

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

PRODUCT SUMMARY			
	V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A)
Channel-1	30	0.022 at V _{GS} = 10 V	7.5
		0.030 at V _{GS} = 4.5 V	6.5
Channel-2		0.022 at V _{GS} = 10 V	7.5
		0.028 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

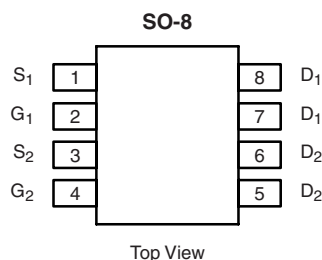
FEATURES

- LITTLE FOOT® *Plus* Schottky
- Si4830DY Pin Compatible
- PWM Optimized
- 100 % R_g Tested

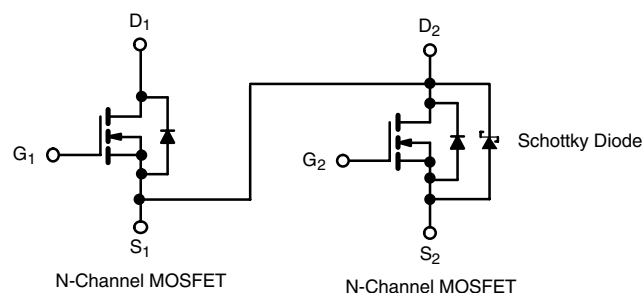


APPLICATIONS

- Asymmetrical Buck-Boost DC/DC Converter



Ordering Information: Si4370DY-T1-E3 (Lead (Pb)-free)



ABSOLUTE MAXIMUM RATINGS $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted							
Parameter		Symbol	10 secs		Steady State		Unit
			Channel-1	Channel-2	Channel-1	Channel-2	
Drain-Source Voltage		V_{DS}	30				V
Gate-Source Voltage		V_{GS}	± 20	± 12	± 20	± 12	
Continuous Drain Current ($T_J = 150\text{ }^{\circ}\text{C}$) ^a	$T_A = 25\text{ }^{\circ}\text{C}$	I_D	7.5		5.7		A
	$T_A = 70\text{ }^{\circ}\text{C}$		6.0		4.6		
Pulsed Drain Current		I_{DM}	30				
Continuous Source Current (Diode Conduction) ^a		I_S	1.7		0.9		
Maximum Power Dissipation ^a	$T_A = 25\text{ }^{\circ}\text{C}$	P_D	2.0		1.1		W
	$T_A = 70\text{ }^{\circ}\text{C}$		1.3		0.7		
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150				$^{\circ}\text{C}$

THERMAL RESISTANCE RATINGS						
Parameter	Symbol	MOSFET		Schottky		Unit
		Typ	Max	Typ	Max	
Maximum Junction-to-Ambient ^a	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	°C/W

Notes:

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

MOSFET SPECIFICATIONS T _J = 25 °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 μA	Ch-1	1.0		3.0	V
			Ch-2	0.8		2.0	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	Ch-1			± 100	nA
		V _{DS} = 0 V, V _{GS} = ± 12 V	Ch-2			± 100	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V	Ch-1			1	μA
			Ch-2			100	
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 85 °C	Ch-1			15	
			Ch-2			2000	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	Ch-1	20			A
			Ch-2	20			
Drain-Source On-State Resistance ^b	r _{DS(on)}	V _{GS} = 10 V, I _D = 7.5 A	Ch-1		0.014	0.022	Ω
			Ch-2		0.015	0.022	
		V _{GS} = 4.5 V, I _D = 6.5 A	Ch-1		0.024	0.030	
			Ch-2		0.020	0.028	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 7.5 A	Ch-1		19		S
			Ch-2		21		
Diode Forward Voltage ^b	V _{SD}	I _S = 1 A, V _{GS} = 0 V	Ch-1		0.75	1.2	V
			Ch-2		0.47	0.5	
Dynamic ^a							
Total Gate Charge	Q _g	V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 7.5 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	Ω	
		Ch-2	0.5	1.8	1.9		
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15 V, R _L = 15 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _g = 6 Ω	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 A, di/dt = 100 A/μs	Ch-1		35	55	
			Ch-2		28	45	

