

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

| PRODUCT SUMMARY | | |
|---------------------|----------------------------------|--------------------|
| V _{DS} (V) | R _{DS(on)} (Ω) | I _D (A) |
| 30 | 0.022 at V _{GS} = 10 V | 7.5 |
| | 0.030 at V _{GS} = 4.5 V | 6.5 |

| SCHOTTKY PRODUCT SUMMARY | | |
|--------------------------|--|--------------------|
| V _{DS} (V) | V _{SD} (V) Diode Forward Voltage | I _F (A) |
| 30 | 0.50 at 1 A | 2.0 |

FEATURES

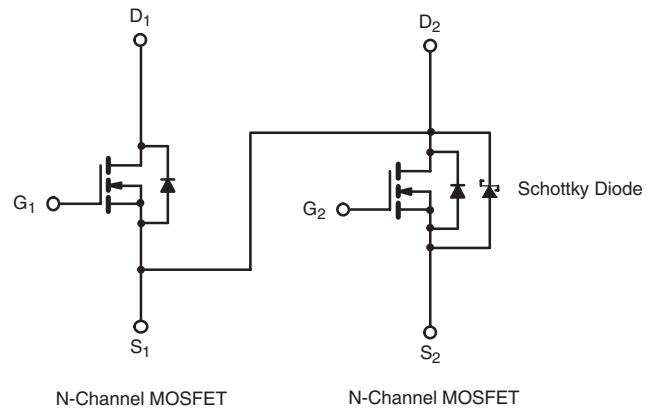
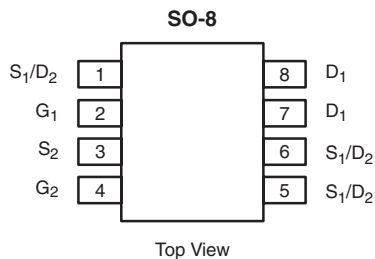
- Halogen-free According to IEC 61249-2-21 Definition
- LITTLE FOOT® Plus Schottky
- Si4830DY Pin Compatible
- PWM Optimized
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- Asymmetrical Buck-Boost DC/DC Converter



Ordering Information: Si4830ADY-T1-E3 (Lead (Pb)-free)
Si4830ADY-T1-GE3 (Lead (Pb)-free and Halogen-free)

| ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted | | | | |
|---|-----------------------------------|------------------------|--------------|------|
| Parameter | Symbol | 10 s | Steady State | Unit |
| Drain-Source Voltage | V _{DS} | 30 | | V |
| Gate-Source Voltage | V _{GS} | ± 20 | | |
| Continuous Drain Current (T _J = 150 °C) ^a | I _D | T _A = 25 °C | 7.5 | 5.7 |
| | | T _A = 70 °C | 6.0 | 4.6 |
| Pulsed Drain Current | I _{DM} | 30 | | A |
| Continuous Source Current (Diode Conduction) ^a | I _S | 1.7 | 0.9 | |
| Maximum Power Dissipation ^a | P _D | T _A = 25 °C | 2.0 | 1.1 |
| | | T _A = 70 °C | 1.3 | 0.7 |
| Operating Junction and Storage Temperature Range | T _J , T _{stg} | - 55 to 150 | | °C |

| THERMAL RESISTANCE RATINGS | | | | | | |
|--|-------------------|--------------|------|----------|------|------|
| Parameter | Symbol | MOSFET | | SCHOTTKY | | Unit |
| | | Typ. | Max. | Typ. | Max. | |
| Maximum Junction-to-Ambient ^a | R _{thJA} | t ≤ 10 s | 52 | 62.5 | 53 | 62.5 |
| | | Steady State | 93 | 110 | 93 | 110 |
| Maximum Junction-to-Foot (Drain) | R _{thJF} | 35 | 40 | 35 | 40 | °C/W |

Notes:

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

| MOSFET SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted | | | | | | |
|---|--------------|---|---|-------------------|-----------|---------------|
| Parameter | Symbol | Test Conditions | Min. | Typ. ^a | Max. | Unit |
| Static | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$ | 1.4 | | 3.0 | V |
| Gate-Body Leakage | I_{GSS} | $V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$ | Ch-1 | | 1 | μA |
| | | | Ch-2 | | 100 | |
| | | $V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 85\text{ }^\circ\text{C}$ | Ch-1 | | 15 | |
| | | | Ch-2 | | 2000 | |
| On-State Drain Current ^b | $I_{D(on)}$ | $V_{DS} = 5\text{ V}$, $V_{GS} = 10\text{ V}$ | 20 | | | A |
| Drain-Source On-State Resistance ^b | $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$, $I_D = 7.5\text{ A}$ | | 0.017 | 0.022 | Ω |
| | | $V_{GS} = 4.5\text{ V}$, $I_D = -6.5\text{ A}$ | | 0.024 | 0.030 | |
| Forward Transconductance ^b | g_{fs} | $V_{DS} = 15\text{ V}$, $I_D = 7.5\text{ A}$ | | 19 | | S |
| Diode Forward Voltage ^b | V_{SD} | $I_S = 1\text{ A}$, $V_{GS} = 0\text{ V}$ | Ch-1 | 0.75 | 1.2 | V |
| | | | Ch-2 | 0.47 | 0.5 | |
| Dynamic^a | | | | | | |
| Total Gate Charge | Q_g | $V_{DS} = 15\text{ V}$, $V_{GS} = 4.5\text{ V}$, $I_D = 7.5\text{ A}$ | | 7 | 11 | nC |
| Gate-Source Charge | Q_{gs} | | | 2.9 | | |
| Gate-Drain Charge | Q_{gd} | | | 2.5 | | |
| Gate Resistance | R_g | | 0.5 | 1.5 | 2.4 | Ω |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD} = 15\text{ V}$, $R_L = 15\text{ }\Omega$ $I_D \cong 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 6\text{ }\Omega$ | | 9 | 15 | ns |
| Rise Time | t_r | | | 10 | 17 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 19 | 30 | |
| Fall Time | t_f | | | 9 | 15 | |
| Source-Drain Reverse Recovery Time | t_{rr} | | $I_F = 1.7\text{ A}$, $di/dt = 100\text{ }\mu\text{s}$ | Ch-1 | 35 | |
| | | Ch-2 | | 32 | 55 | |

