 | | 15 2000 | | |
| On-State Drain Current ^b | $I_{D(on)}$ | $V_{DS} = 5$ V, $V_{GS} = 10$ V | Ch-1 Ch-2 | 20 20 | | A | |
| Drain-Source On-State Resistance ^b | $R_{DS(on)}$ | $V_{GS} = 10$ V, $I_D = 10$ A | Ch-1 | | 0.0145 | 0.018 | Ω |
| | | $V_{GS} = 10$ V, $I_D = 10.5$ A | Ch-2 | | 0.015 | 0.018 | |
| | | $V_{GS} = 4.5$ V, $I_D = 8.5$ A | Ch-1 | | 0.019 | 0.023 | |
| | | $V_{GS} = 4.5$ V, $I_D = 9.3$ A | Ch-2 | | 0.018 | 0.022 | |
| Forward Transconductance ^b | g_{fs} | $V_{DS} = 15$ V, $I_D = 10$ A | Ch-1 | | 30 | S | |
| | | $V_{DS} = 15$ V, $I_D = 10.5$ A | Ch-2 | | 35 | | |
| Diode Forward Voltage ^b | V_{SD} | $I_S = 1.7$ A, $V_{GS} = 0$ V | Ch-1 | | 0.75 | 1.1 | V |
| | | $I_S = 1$ A, $V_{GS} = 0$ V | Ch-2 | | 0.47 | 0.5 | |
| Dynamic^a | | | | | | | |
| Total Gate Charge | Q_g | Channel-1 $V_{DS} = 15$ V, $V_{GS} = 4.5$ V, $I_D = 10$ A | Ch-1 Ch-2 | | 6.6 8.9 | 10 14 | nC |
| Gate-Source Charge | Q_{gs} | | Ch-1 Ch-2 | | 2.9 3.4 | | |
| Gate-Drain Charge | Q_{gd} | Channel-2 $V_{DS} = 15$ V, $V_{GS} = 4.5$ V, $I_D = -10.5$ A | Ch-1 Ch-2 | | 2.3 2.4 | | |
| | | | Ch-1 Ch-2 | | 0.5 0.5 | 1.9 2.3 | |
| Gate Resistance | R_g | | Ch-1 Ch-2 | | | | Ω |



| MOSFET SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted | | | | | | |
|--|--------------|--|------|-------------------|------|------|
| Parameter | Symbol | Test Conditions | Min. | Typ. ^a | Max. | Unit |
| Dynamic^a | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | Channel-1 $V_{DD} = 15\text{ V}$, $R_L = 15\text{ }\Omega$ $I_D \cong 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 6\text{ }\Omega$ | Ch-1 | 8 | 15 | ns |
| | | | Ch-2 | 9 | 15 | |
| Rise Time | t_r | | Ch-1 | 11 | 18 | |
| | | | Ch-2 | 13 | 20 | |
| Turn-Off Delay Time | $t_{d(off)}$ | Channel-2 $V_{DD} = 15\text{ V}$, $R_L = 15\text{ }\Omega$ $I_D \cong 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 6\text{ }\Omega$ | Ch-1 | 21 | 32 | |
| | | | Ch-2 | 27 | 40 | |
| Fall Time | t_f | | Ch-1 | 6 | 10 | |
| | | | Ch-2 | 9 | 15 | |
| Source-Drain Reverse Recovery Time | t_{rr} | $I_F = 1.3\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$ $I_F = 2.2\text{ A}$, $dI/dt = 100\text{ }\mu\text{A}/\mu\text{s}$ | Ch-1 | 28 | 40 | |
| | | | Ch-2 | 24 | 35 | |
| Body Diode Reverse Recovery Charge | Q_{rr} | $I_F = 1.3\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$ $I_F = 2.2\text{ A}$, $dI/dt = 100\text{ }\mu\text{A}/\mu\text{s}$ | Ch-1 | 17 | | nC |
| | | | Ch-2 | 12 | | |
| Reverse Recovery Fall Time | t_a | $I_F = 1.3\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$ $I_F = 2.2\text{ A}$, $dI/dt = 100\text{ }\mu\text{A}/\mu\text{s}$ | Ch-1 | 12 | | ns |
| | | | Ch-2 | 11 | | |
| Reverse Recovery Rise Time | t_b | $I_F = 1.3\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$ $I_F = 2.2\text{ A}$, $dI/dt = 100\text{ }\mu\text{A}/\mu\text{s}$ | Ch-1 | 16 | | |
| | | | Ch-2 | 13 | | |

