



## 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)
Channel-1	30	0.022 @ V <sub>GS</sub> = 10 V	7.5
		0.030 @ V <sub>GS</sub> = 4.5 V	6.5
Channel-2		0.022 @ V <sub>GS</sub> = 10 V	7.5
		0.028 @ V <sub>GS</sub> = 4.5 V	6.5

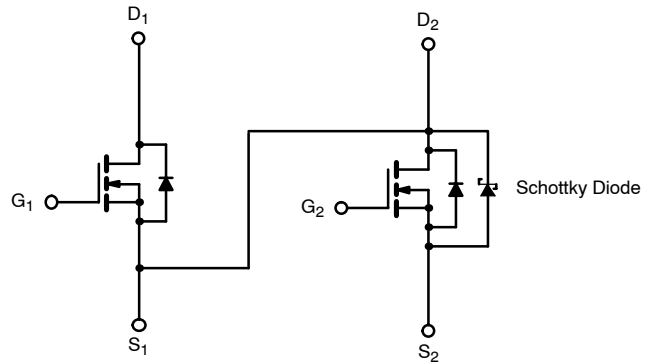
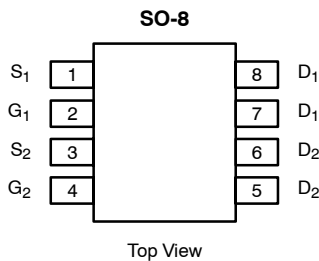
SCHOTTKY PRODUCT SUMMARY		
V <sub>DS</sub> (V)	V <sub>SD</sub> (V) Diode Forward Voltage	I <sub>F</sub> (A)
30	0.50 V @ 1.0 A	2.0

### FEATURES

- LITTLE FOOT® Plus Schottky
- Si4830DY Pin Compatible
- PWM Optimized
- 100% R<sub>g</sub> Tested

### APPLICATIONS

- Asymmetrical Buck-Boost DC/DC Converter



Ordering Information: Si4370DY—E3 (Lead Free)  
Si4370DY-T1—E3 (Lead Free with Tape and Reel)

ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	10 secs		Steady State		Unit
		Channel-1	Channel-2	Channel-1	Channel-2	
Drain-Source Voltage	V <sub>DS</sub>	30				V
Gate-Source Voltage	V <sub>GS</sub>	± 20	± 12	± 20	± 12	
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>	I <sub>D</sub>	T <sub>A</sub> = 25 °C		5.7		A
		T <sub>A</sub> = 70 °C		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>	P <sub>D</sub>	T <sub>A</sub> = 25 °C		1.1		W
		T <sub>A</sub> = 70 °C		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>	52	62.5	53	62.5	°C/W
		93	110	93	110	
Maximum Junction-to-Foot (Drain)	R <sub>thJF</sub>	35	40	35	40	

Notes  
a. Surface Mounted on 1" x 1" FR4 Board.

<b>MOSFET SPECIFICATIONS (<math>T_J = 25^\circ\text{C}</math> UNLESS OTHERWISE NOTED).</b>								
Parameter	Symbol	Test Condition	Min	Typ <sup>a</sup>	Max	Unit		
<b>Static</b>								
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	Ch-1	1.0		3.0	V	
			Ch-2	0.8		2.0		
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 20\ \text{V}$	Ch-1			$\pm 100$	nA	
		$V_{DS} = 0\ \text{V}, V_{GS} = \pm 12\ \text{V}$	Ch-2			$\pm 100$		
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		
		$V_{DS} = 30\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 85^\circ\text{C}$	Ch-1			15		
			Ch-2			2000		
On-State Drain Current <sup>b</sup>	$I_{D(on)}$	$V_{DS} = 5\ \text{V}, V_{GS} = 10\ \text{V}$	Ch-1	20			A	
			Ch-2	20				
Drain-Source On-State Resistance <sup>b</sup>	$r_{DS(on)}$	$V_{GS} = 10\ \text{V}, I_D = 7.5\ \text{A}$	Ch-1		0.014	0.022	$\Omega$	
			Ch-2		0.015	0.022		
		$V_{GS} = 4.5\ \text{V}, I_D = 6.5\ \text{A}$	Ch-1		0.024	0.030		
			Ch-2		0.020	0.028		
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\ \text{V}, I_D = 7.5\ \text{A}$	Ch-1		19		S	
			Ch-2		21			
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	$Q_g$	$V_{DS} = 15\ \text{V}, V_{GS} = 4.5\ \text{V}, I_D = 7.5\ \text{A}$	Ch-1		7	11	nC	
			Ch-2		11.5	18		
Gate-Source Charge	$Q_{GS}$		Ch-1		2.9			
			Ch-2		3.8			
Gate-Drain Charge	$Q_{gd}$		Ch-1		2.5			
			Ch-2		3.5			
Gate Resistance	$R_g$		Ch-1	0.5	1.5	1.9	$\Omega$	
			Ch-2	0.5	1.8	1.9		
Turn-On Delay Time	$t_{d(on)}$		$V_{DD} = 15\ \text{V}, R_L = 15\ \Omega$ $I_D \approx 1\ \text{A}, V_{GEN} = 10\ \text{V}, R_g = 6\ \Omega$	Ch-1		9	15	ns
				Ch-2		12	20	
Rise Time	$t_r$	Ch-1			10	17		
		Ch-2			10	17		
Turn-Off Delay Time	$t_{d(off)}$	Ch-1			19	30		
		Ch-2			40	66		
Fall Time	$t_f$	Ch-1			9	15		
		Ch-2			9	15		
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = 1.7\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$		Ch-1		35	55	
				Ch-2		28	45	

