

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

## PRODUCT SUMMARY

$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (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 V at 1.0 A	2.0

## FEATURES

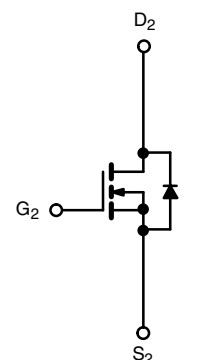
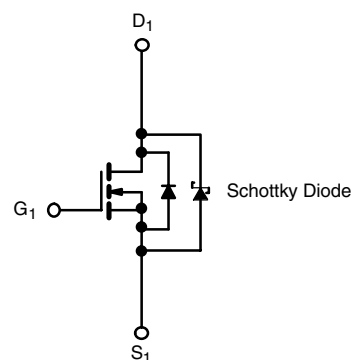
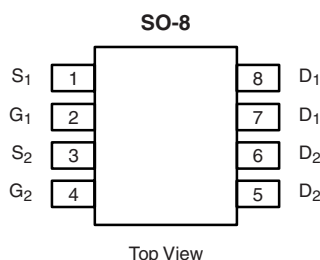
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- PWM Optimized
- 100 %  $R_g$  Tested
- Compliant to RoHS Directive 2002/95/EC



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

## APPLICATIONS

- Symmetrical Buck-Boost DC/DC Converter



**Ordering Information:** Si4834BDY-T1-E3 (Lead (Pb)-free)  
Si4834BDY-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 <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>	7.5	5.7	A
	T <sub>A</sub> = 70 °C		6.0	4.6	
Pulsed Drain Current		I <sub>DM</sub>	30		
Continuous Source Current (Diode Conduction) <sup>a</sup>		I <sub>S</sub>	1.7	0.9	
Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> = 25 °C	P <sub>D</sub>	2.0	1.1	W
	T <sub>A</sub> = 70 °C		1.3	0.7	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>sta</sub>	- 55 to 150		°C

## THERMAL RESISTANCE RATINGS

Parameter	Symbol	MOSFET		Schottky		Unit
		Typ.	Max.	Typ.	Max.	
Maximum Junction-to-Ambient <sup>a</sup>	$R_{thJA}$	52	62.5	53	62.5	°C/W
		93	110	93	110	
Maximum Junction-to-Foot (Drain)	$R_{thJF}$	35	40	35	40	

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		0.8		3.0	V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 20 V				± 100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V	Ch-1			100	μA
			Ch-2			1	
		V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 85 °C	Ch-1			2000	
			Ch-2			15	
On-State Drain Current <sup>b</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V		20			A
Drain-Source On-State Resistance <sup>b</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 7.5 A			0.017	0.022	Ω
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 6.5 A			0.024	0.030	
Forward Transconductance <sup>b</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 7.5 A			19		S
Diode Forward Voltage <sup>b</sup>	V <sub>SD</sub>	I <sub>S</sub> = 1 A, V <sub>GS</sub> = 0 V	Ch-1		0.47	0.5	V
			Ch-2		0.75	1.2	
Dynamic <sup>a</sup>							
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 7.5 A			7	11	nC
Gate-Source Charge	Q <sub>gs</sub>				2.9		
Gate-Drain Charge	Q <sub>gd</sub>				2.5		
Gate Resistance	R <sub>g</sub>			0.5	1.5	2.6	Ω
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 15 V, R <sub>L</sub> = 15 Ω I <sub>D</sub> ≅ 1 A, V <sub>GEN</sub> = 10 V, R <sub>g</sub> = 6 Ω			9	15	ns
Rise Time	t <sub>r</sub>				10	17	
Turn-Off Delay Time	t <sub>d(off)</sub>				19	30	
Fall Time	t <sub>f</sub>				9	15	
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 1.7 A, dl/dt = 100 A/μs	Ch-1		32	55	
			Ch-2		35	55	

Notes:

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

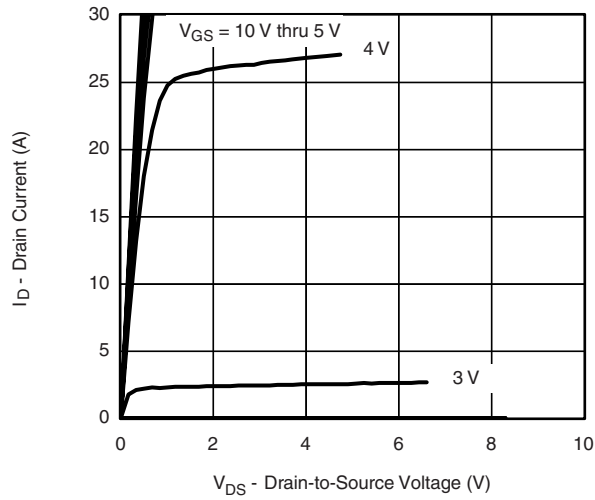
b. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