Notes:

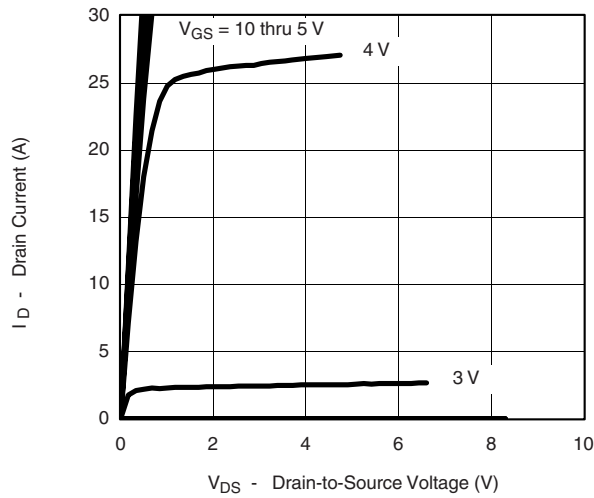
a. Guaranteed by design, not subject to production testing.

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

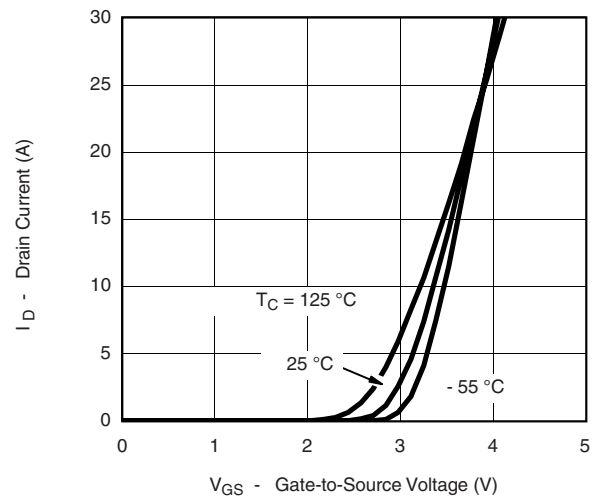
SCHOTTKY SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Voltage Drop	V_F	$I_F = 1.0\text{ A}$		0.47	0.50	V
		$I_F = 1.0\text{ A}$, $T_J = 125\text{ }^{\circ}\text{C}$		0.36	0.42	
Maximum Reverse Leakage Current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

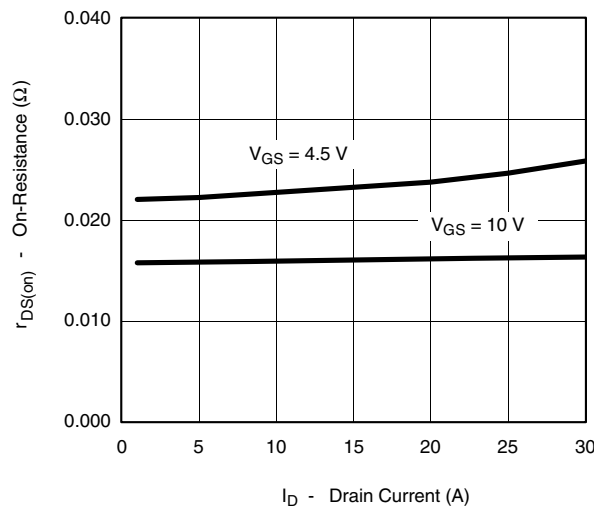
MOSFET CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