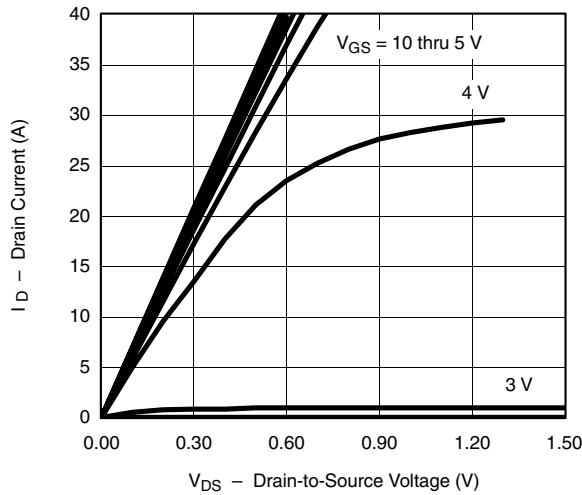
Notes:

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

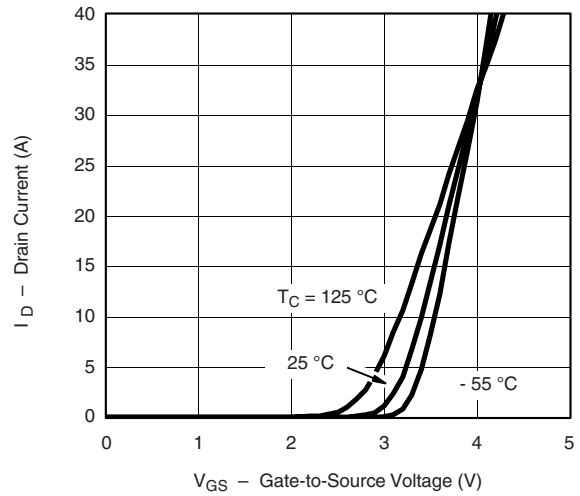
| SCHOTTKY SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted | | | | | | |
|--|----------|--|------|-------|-------|------|
| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
| Forward Voltage Drop | V_F | $I_F = 1.0\text{ A}$ | | 0.47 | 0.50 | V |
| | | $I_F = 1.0\text{ A}$, $T_J = 125\text{ }^\circ\text{C}$ | | 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.

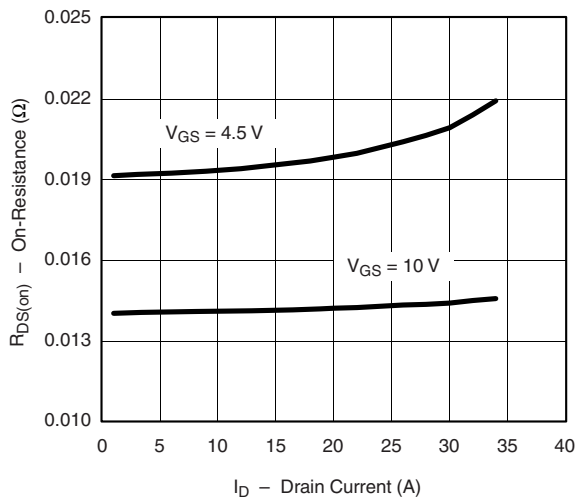
CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



