

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

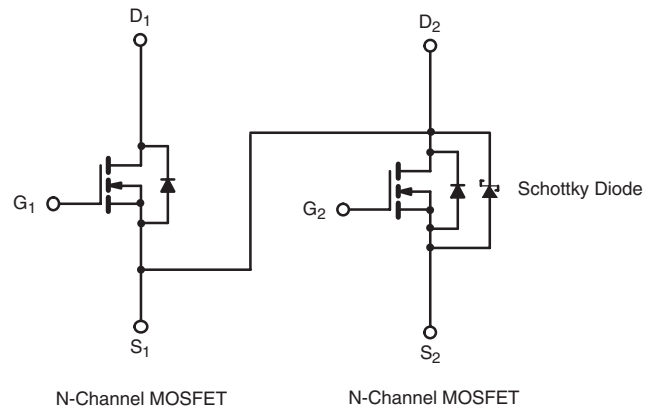
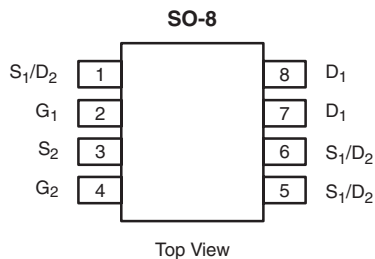
- Halogen-free According to IEC 61249-2-21 Definition
- LITTLE FOOT® Plus Schottky
- Si4830DY Pin Compatible
- PWM Optimized
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC



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	W	
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	°C/W
		Steady State	93	110	93	110	
Maximum Junction-to-Foot (Drain)	R _{thJF}	Steady State	35	40	35	40	

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:

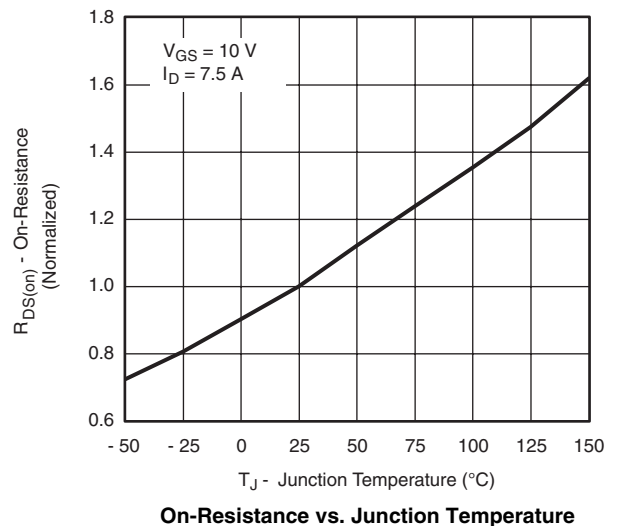
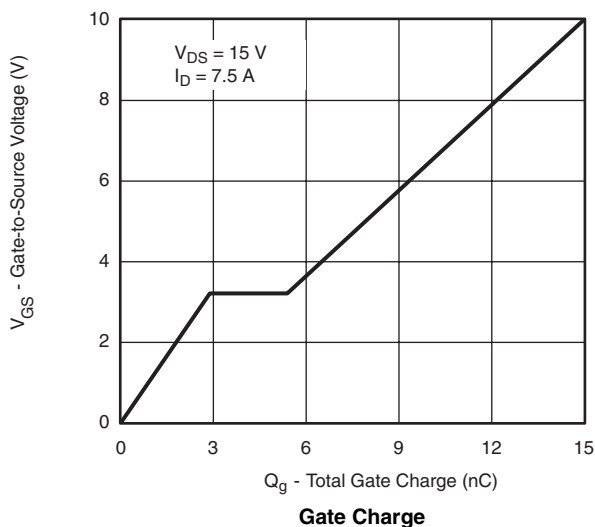
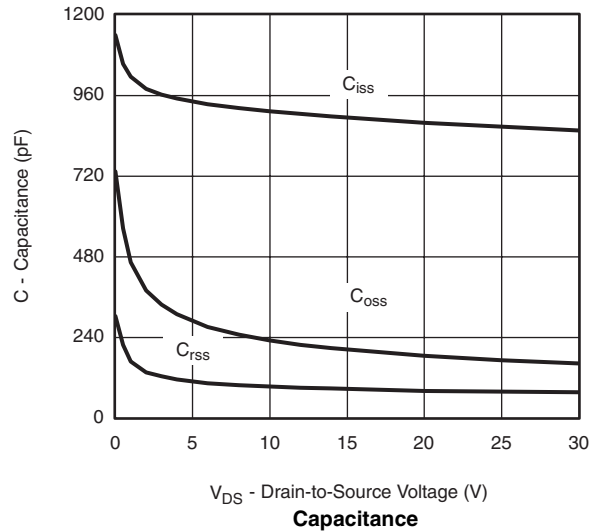
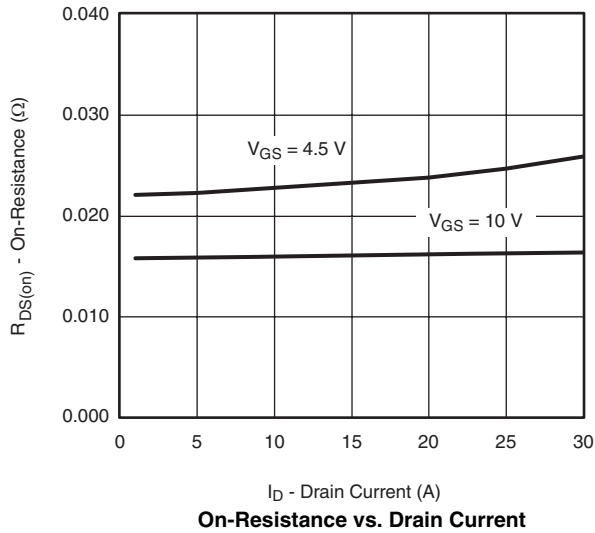
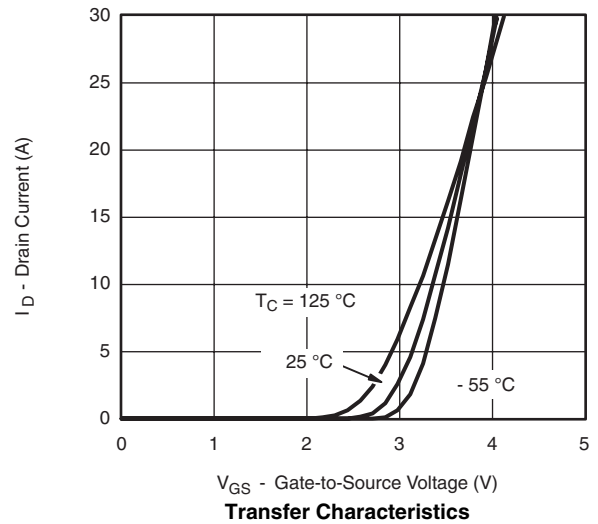
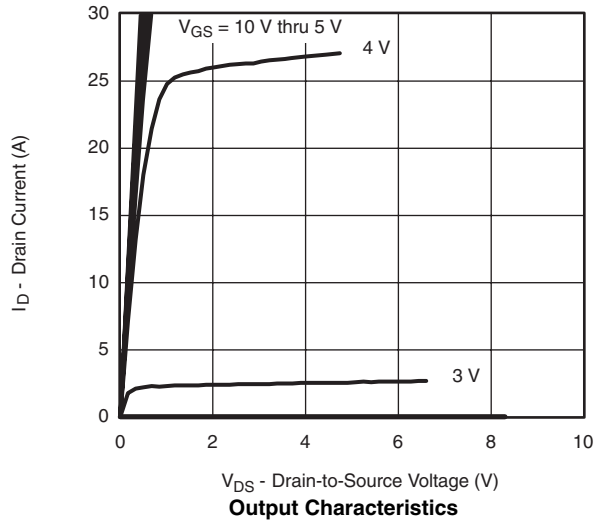
a. Guaranteed by design, not subject to production testing.