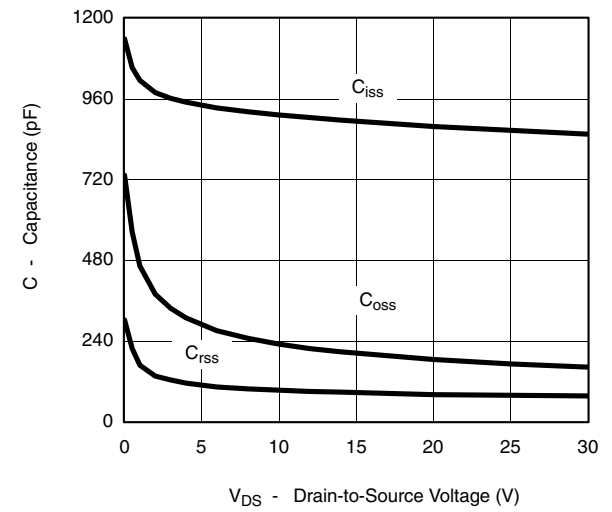
Output Characteristics



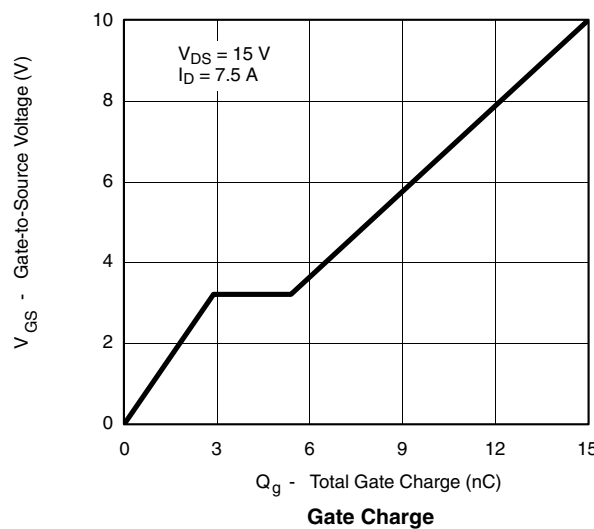
Transfer Characteristics



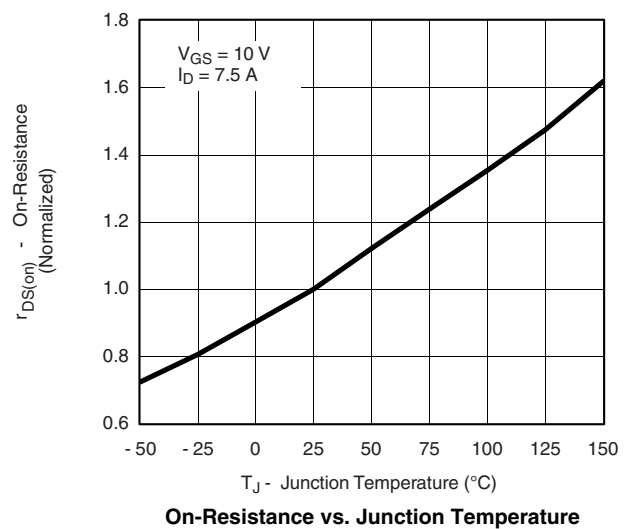
On-Resistance vs. Drain Current