## Notes

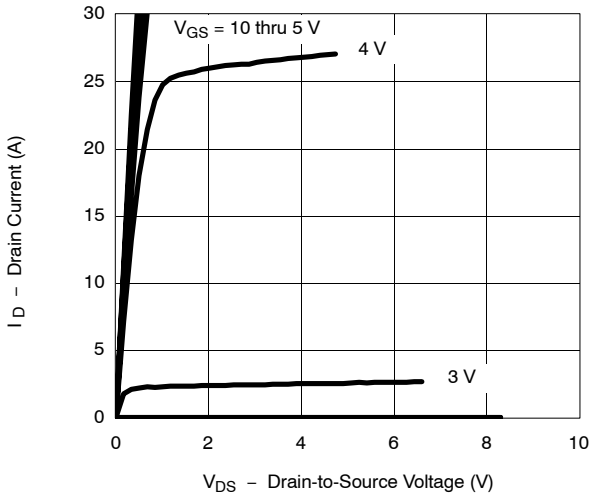
- a. Guaranteed by design, not subject to production testing.  
b. Pulse test; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .

<b>SCHOTTKY SPECIFICATIONS (<math>T_J = 25^\circ\text{C}</math> UNLESS OTHERWISE NOTED)</b>							
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit	
Forward Voltage Drop	$V_F$	$I_F = 1.0\ \text{A}$		0.47	0.50	V	
		$I_F = 1.0\ \text{A}, T_J = 125^\circ\text{C}$		0.36	0.42		
Maximum Reverse Leakage Current	$I_{rm}$	$V_r = 30\ \text{V}$		0.004	0.100	mA	
		$V_r = 30\ \text{V}, T_J = 100^\circ\text{C}$		0.7	10		
		$V_r = -30\ \text{V}, T_J = 125^\circ\text{C}$		3.0	20		
Junction Capacitance	$C_T$	$V_r = 10\ \text{V}$		50		pF	