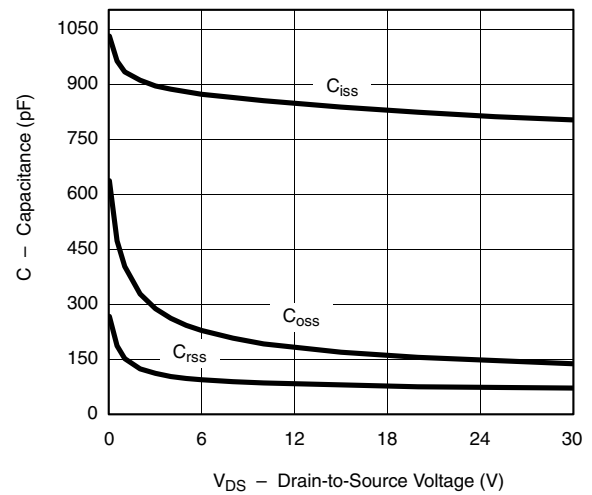
Output Characteristics



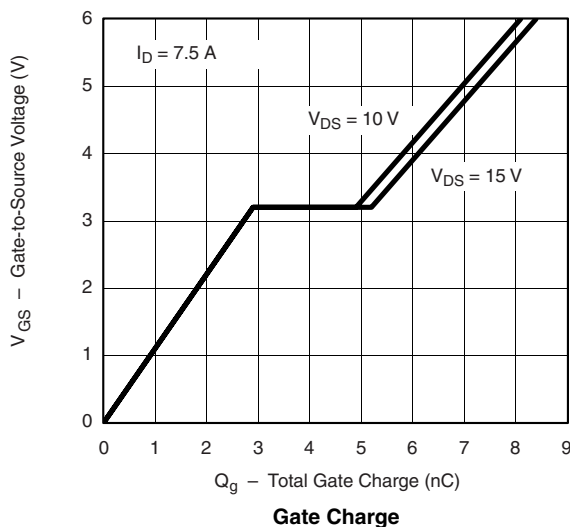
Transfer Characteristics



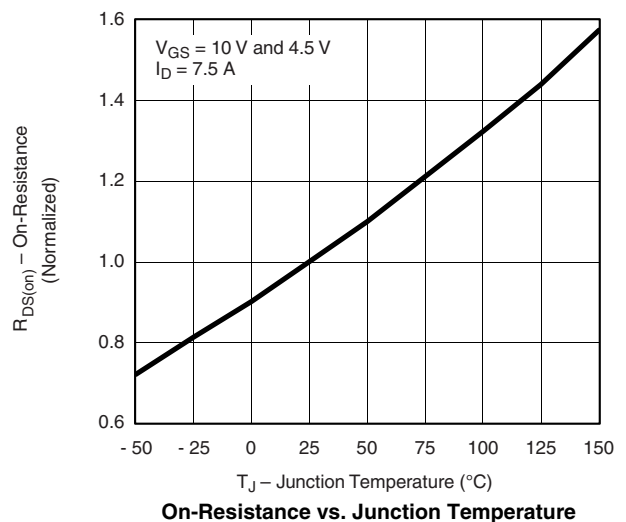
On-Resistance vs. Drain Current