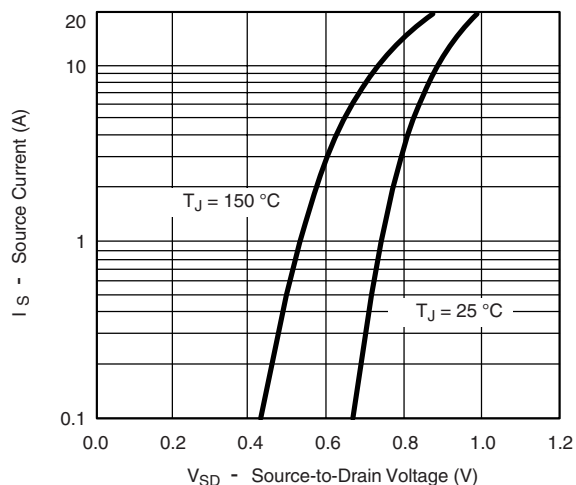
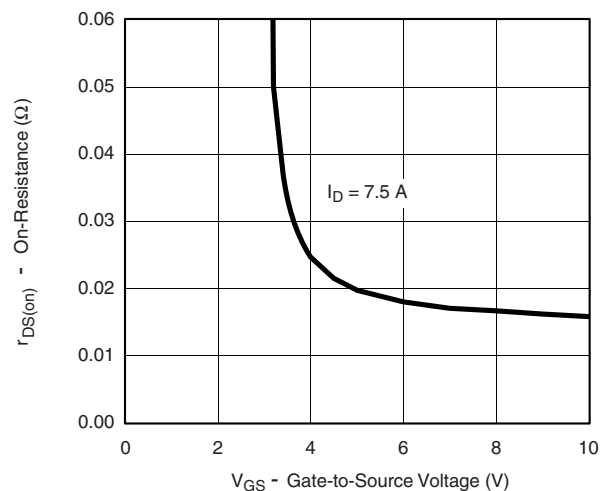
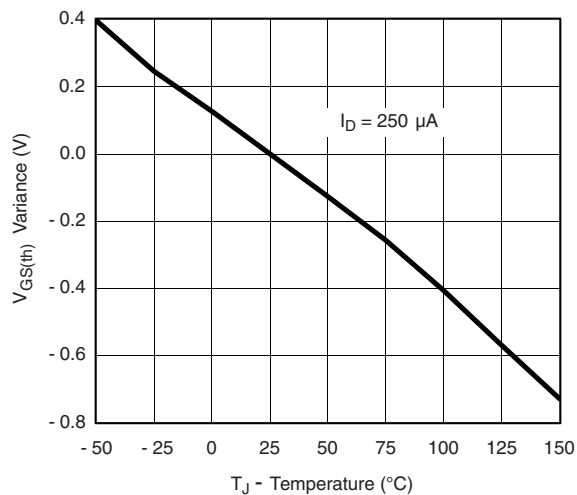
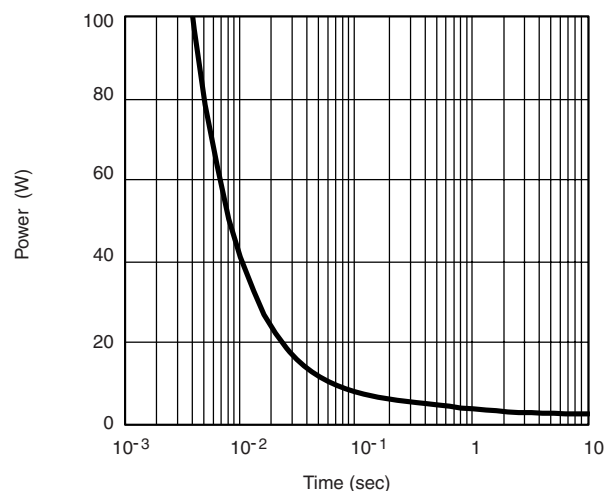
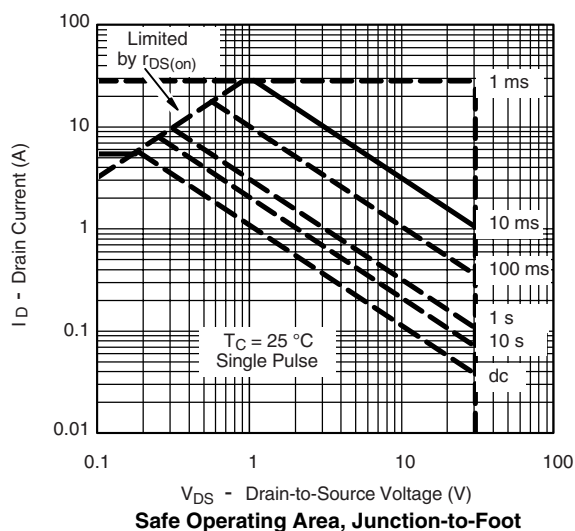
Capacitance