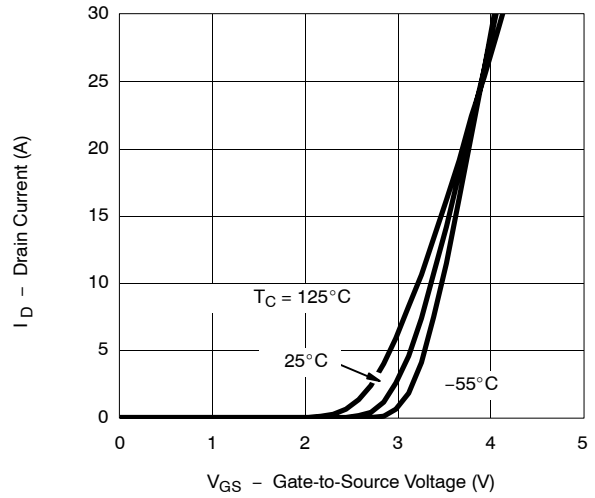


**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED) MOSFET CHANNEL-1**

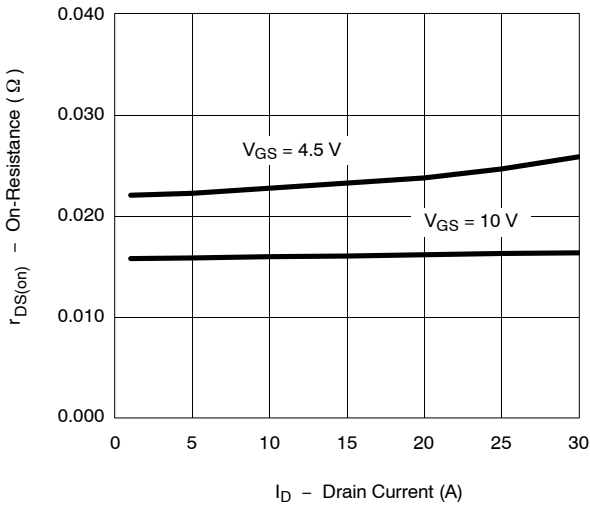
**Output Characteristics**



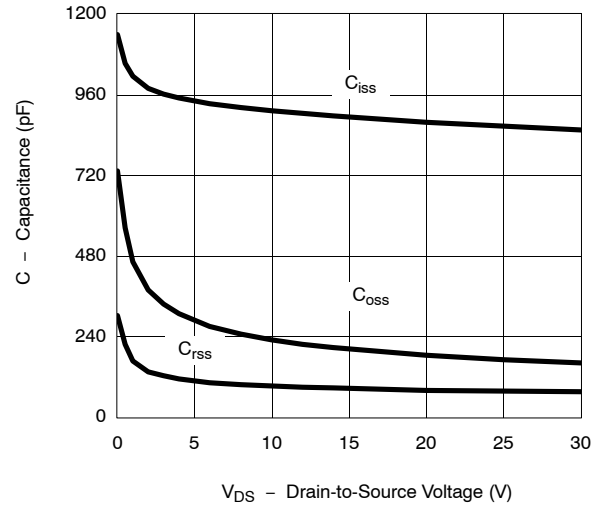
**Transfer Characteristics**



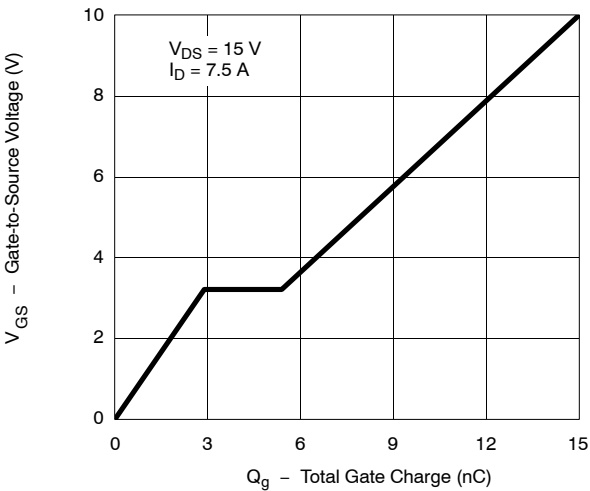
**On-Resistance vs. Drain Current**



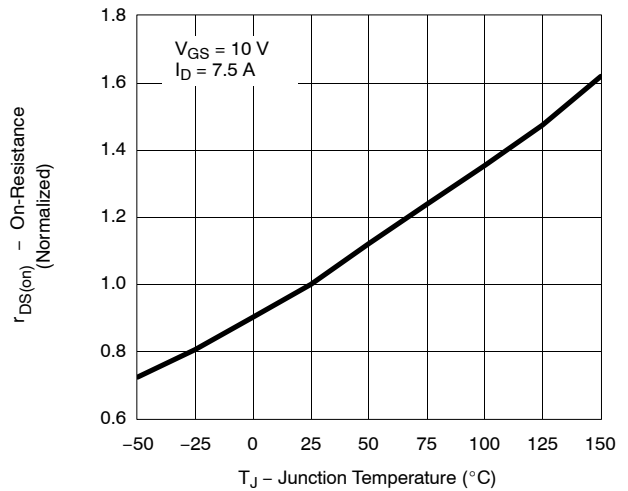