Capacitance

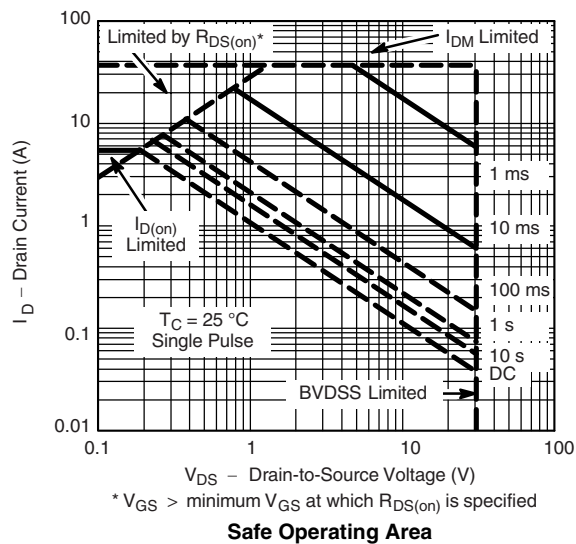
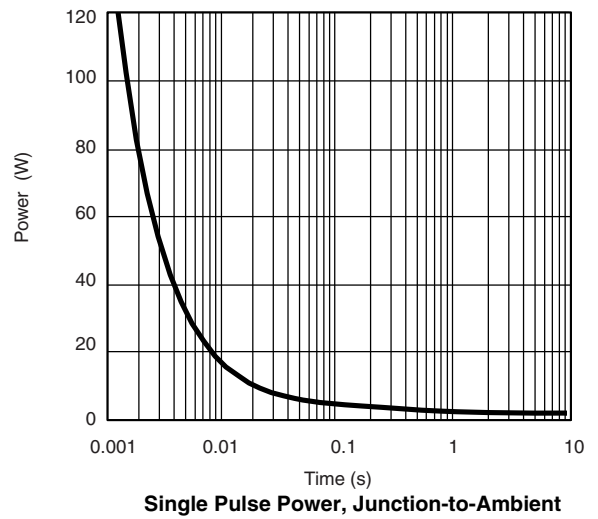
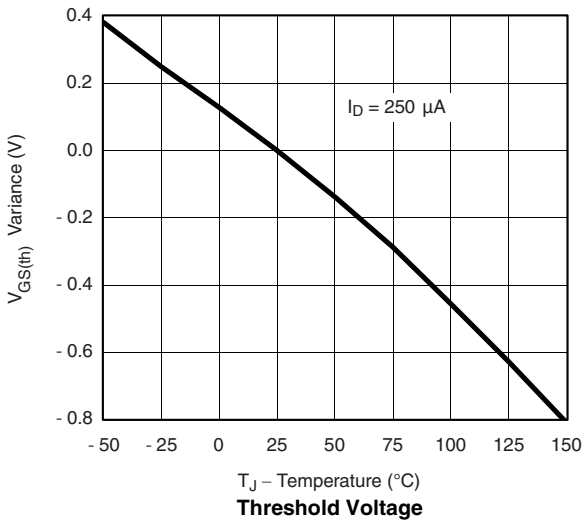
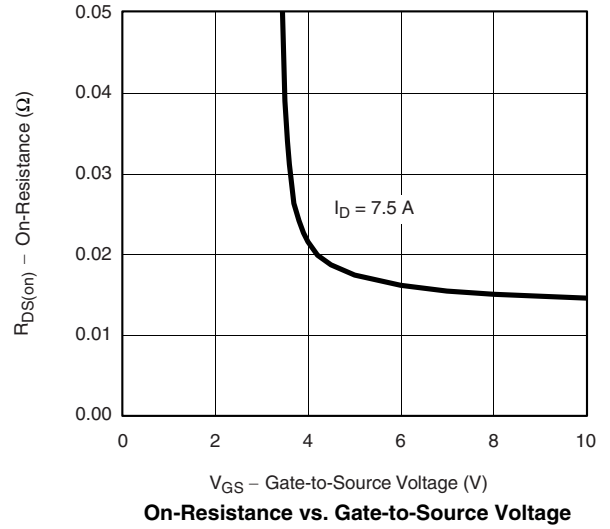
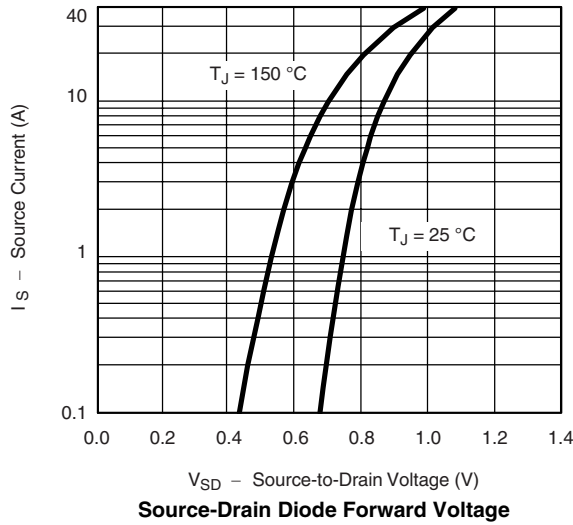


