

## 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)
30	0.022 at V <sub>GS</sub> = 10 V	7.5
	0.030 at V <sub>GS</sub> = 4.5 V	6.5

SCHOTTKY PRODUCT SUMMARY		
V <sub>DS</sub> (V)	V <sub>SD</sub> (V) Diode Forward Voltage	I <sub>F</sub> (A)
30	0.50 at 1 A	2.0

### FEATURES

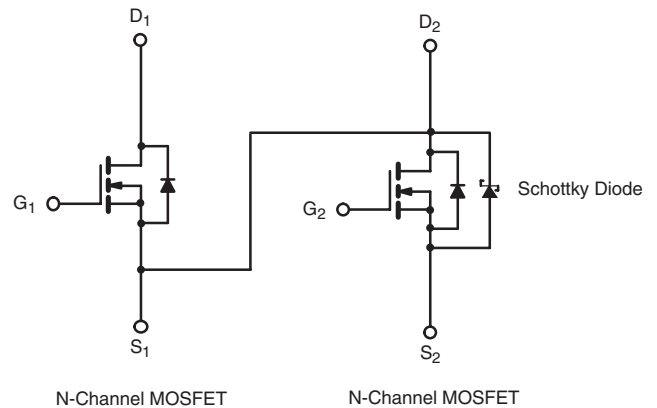
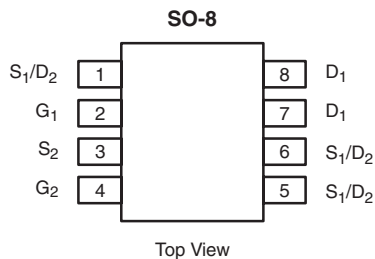
- Halogen-free According to IEC 61249-2-21 Definition
- LITTLE FOOT® Plus Schottky
- Si4830DY Pin Compatible
- PWM Optimized
- 100 % R<sub>g</sub> Tested
- Compliant to RoHS Directive 2002/95/EC



**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 <sub>A</sub> = 25 °C, unless otherwise noted				
Parameter	Symbol	10 s	Steady State	Unit
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>	I <sub>D</sub>	T <sub>A</sub> = 25 °C	7.5	5.7
		T <sub>A</sub> = 70 °C	6.0	4.6
Pulsed Drain Current	I <sub>DM</sub>	30		A
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	1.7	0.9	W
Maximum Power Dissipation <sup>a</sup>	P <sub>D</sub>	T <sub>A</sub> = 25 °C	2.0	
		T <sub>A</sub> = 70 °C	1.3	0.7
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150		°C

THERMAL RESISTANCE RATINGS						
Parameter	Symbol	MOSFET		SCHOTTKY		Unit
		Typ.	Max.	Typ.	Max.	
Maximum Junction-to-Ambient <sup>a</sup>	R <sub>thJA</sub>	t ≤ 10 s	52	62.5	53	62.5
		Steady State	93	110	93	110
Maximum Junction-to-Foot (Drain)	R <sub>thJF</sub>	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. <sup>a</sup>	Max.	Unit
<b>Static</b>						
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	$I_{GSS}$	$V_{DS} = 0\text{ V}$ , $V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 30\text{ V}$ , $V_{GS} = 0\text{ V}$	Ch-1		1	$\mu\text{A}$
			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 <sup>b</sup>	$I_{D(on)}$	$V_{DS} = 5\text{ V}$ , $V_{GS} = 10\text{ V}$	20			A
Drain-Source On-State Resistance <sup>b</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$ , $I_D = 7.5\text{ A}$		0.017	0.022	$\Omega$
		$V_{GS} = 4.5\text{ V}$ , $I_D = -6.5\text{ A}$		0.024	0.030	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}$ , $I_D = 7.5\text{ A}$		19		S
Diode Forward Voltage <sup>b</sup>	$V_{SD}$	$I_S = 1\text{ A}$ , $V_{GS} = 0\text{ V}$	Ch-1	0.75	1.2	V
			Ch-2	0.47	0.5	
<b>Dynamic<sup>a</sup></b>						
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	$\Omega$
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:

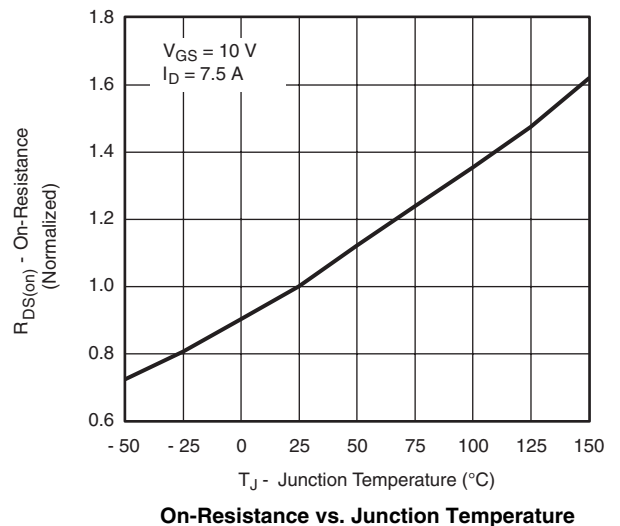
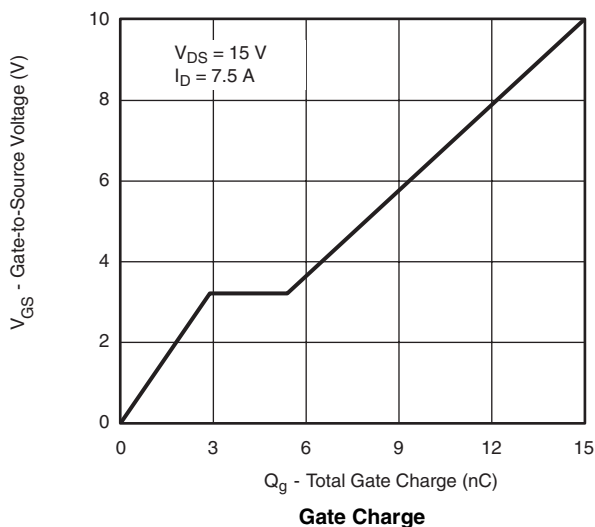
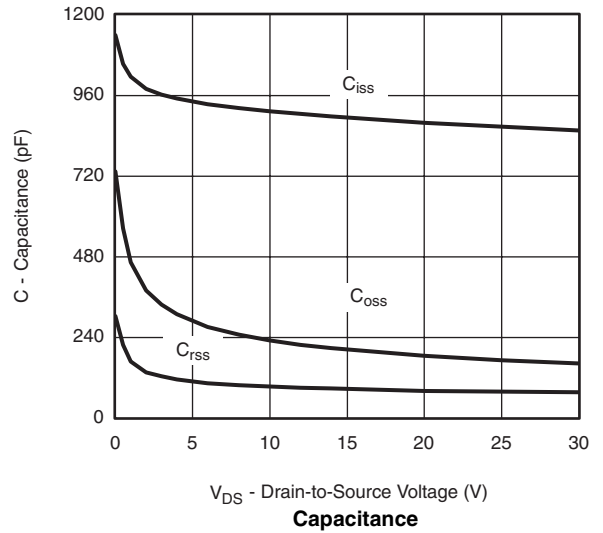
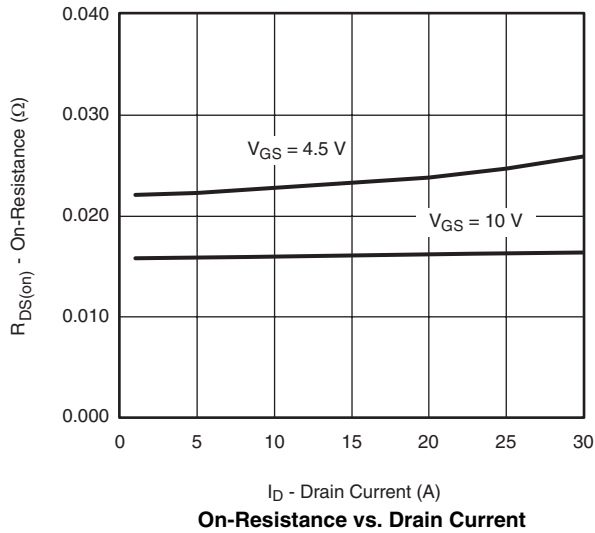