**Capacitance**



**Gate Charge**

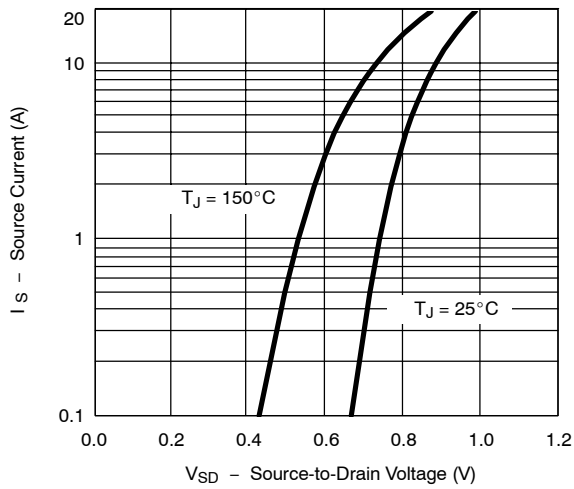


**On-Resistance vs. Junction Temperature**

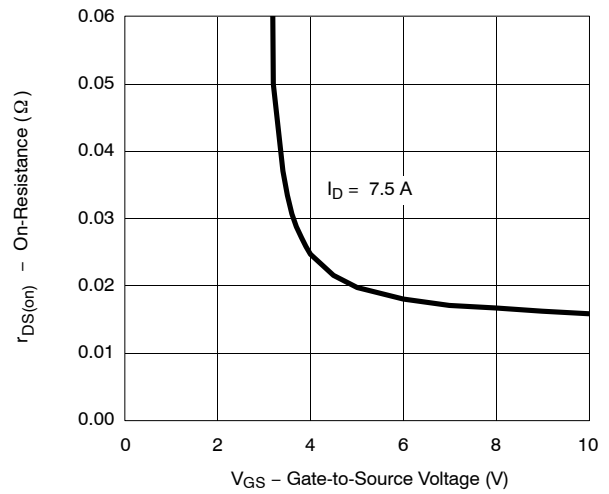


**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED) MOSFET CHANNEL-1**

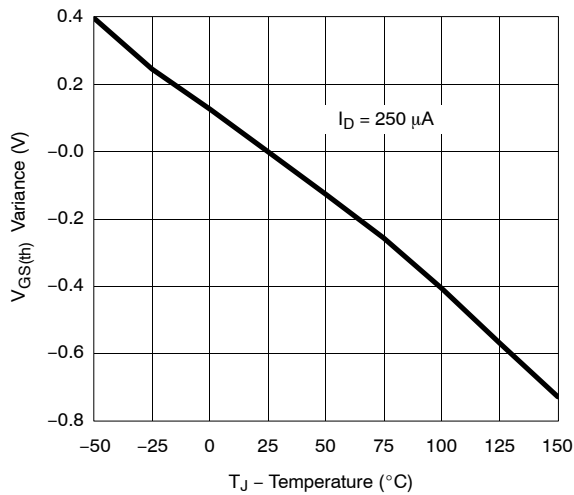
Source-Drain Diode Forward Voltage



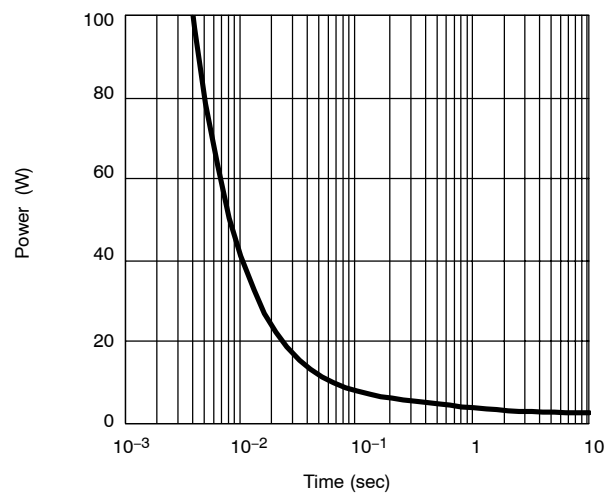
On-Resistance vs. Gate-to-Source Voltage