Gate Charge

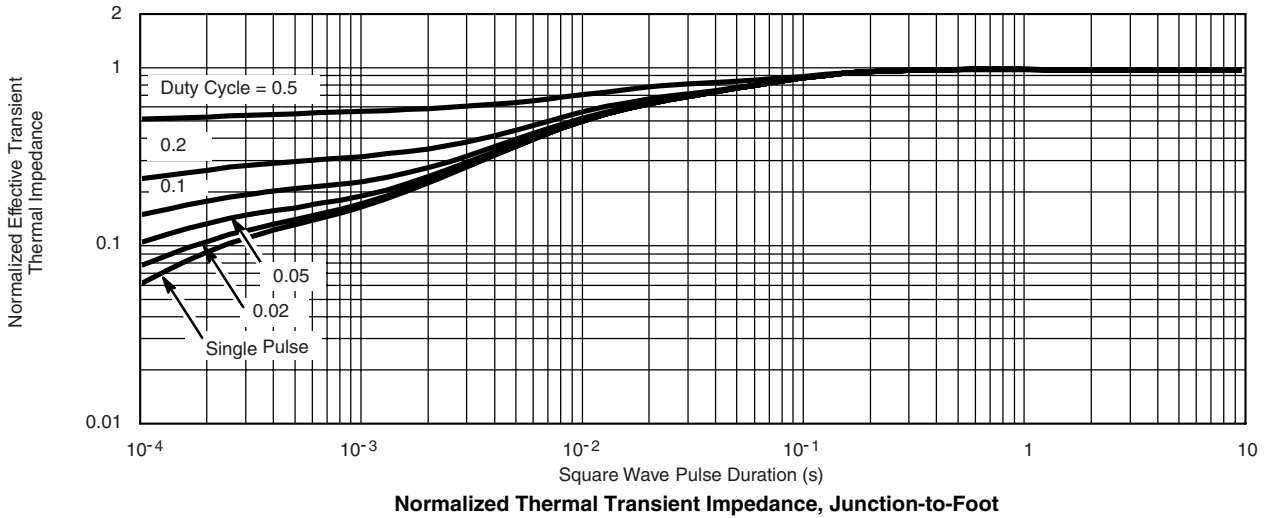
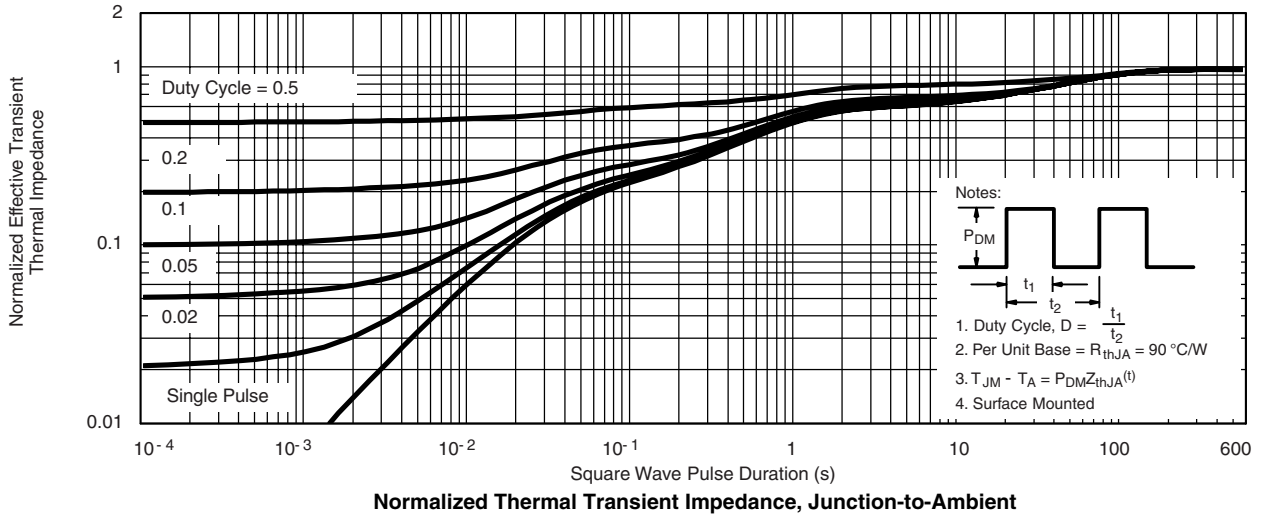