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

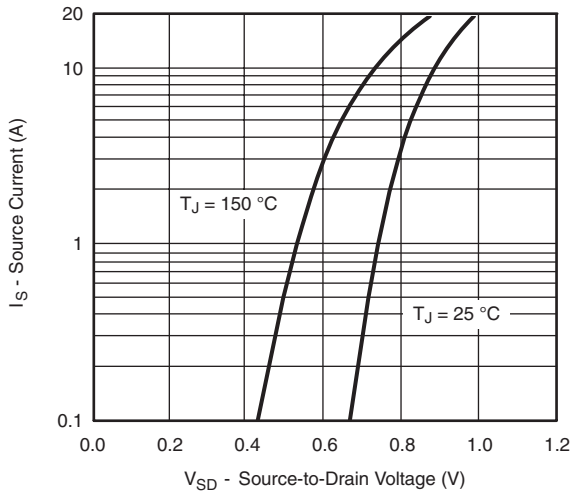
SCHOTTKY SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Forward Voltage Drop	V_F	$I_F = 1.0\text{ A}$		0.47	0.50	V
		$I_F = 1.0\text{ A}$, $T_J = 125\text{ }^\circ\text{C}$		0.36	0.42	
Maximum Reverse Leakage Current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

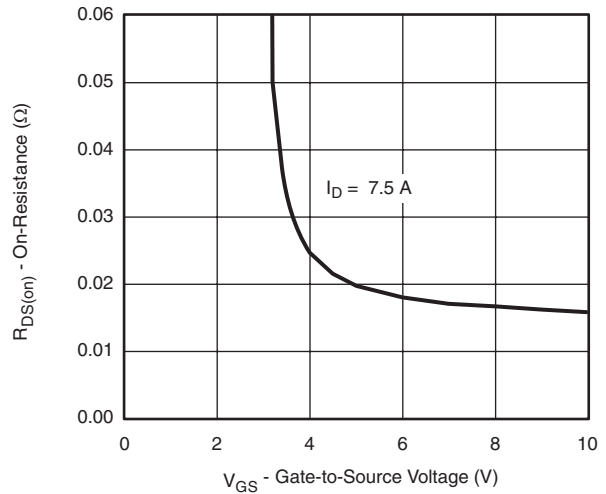
MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



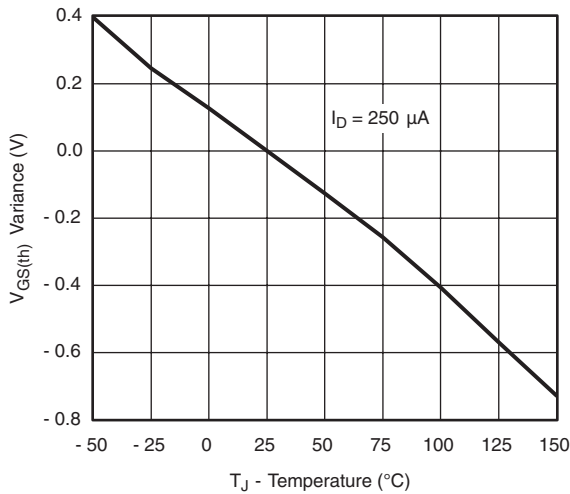
MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