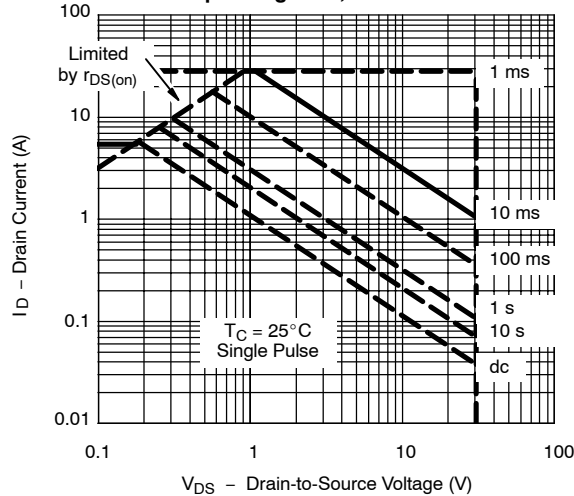
Threshold Voltage



Single Pulse Power, Junction-to-Ambient



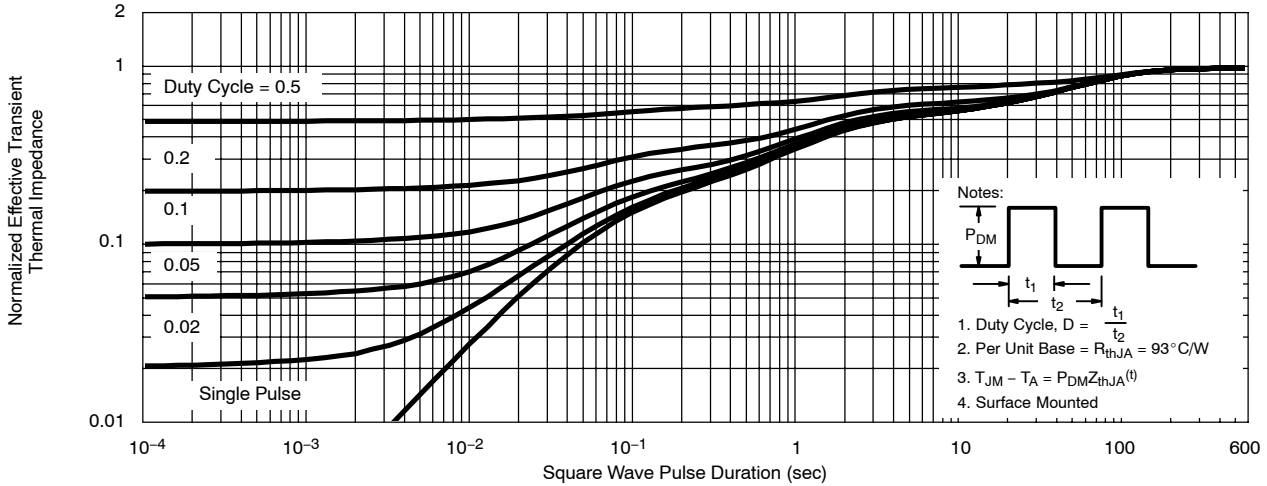
Safe Operating Area, Junction-to-Foot



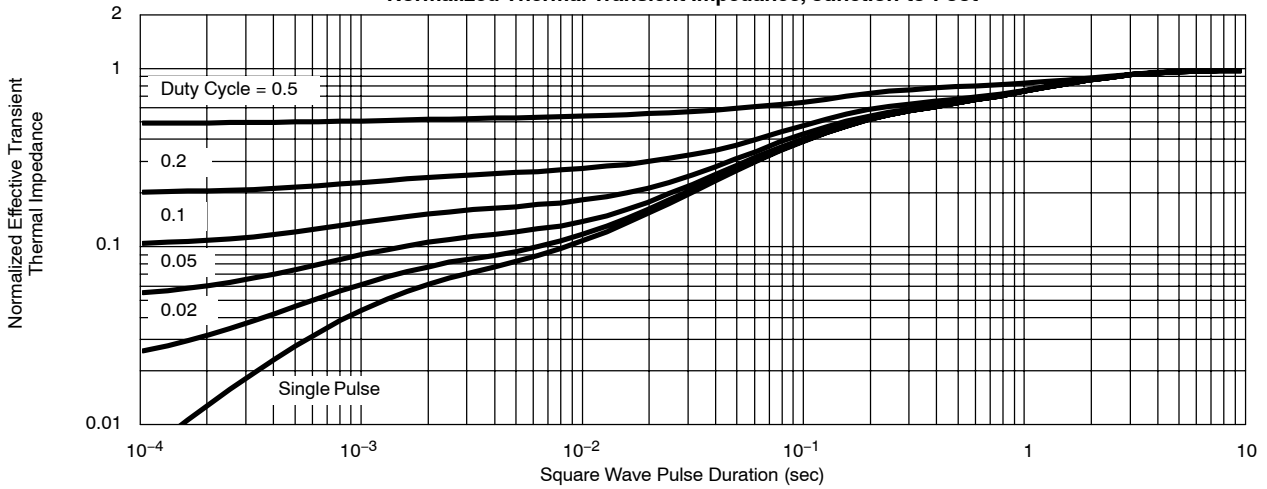


**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED) MOSFET CHANNEL 1**

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

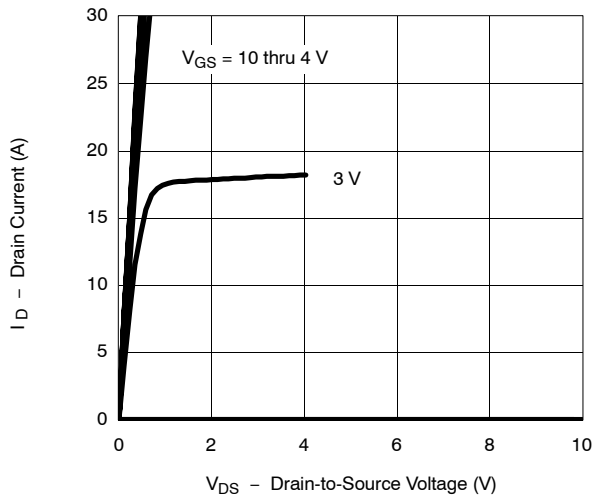


**Normalized Thermal Transient Impedance, Junction-to-Foot**

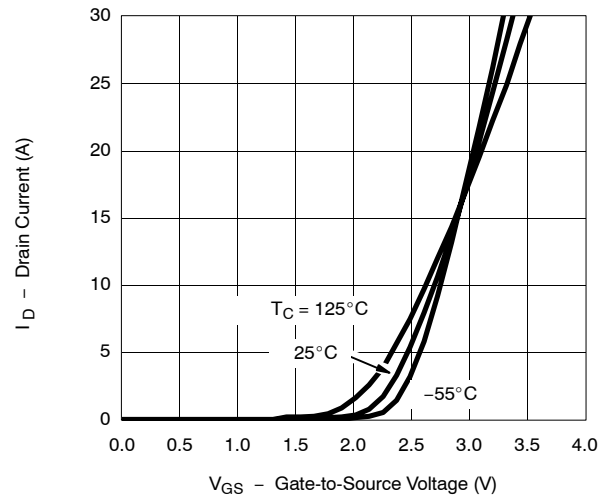