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

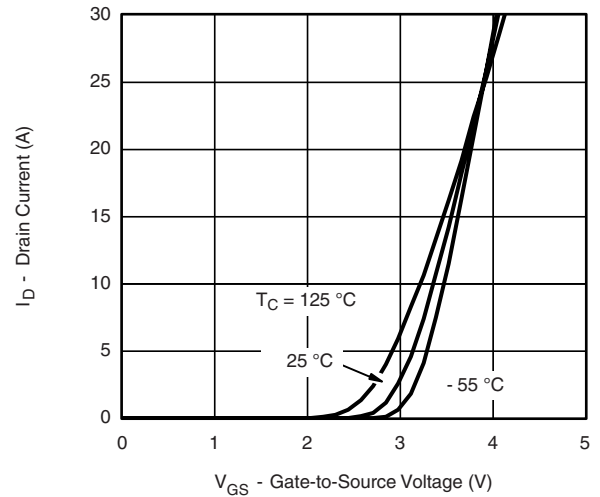
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



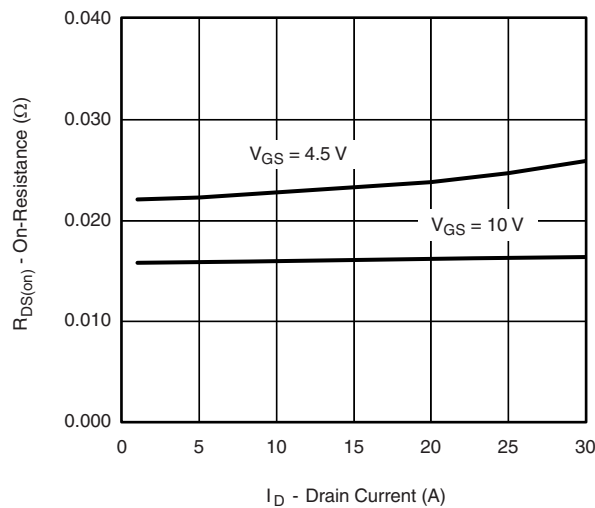
**MOSFET TYPICAL CHARACTERISTICS** 25 °C unless otherwise noted