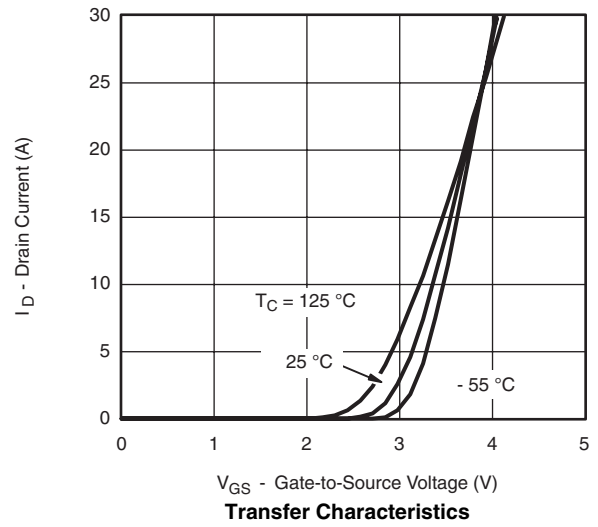
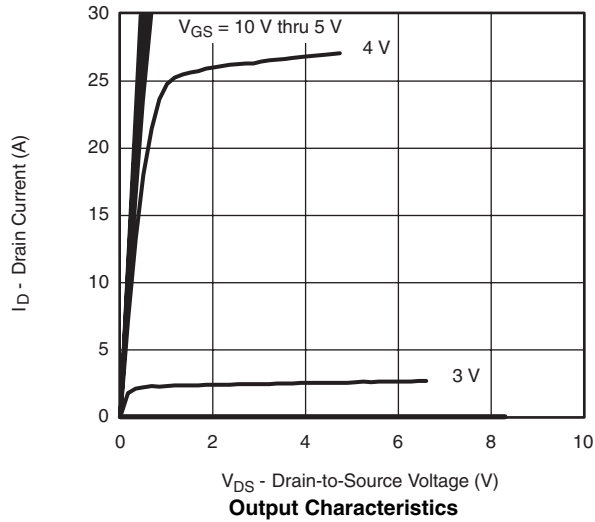
a. Guaranteed by design, not subject to production testing.