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) MOSFET CHANNEL-2**

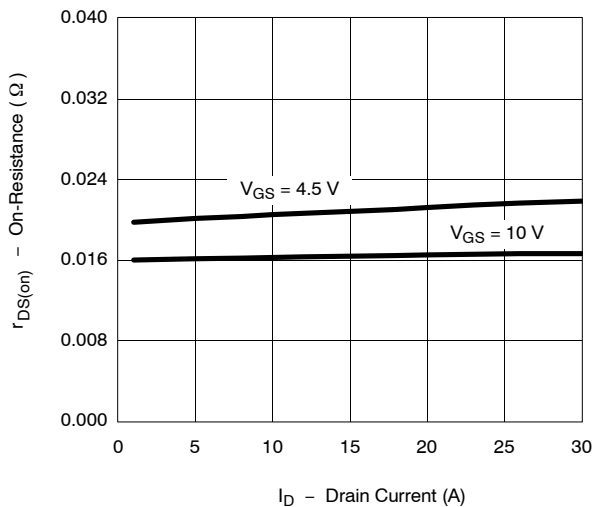
**Output Characteristics**



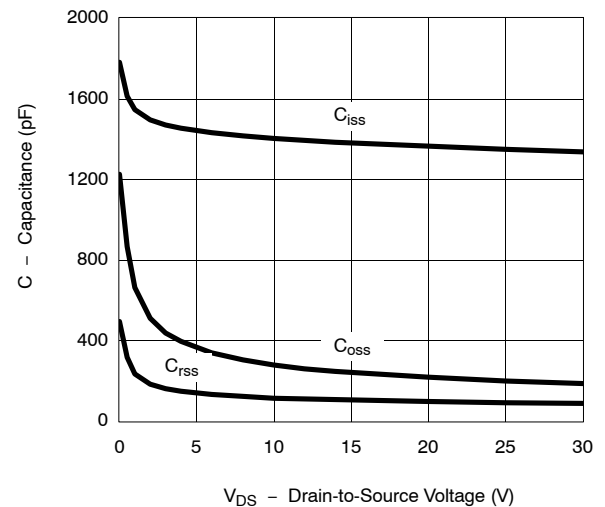
**Transfer Characteristics**



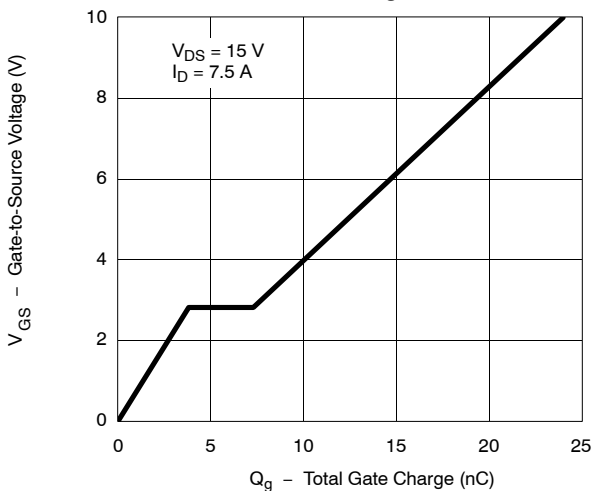
**On-Resistance vs. Drain Current**



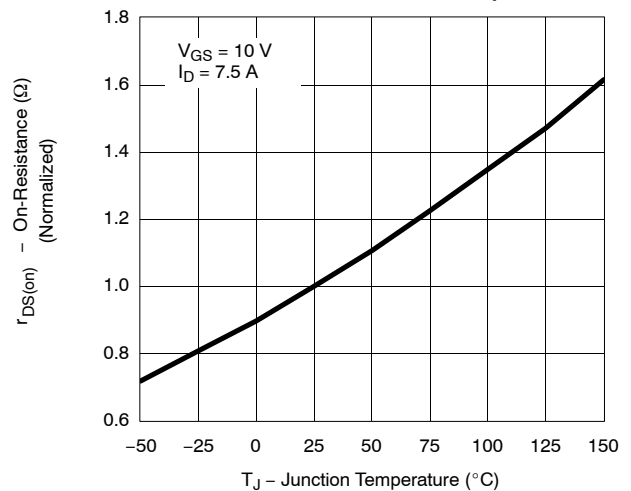
**Capacitance**



**Gate Charge**



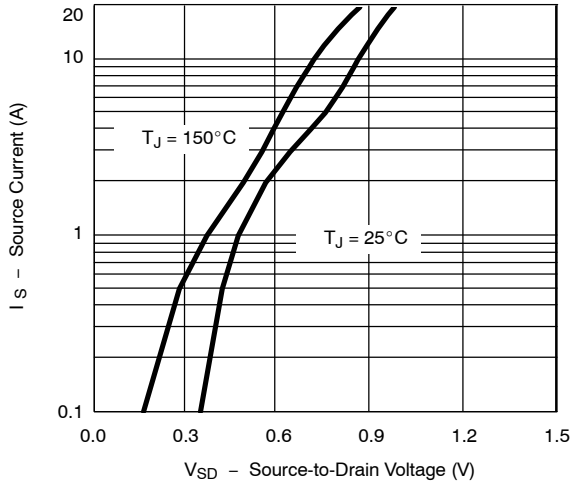
**On-Resistance vs. Junction Temperature**