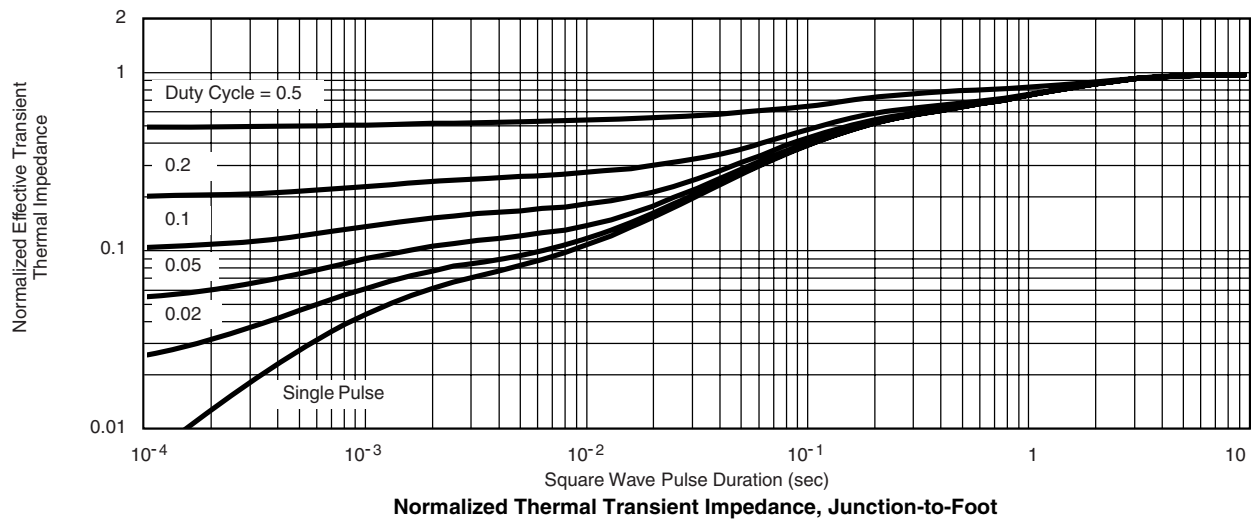
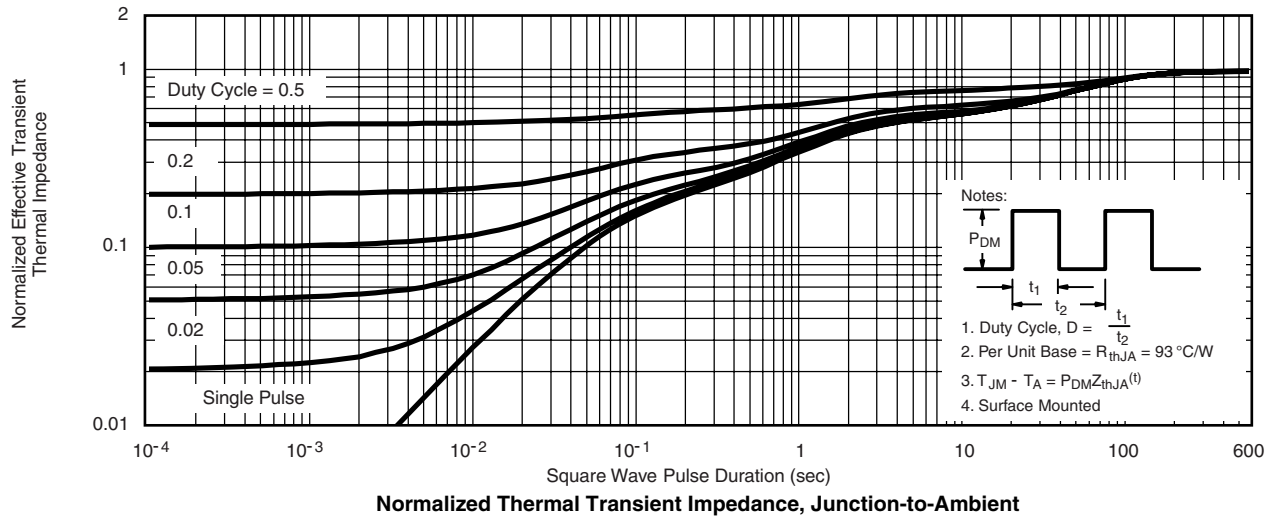
Gate Charge