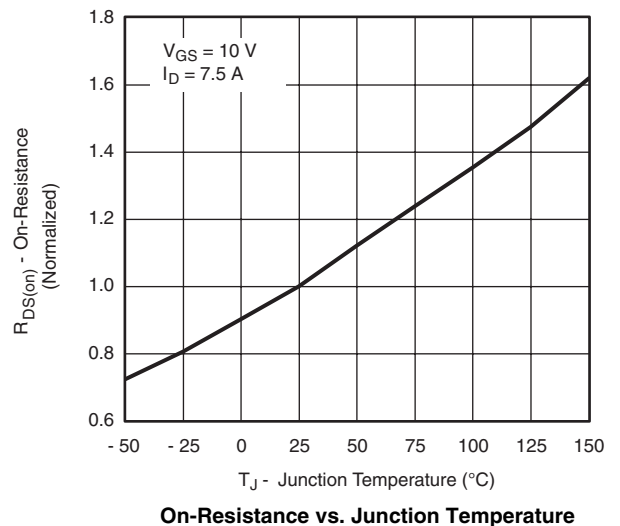
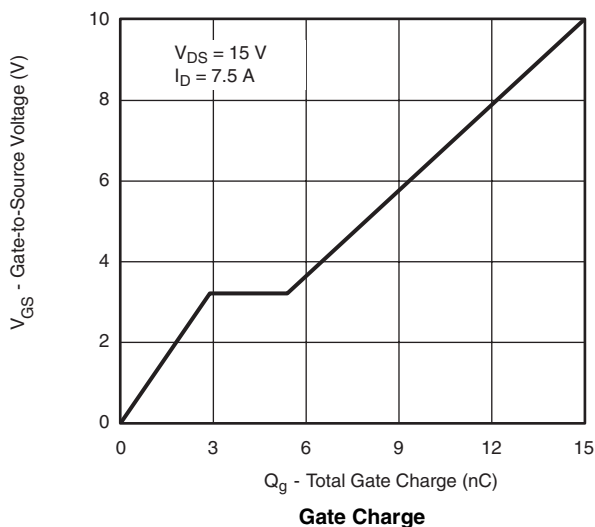
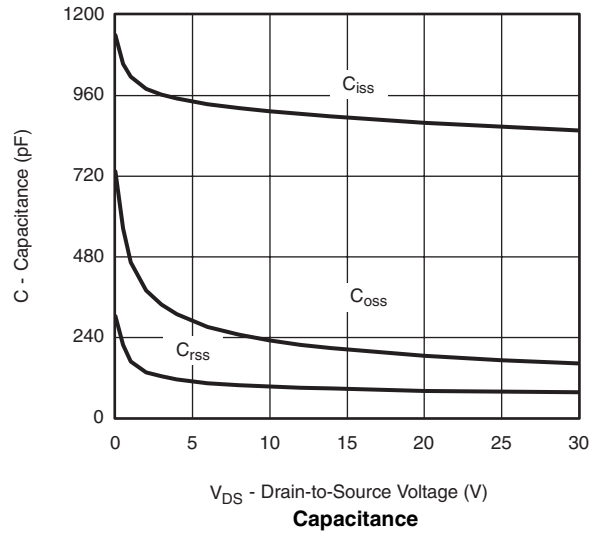
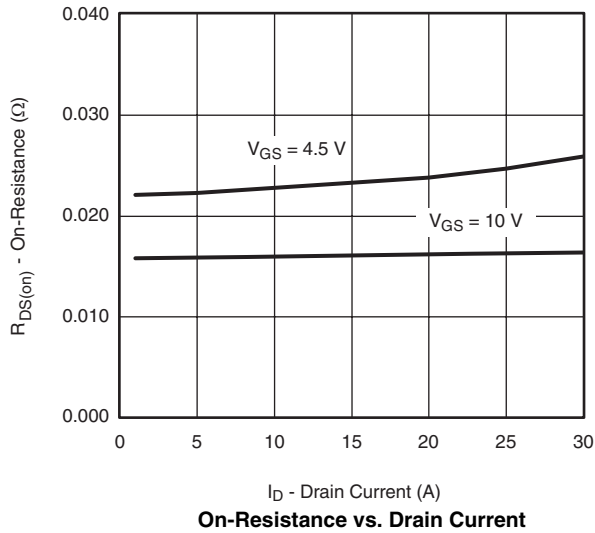
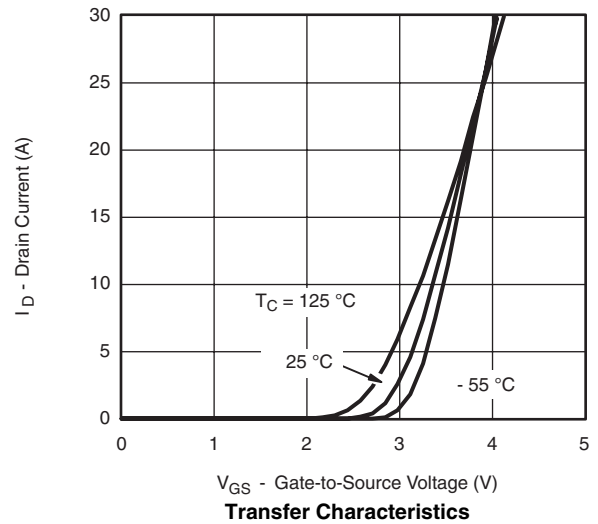
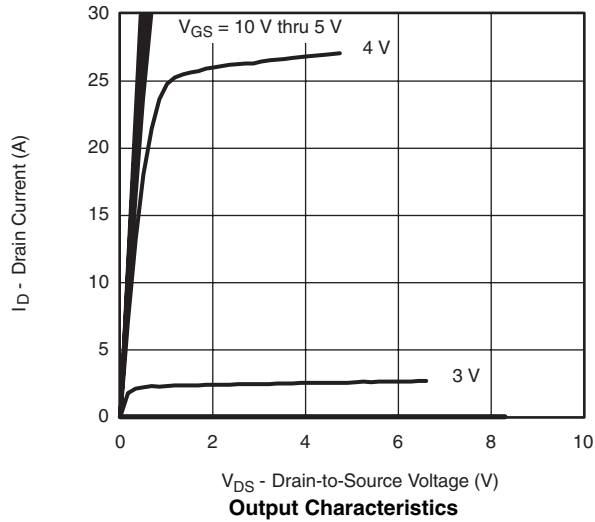
Notes:

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

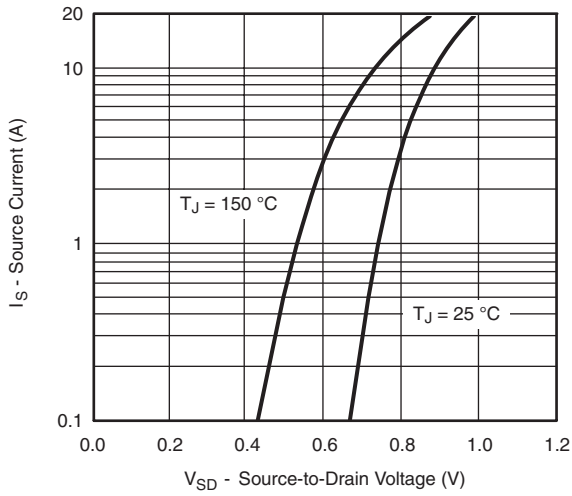
| SCHOTTKY SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted | | | | | | |
|---|----------|--|------|-------|-------|------|
| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
| Forward Voltage Drop | V_F | $I_F = 1.0\text{ A}$ | | 0.47 | 0.50 | V |
| | | $I_F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

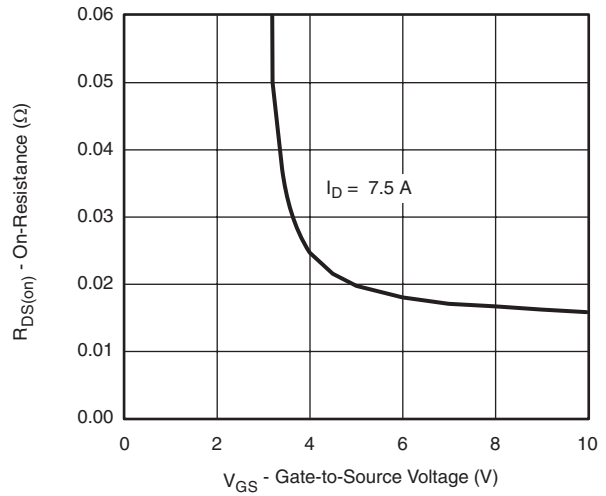
MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



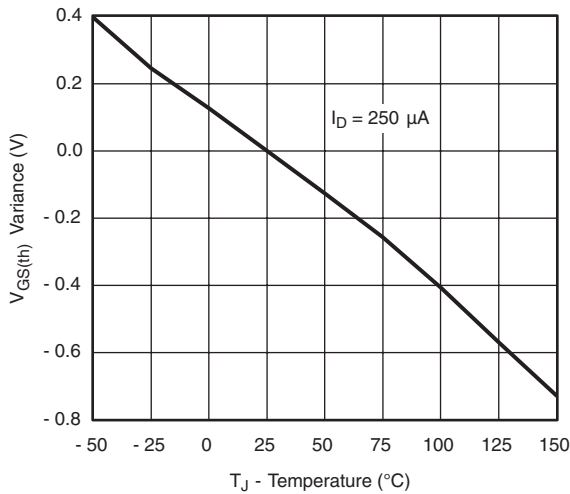
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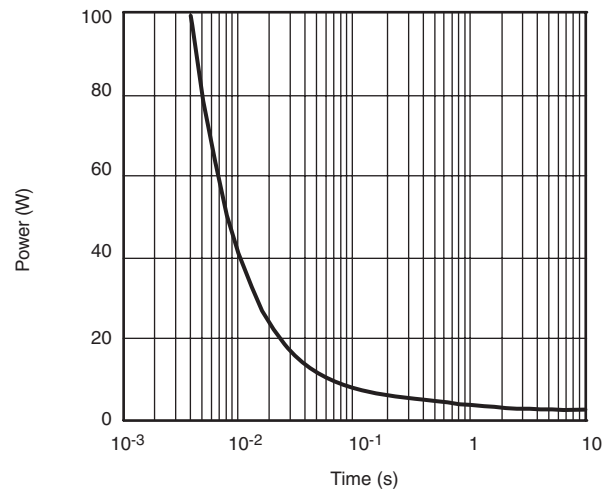
Source-Drain Diode Forward Voltage