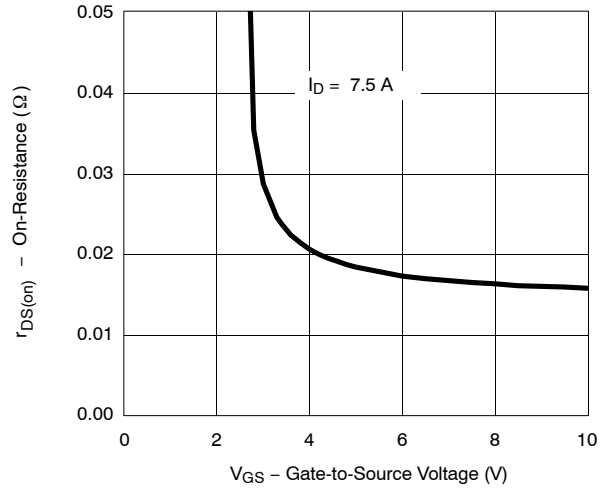


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) MOSFET CHANNEL-2**

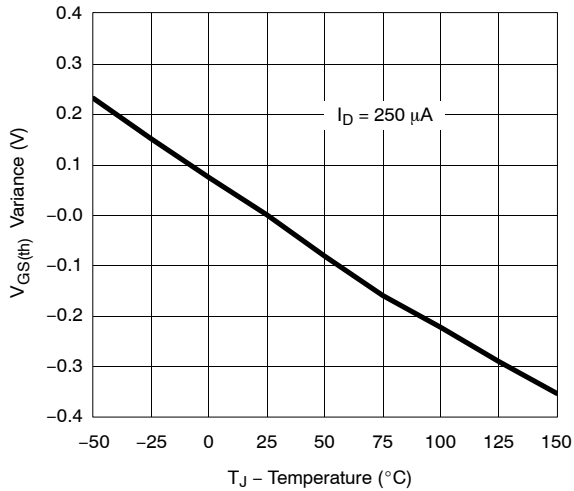
Source-Drain Diode Forward Voltage



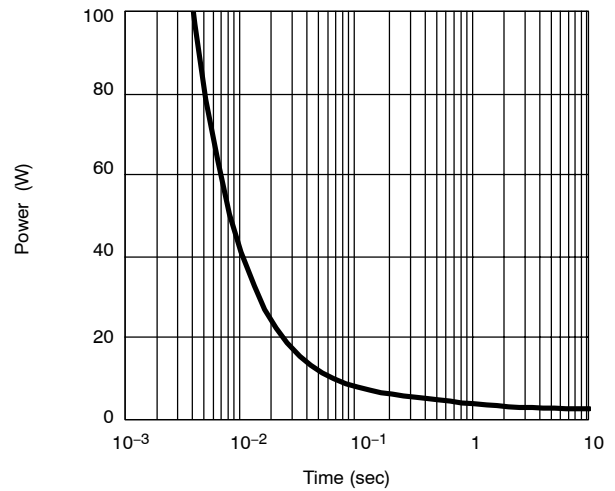
On-Resistance vs. Gate-to-Source Voltage