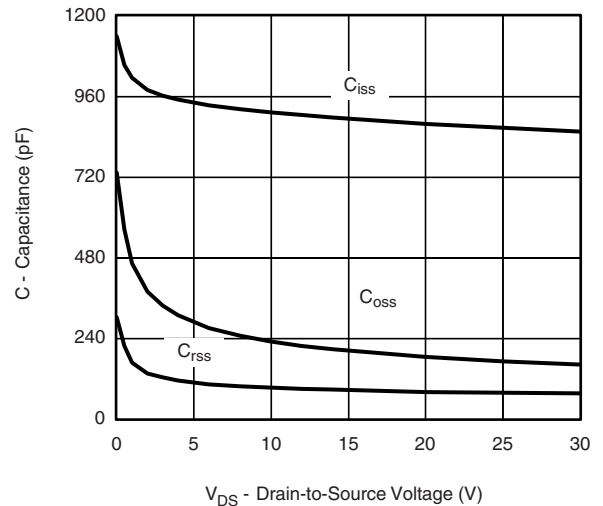
**Output Characteristics**



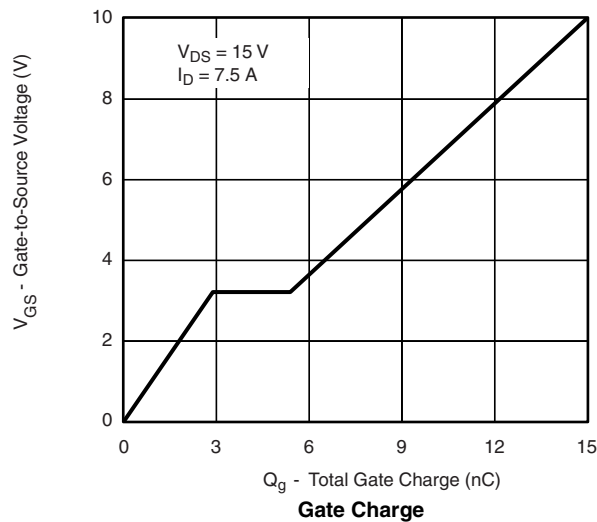
**Transfer Characteristics**



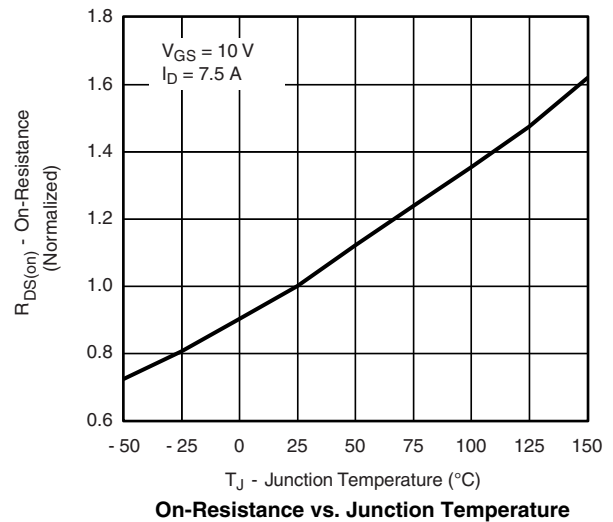
**On-Resistance vs. Drain Current**