On-Resistance vs. Junction Temperature

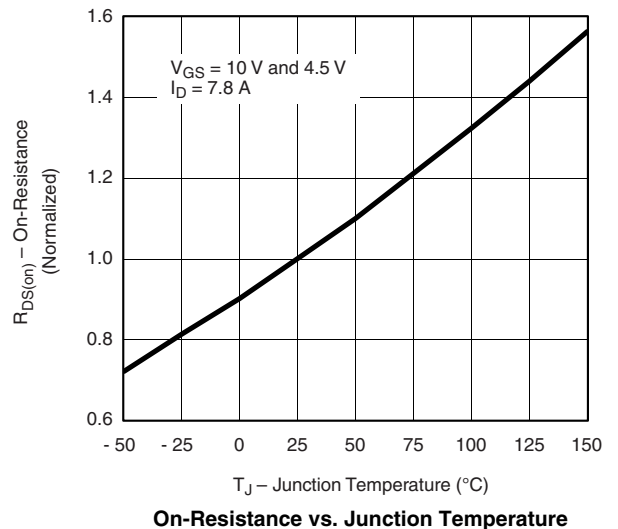
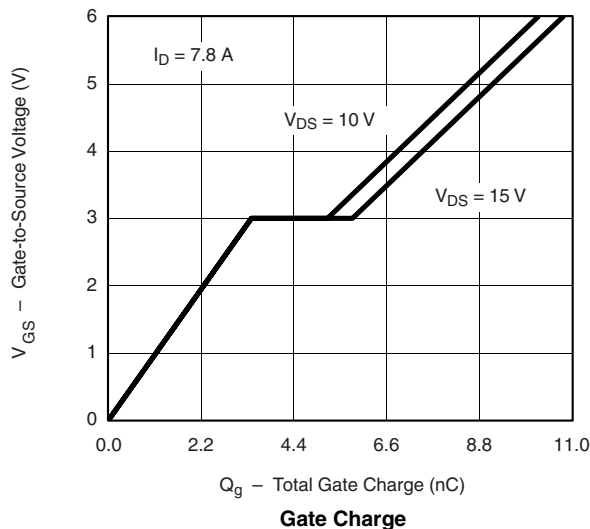
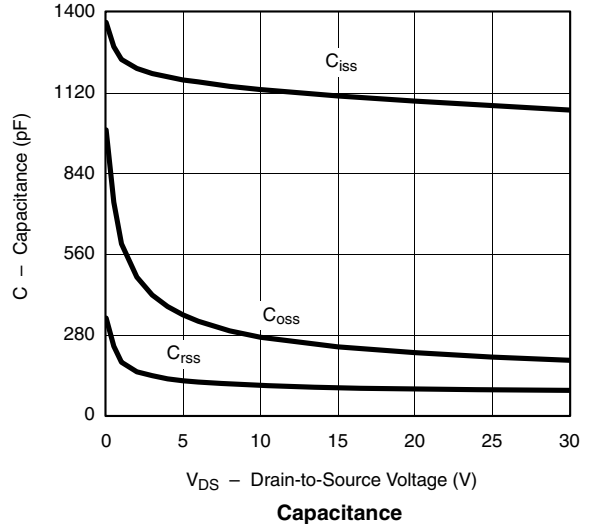
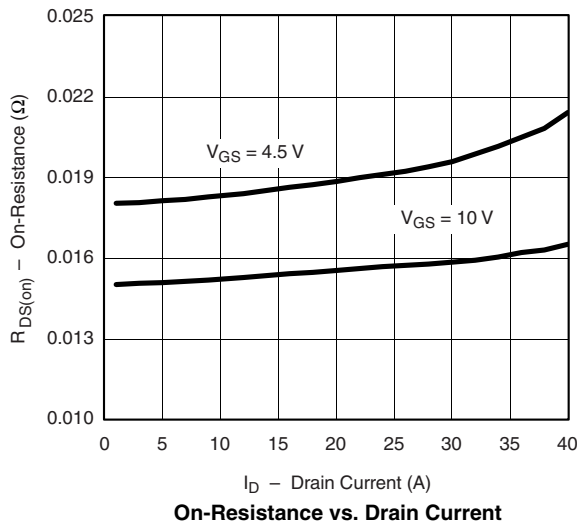
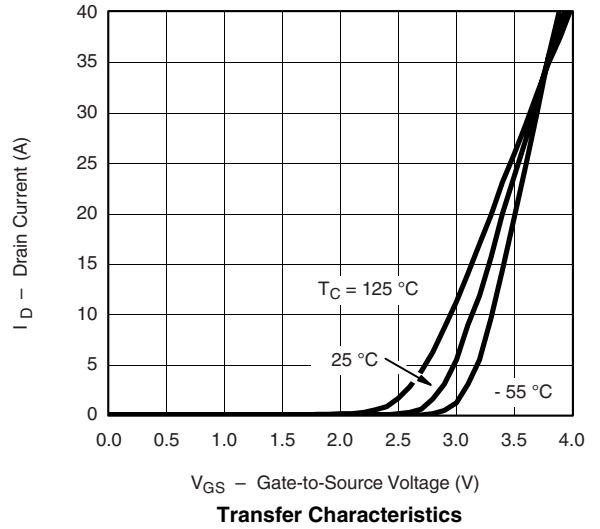
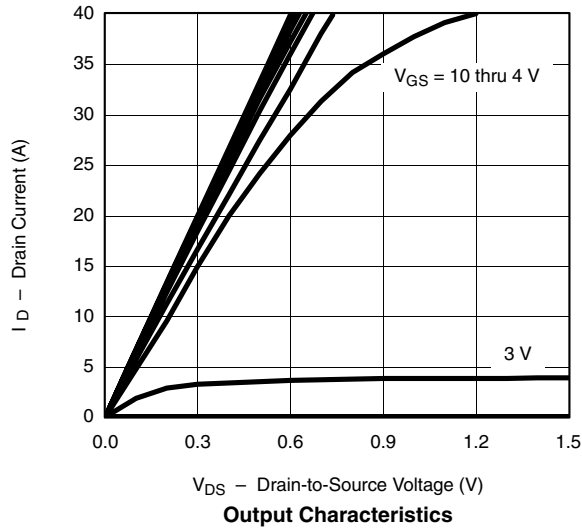
CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