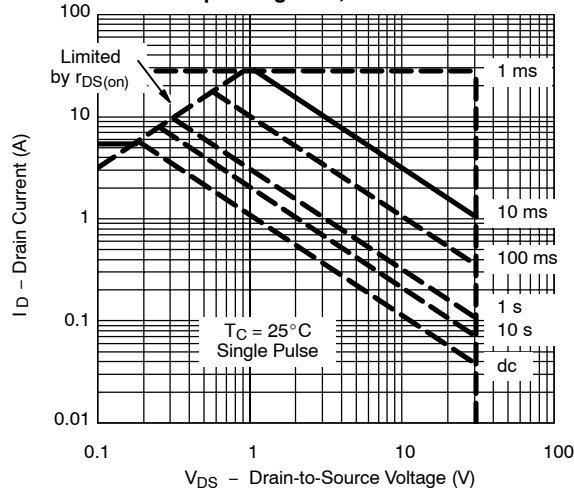
Threshold Voltage



Single Pulse Power, Junction-to-Ambient

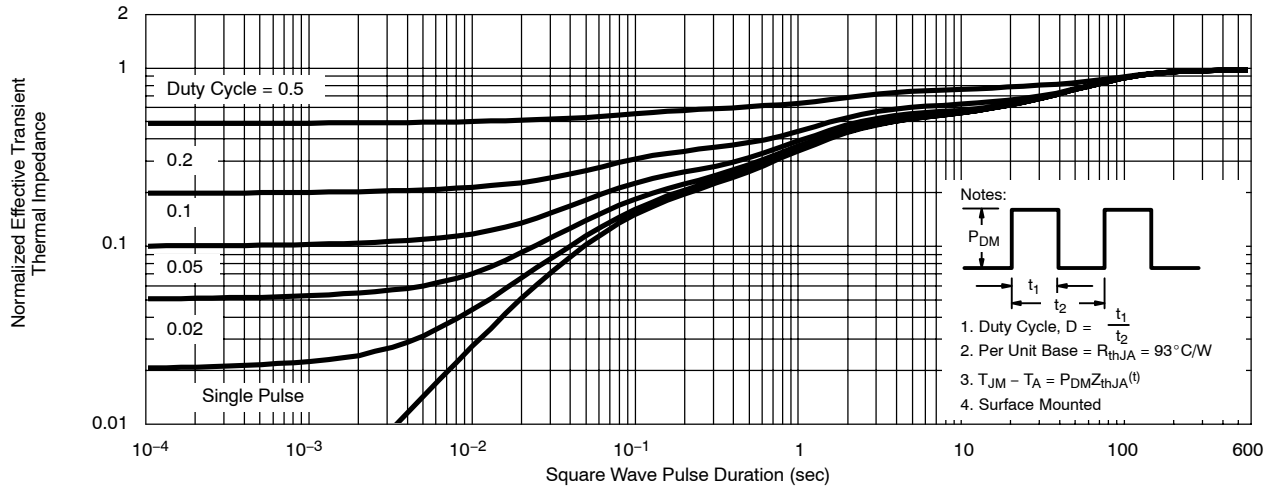


Safe Operating Area, Junction-to-Foot

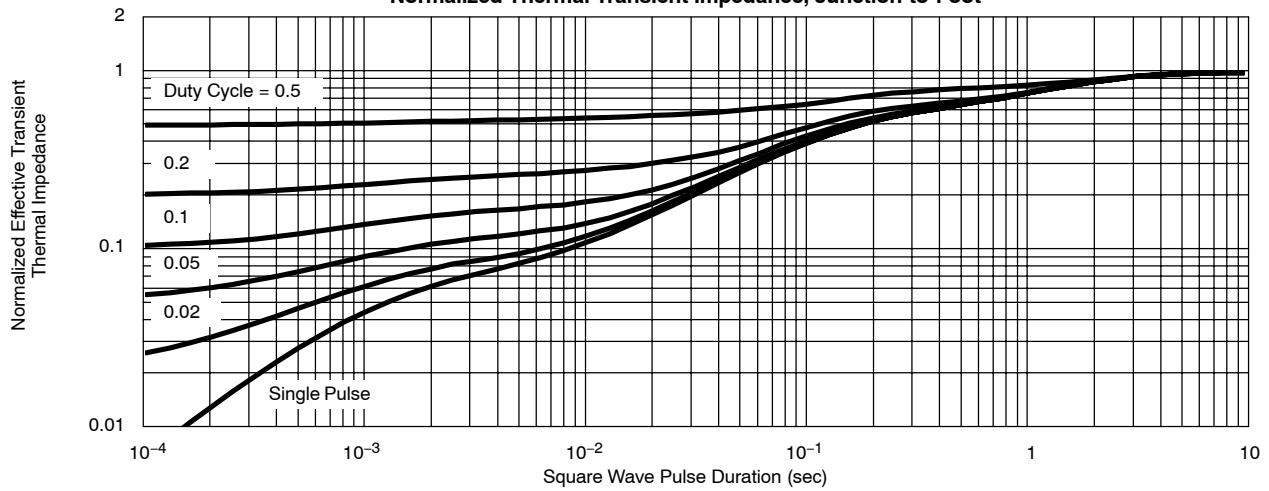


**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED) MOSFET CHANNEL-2**

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



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

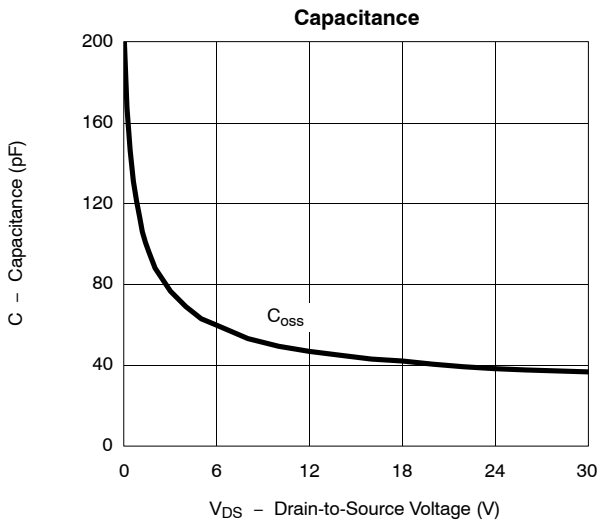
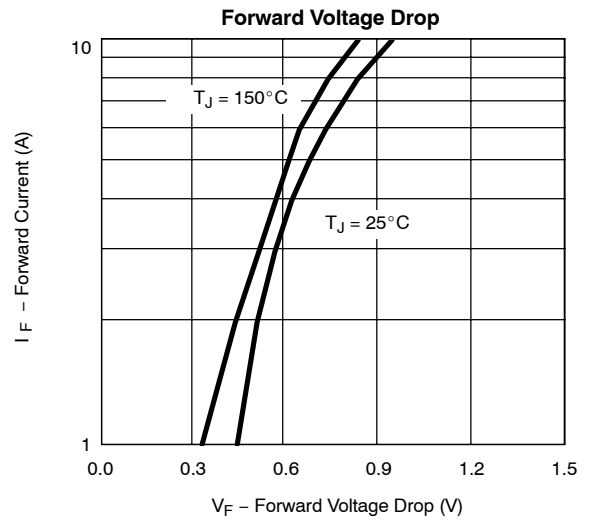
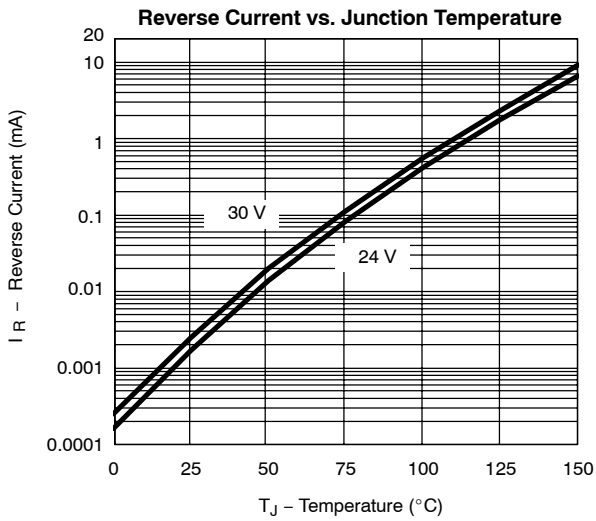






**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

**SCHOTTKY**



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