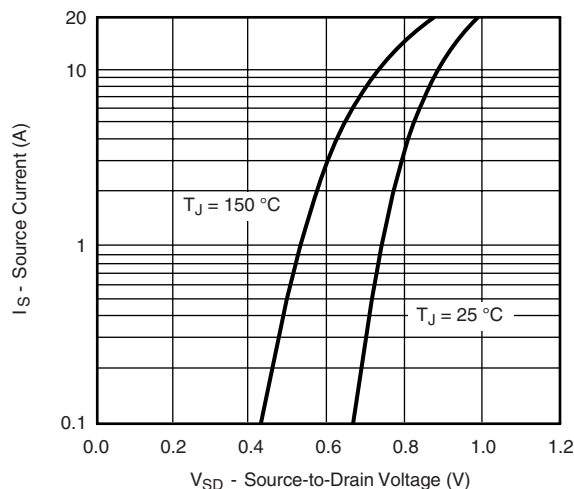
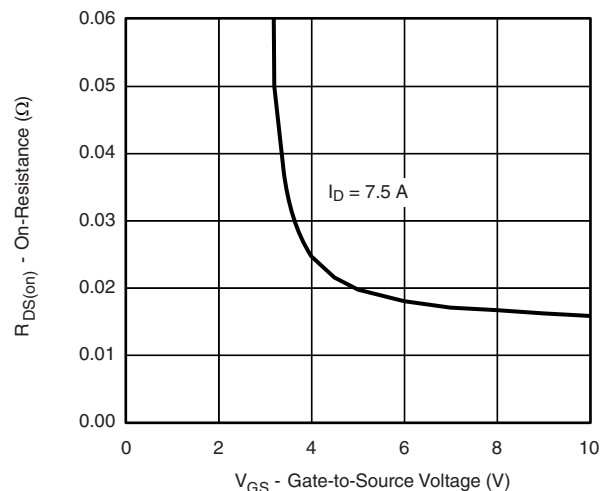
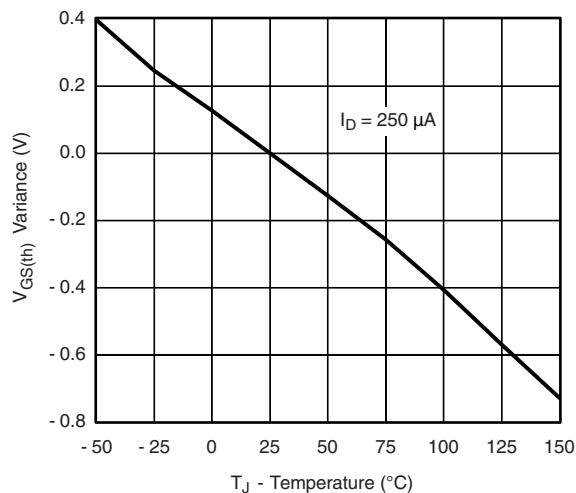
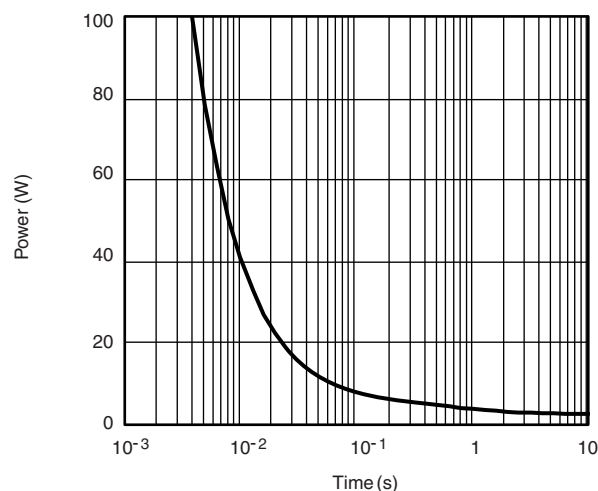
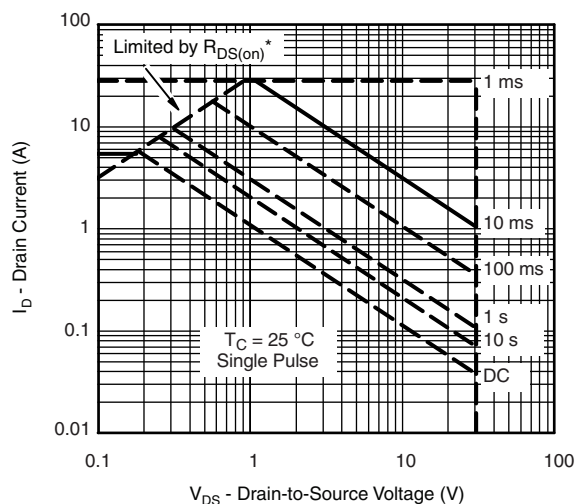
**Capacitance**