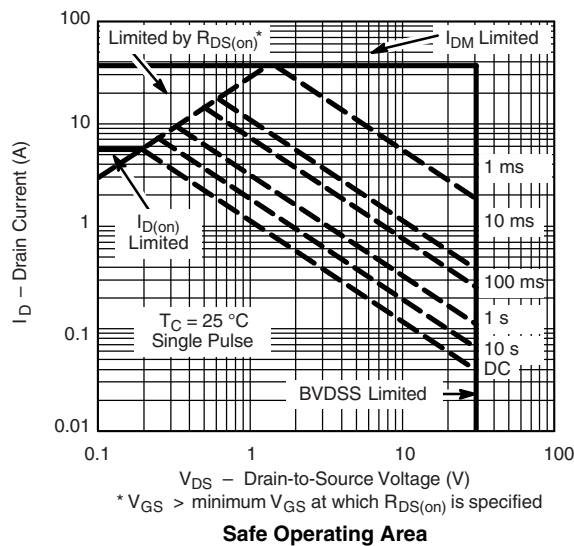
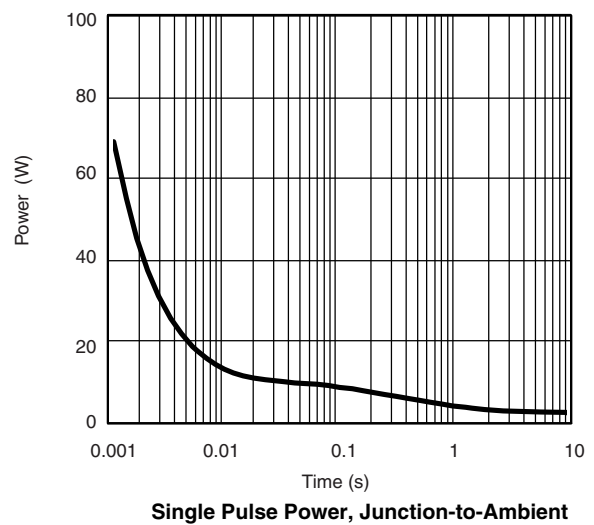
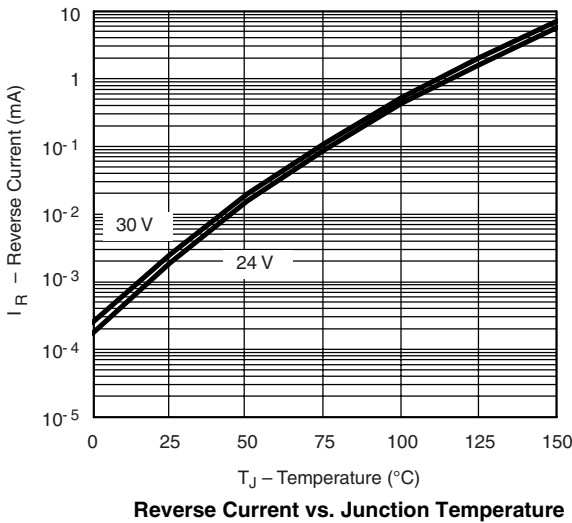
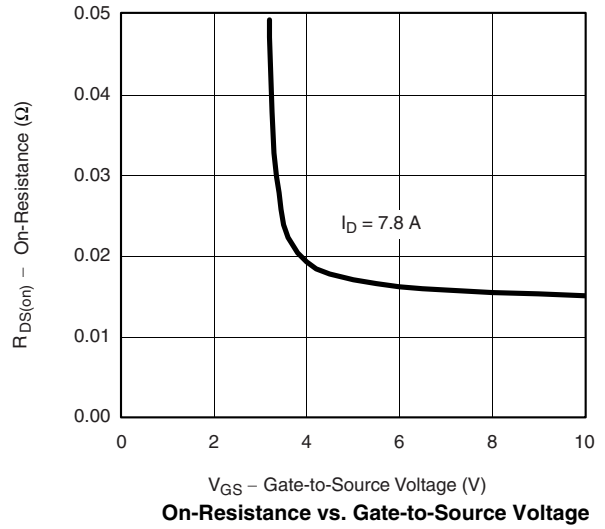
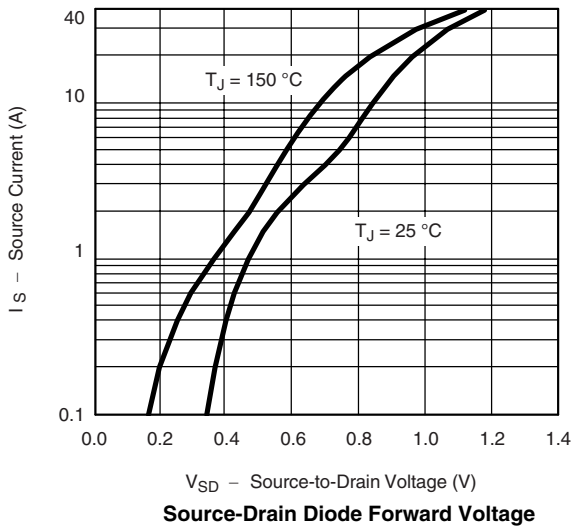
CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