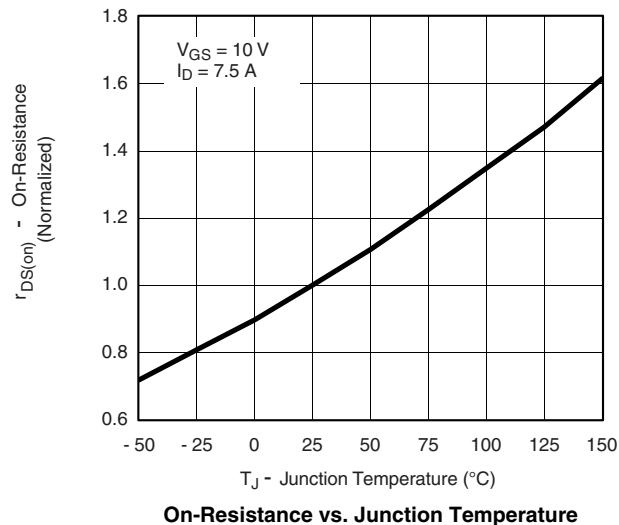
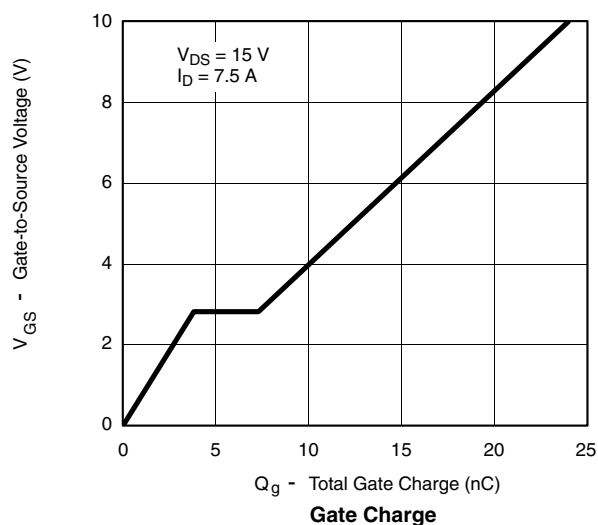
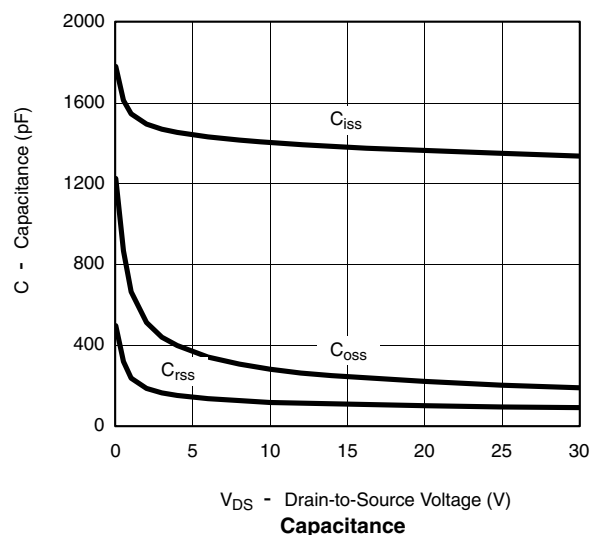