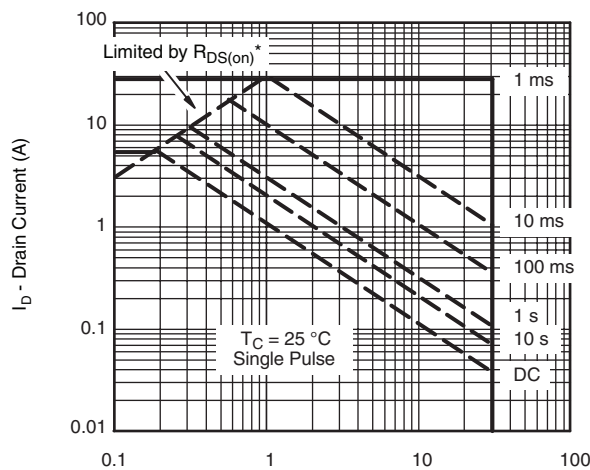
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



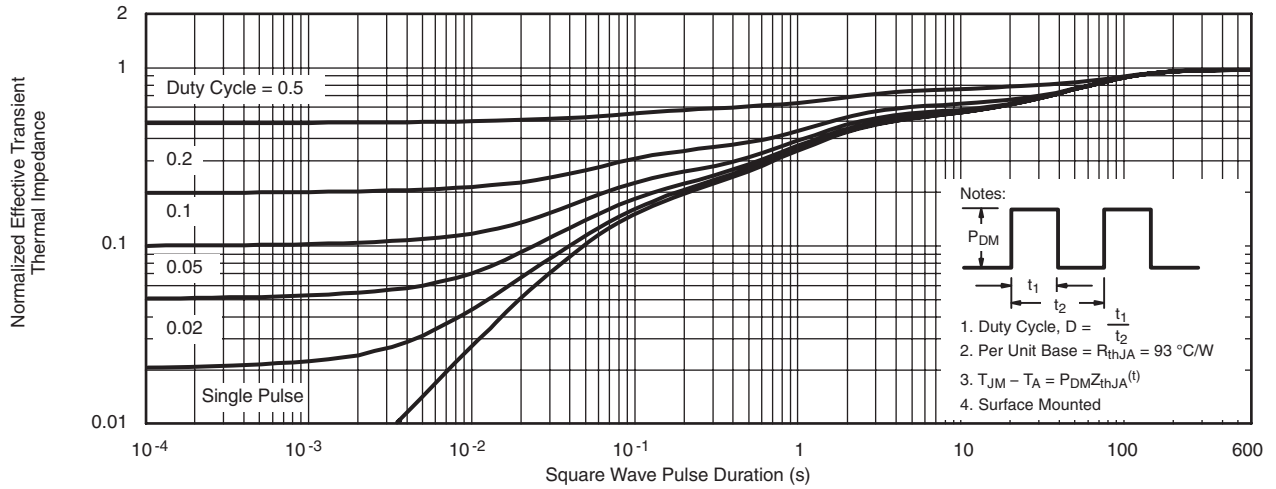
Single Pulse Power, Junction-to-Ambient



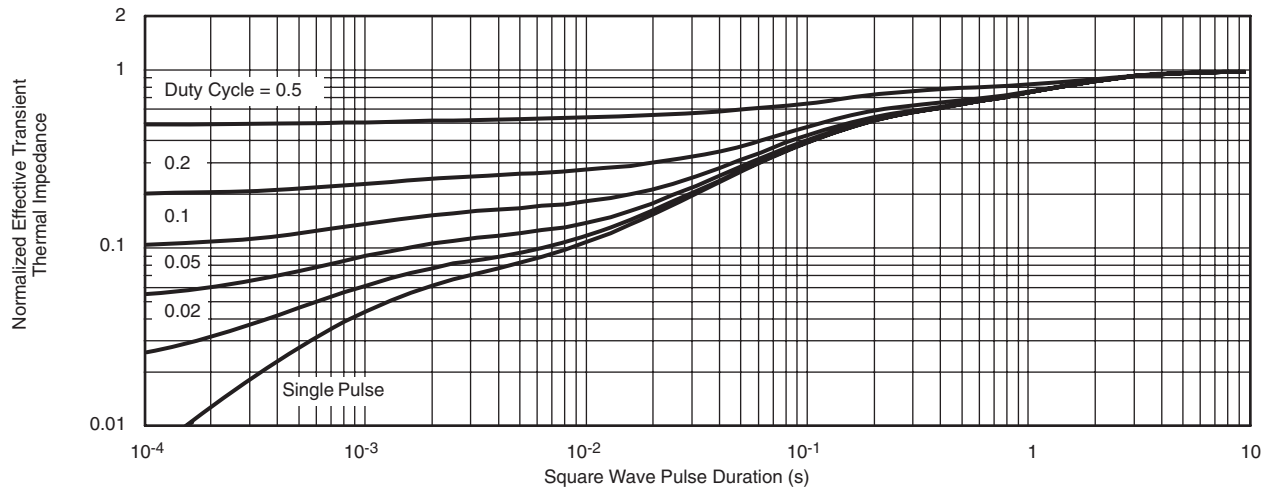
Safe Operating Area, Junction-to-Foot
 * $V_{DS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