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

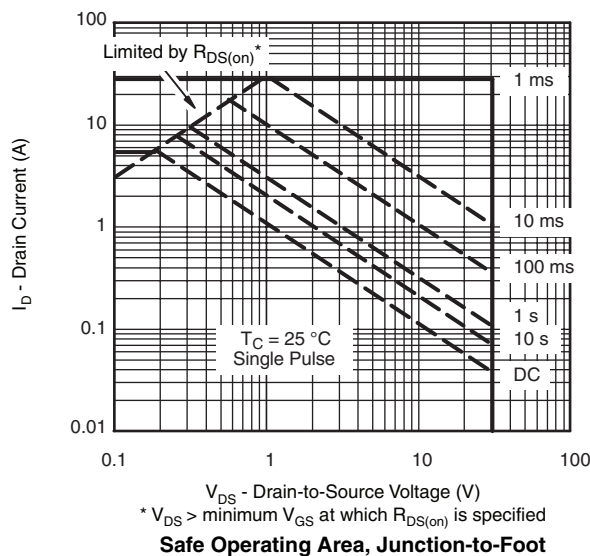
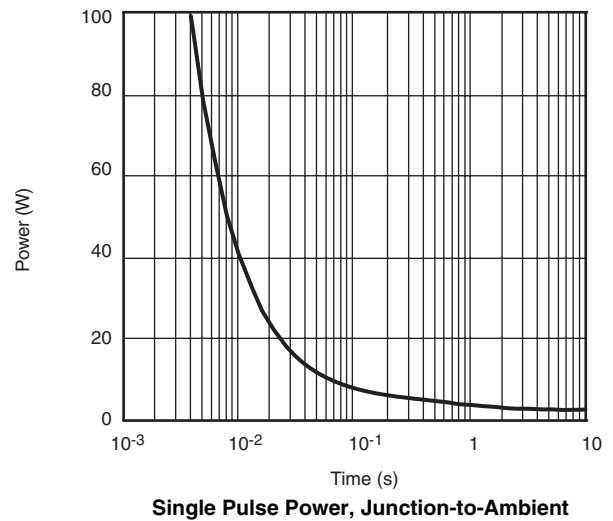
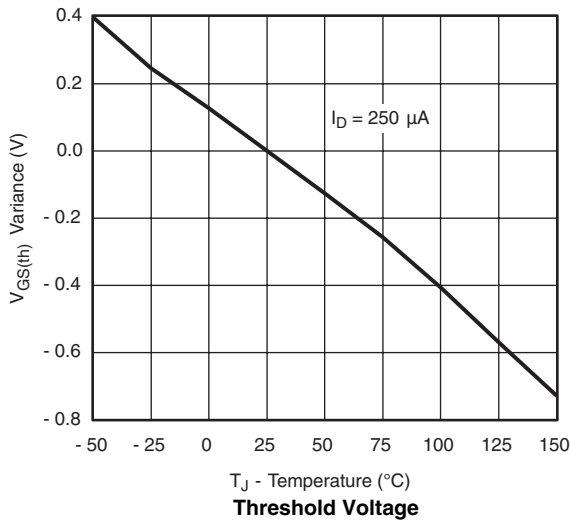
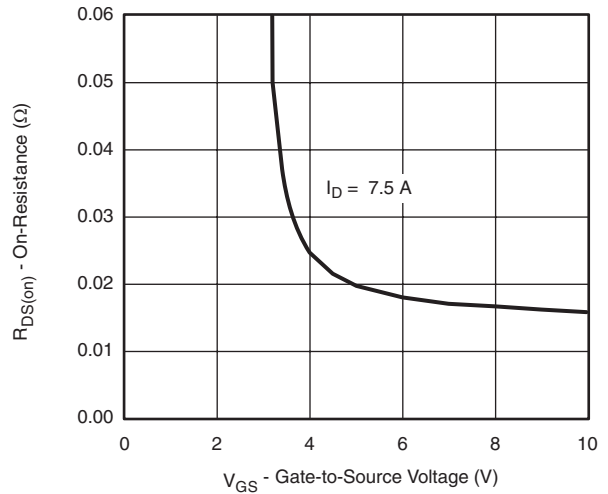
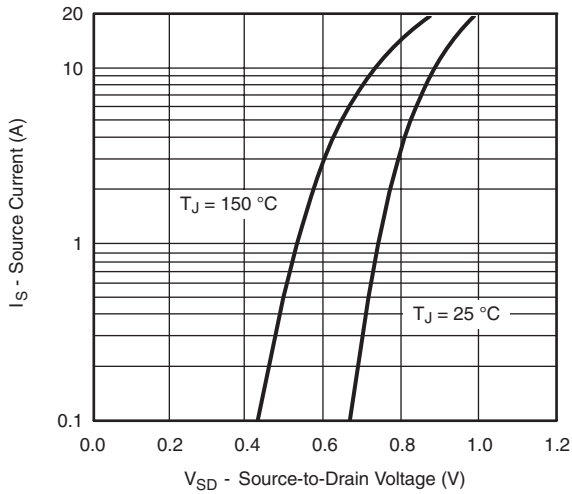
SCHOTTKY SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Forward Voltage Drop	$V_F$	$I_F = 1.0\text{ A}$		0.47	0.50	V
		$I_F = 1.0\text{ A}$ , $T_J = 125\text{ }^\circ\text{C}$		0.36	0.42	
Maximum Reverse Leakage Current	$I_{rm}$	$V_R = 30\text{ V}$		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.