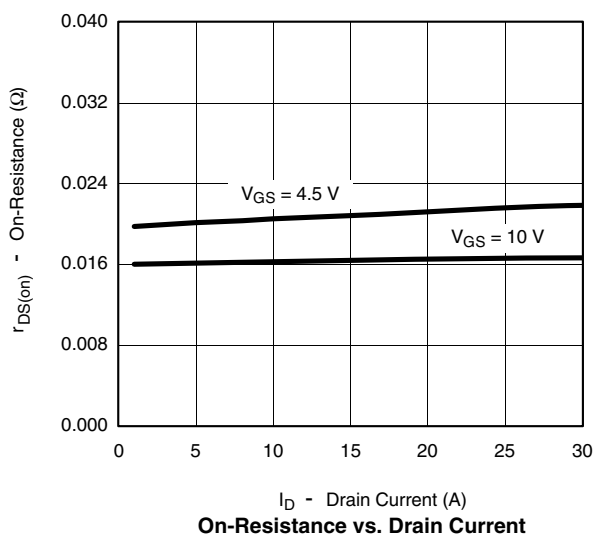
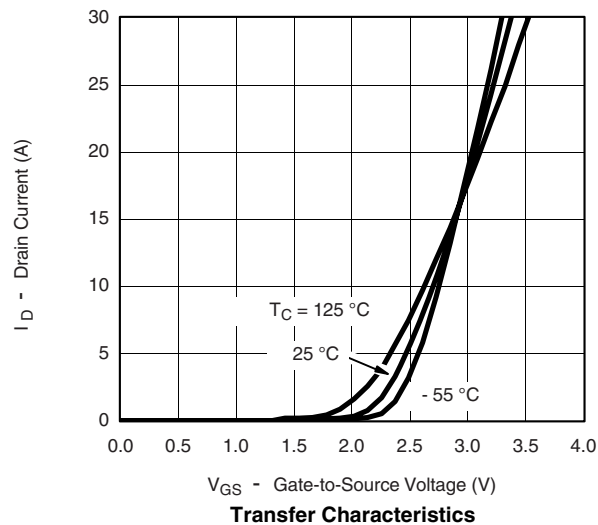
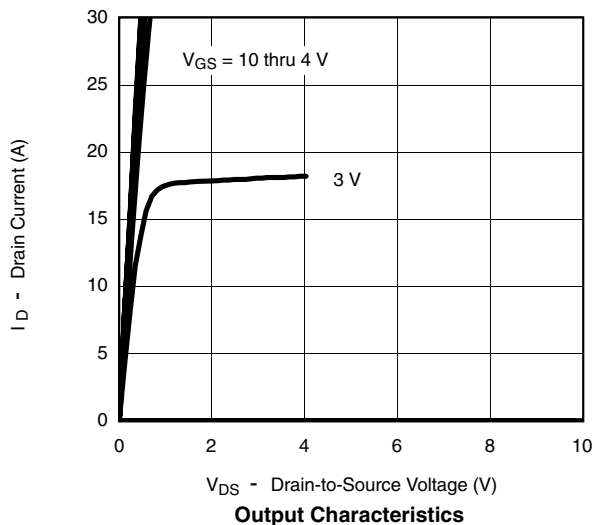