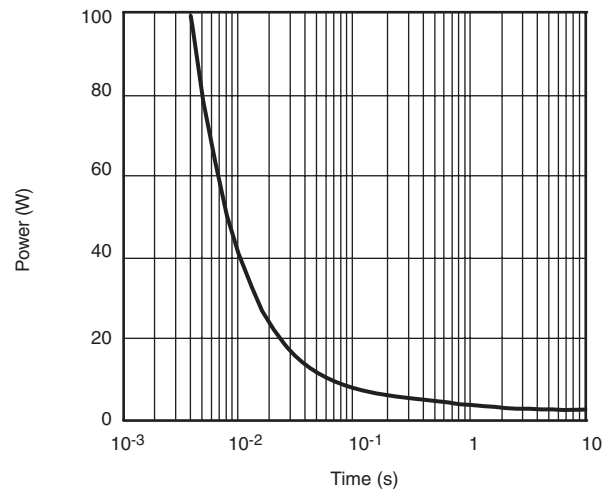
Source-Drain Diode Forward Voltage



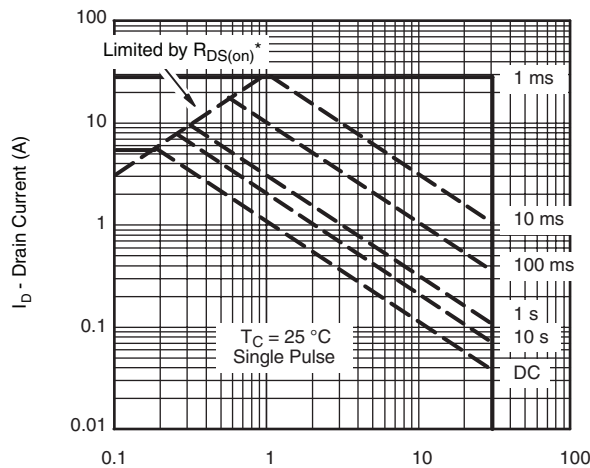
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