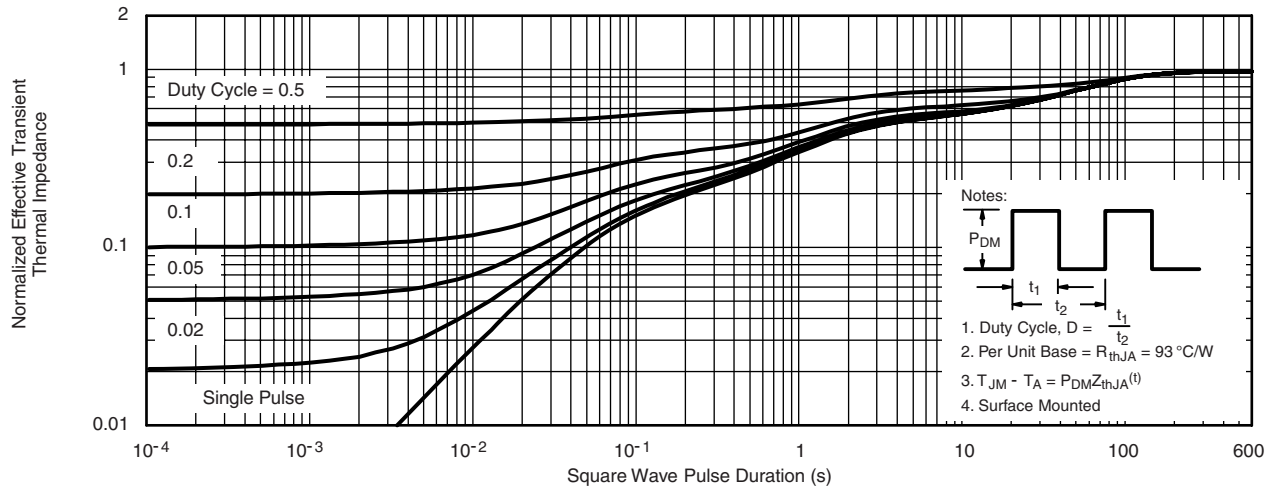
**Gate Charge**



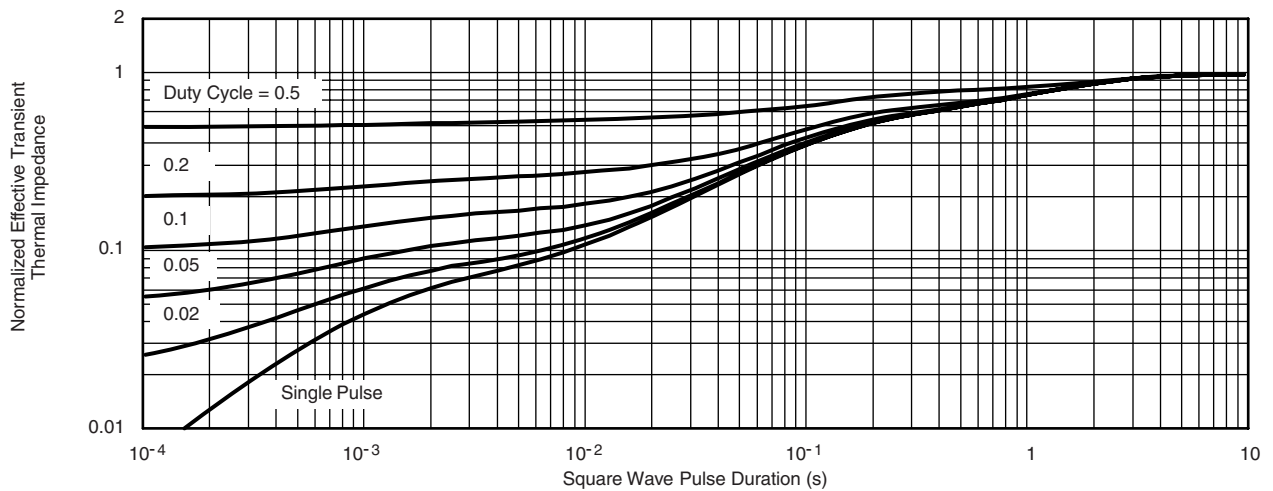
**On-Resistance vs. Junction Temperature**

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

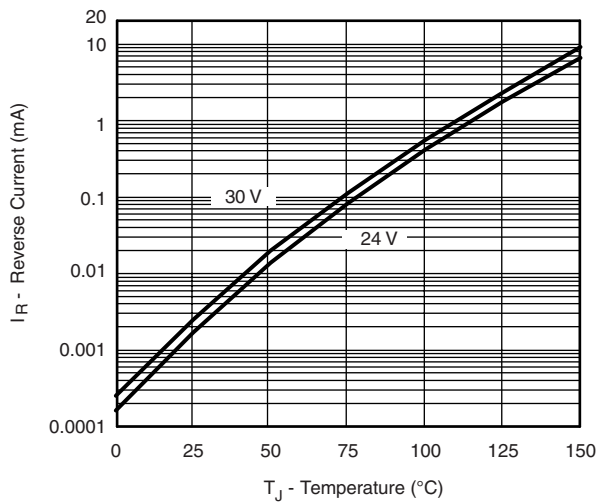
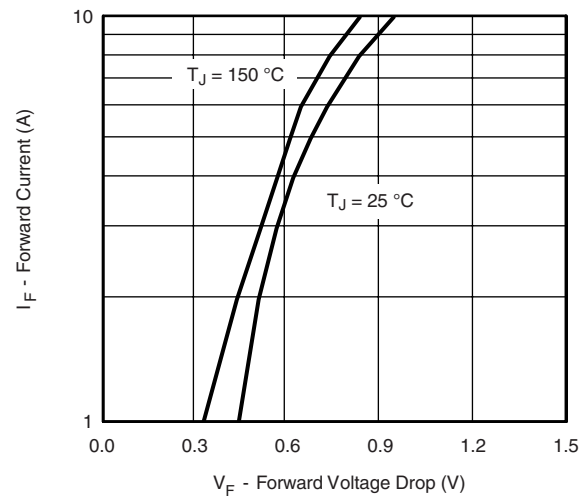
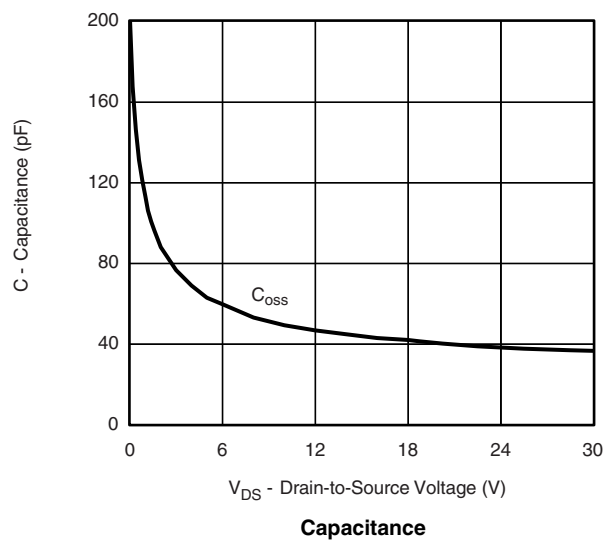
**MOSFET TYPICAL CHARACTERISTICS** 25 °C unless otherwise noted



**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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