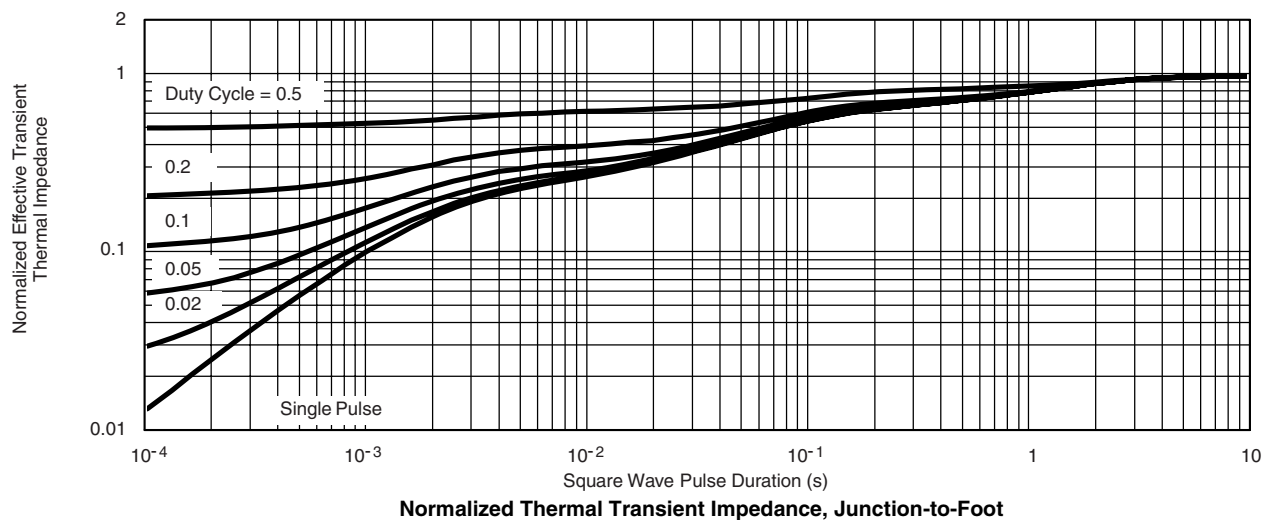
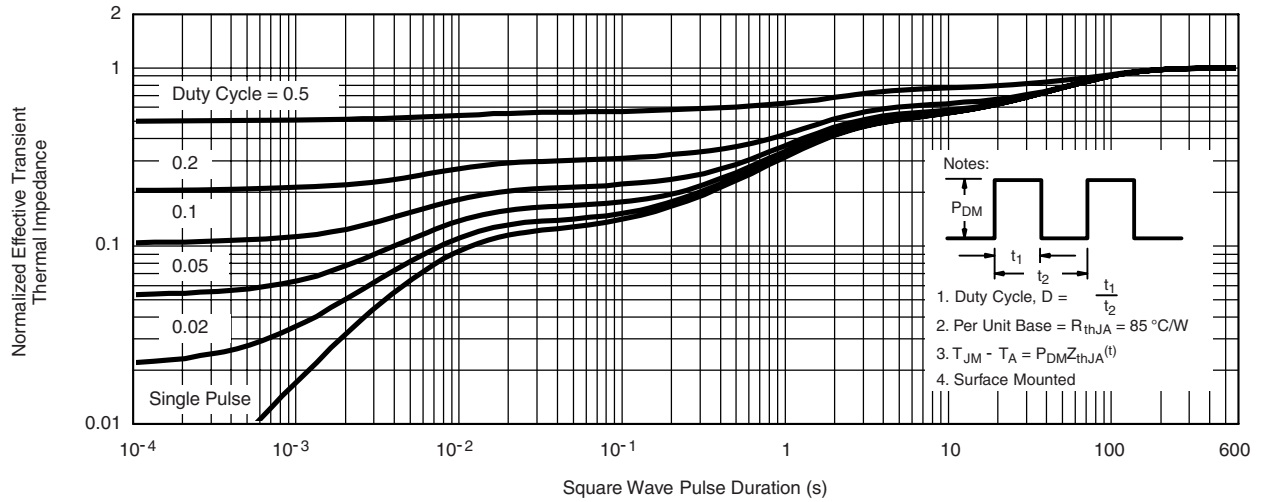
CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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



CHANNEL-2 TYPICAL CHARACTERISTICS 25 °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 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)

[Return to Index](#)



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