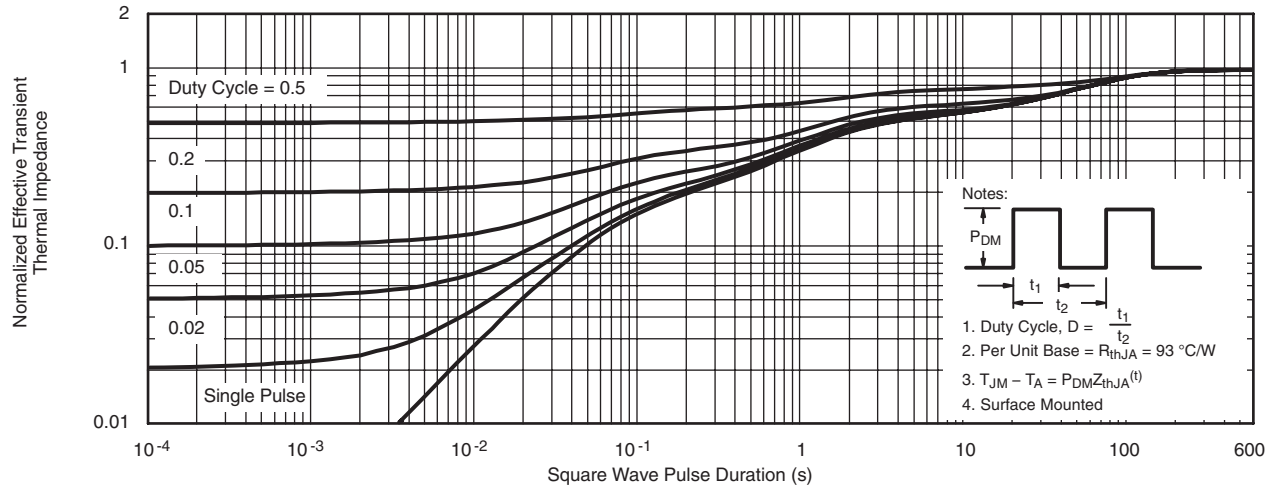


Single Pulse Power, Junction-to-Ambient

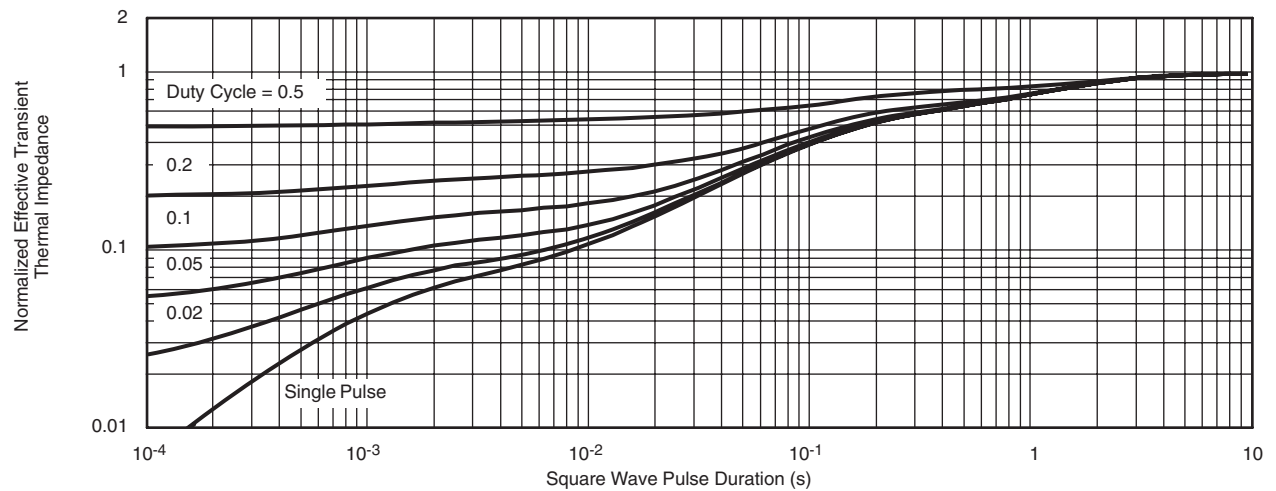


Safe Operating Area, Junction-to-Foot
 * $V_{DS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

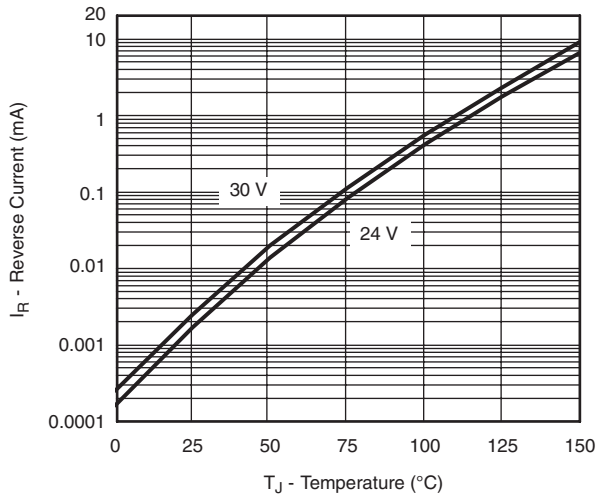


Normalized Thermal Transient Impedance, Junction-to-Ambient

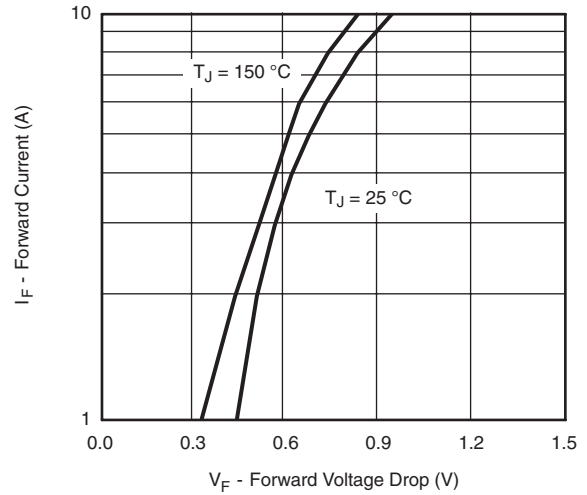


Normalized Thermal Transient Impedance, Junction-to-Foot

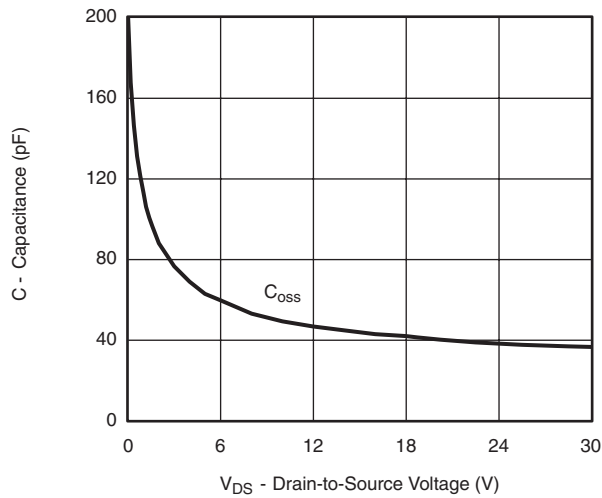
SCHOTTKY TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Reverse Current vs. Junction Temperature



Forward Voltage Drop



Capacitance

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