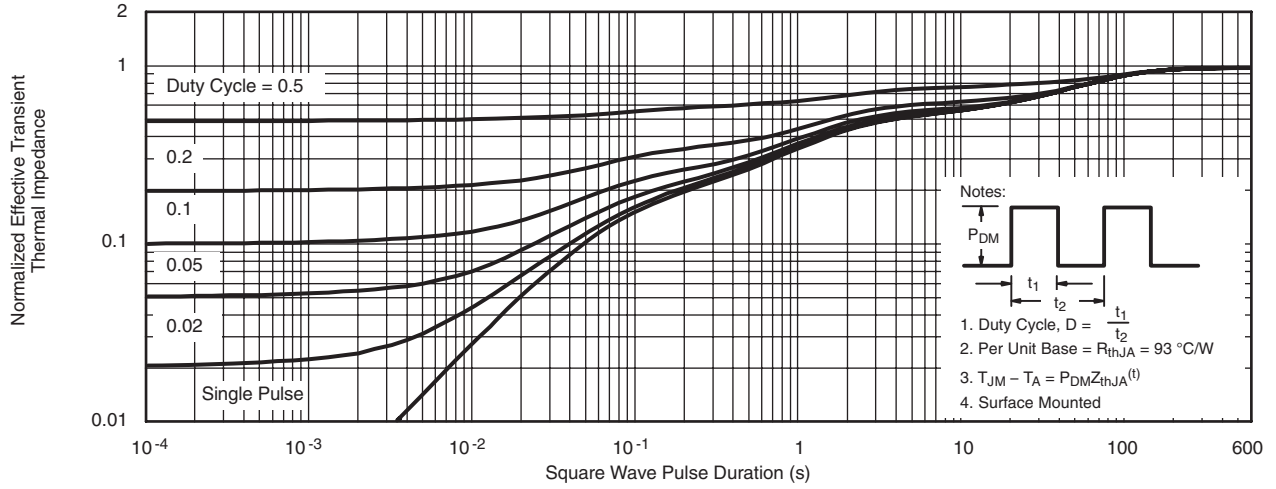
## MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



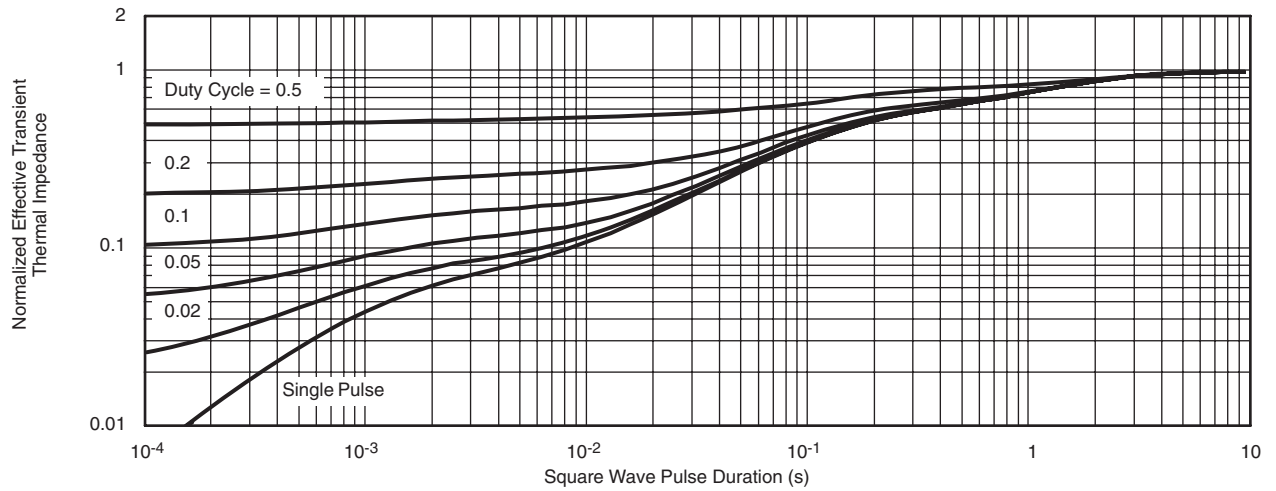
## MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