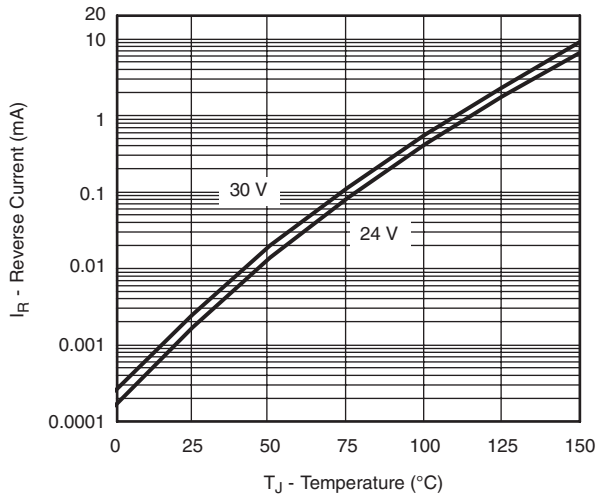


Normalized Thermal Transient Impedance, Junction-to-Ambient

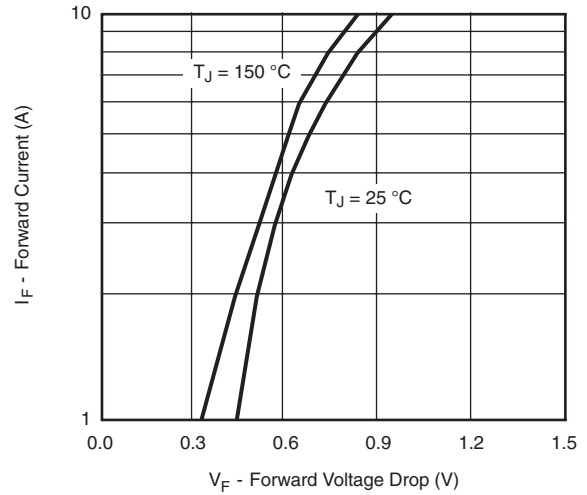


Normalized Thermal Transient Impedance, Junction-to-Foot

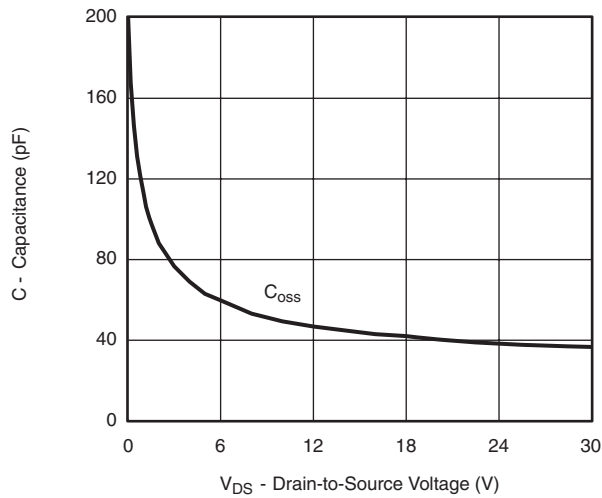
SCHOTTKY TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Reverse Current vs. Junction Temperature



Forward Voltage Drop



Capacitance

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