**MOSFET TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted

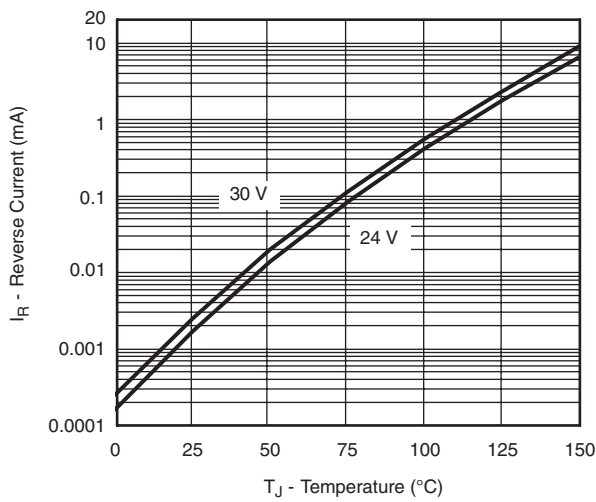


**Normalized Thermal Transient Impedance, Junction-to-Ambient**

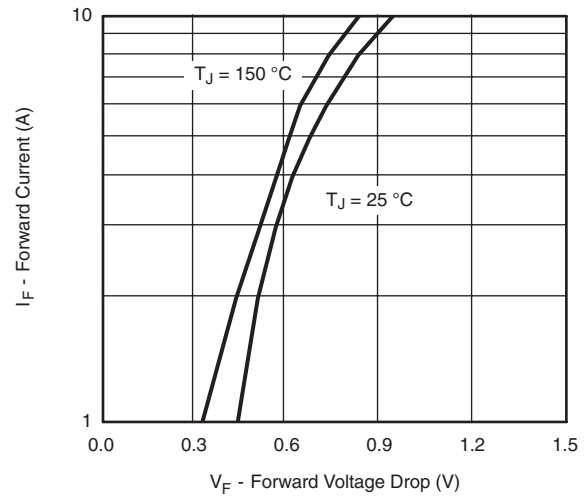


**Normalized Thermal Transient Impedance, Junction-to-Foot**

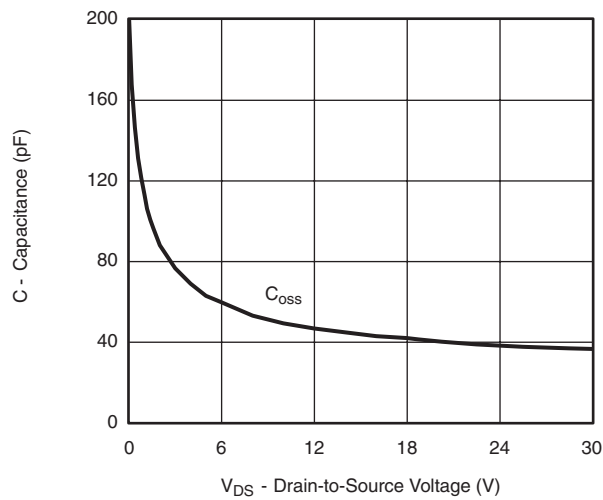
**SCHOTTKY TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



Reverse Current vs. Junction Temperature



Forward Voltage Drop



Capacitance

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