On-Resistance vs. Junction Temperature

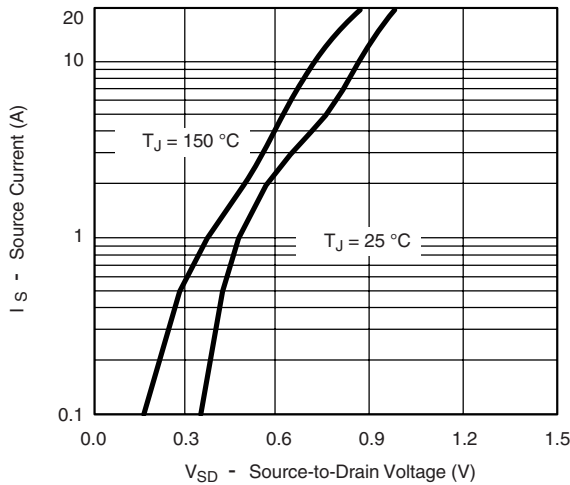
MOSFET CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted**Source-Drain Diode Forward Voltage****On-Resistance vs. Gate-to-Source Voltage****Threshold Voltage****Single Pulse Power, Junction-to-Ambient****Safe Operating Area, Junction-to-Foot**

MOSFET CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

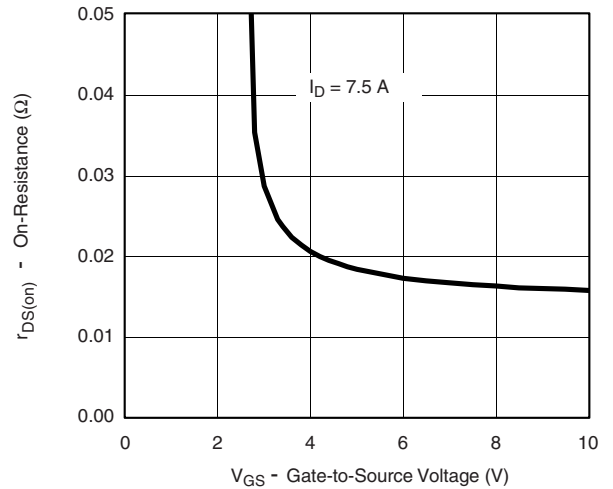


MOSFET CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

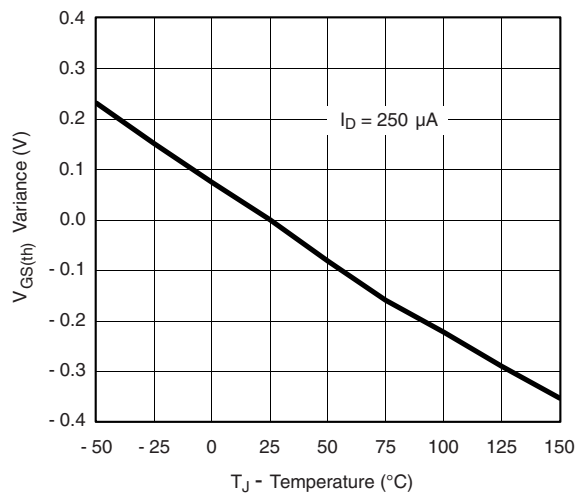
MOSFET CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



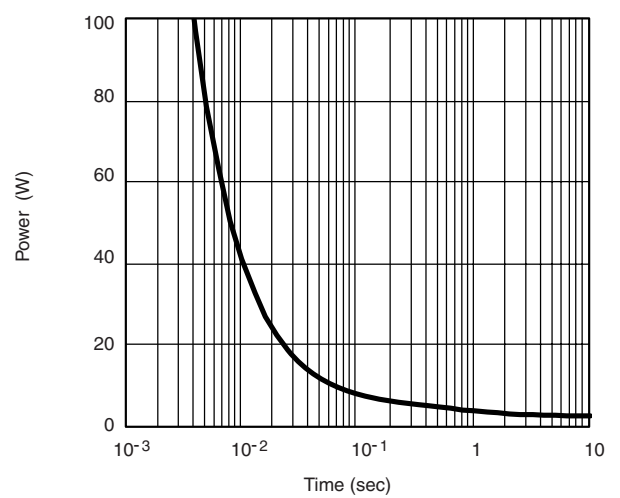
Source-Drain Diode Forward Voltage



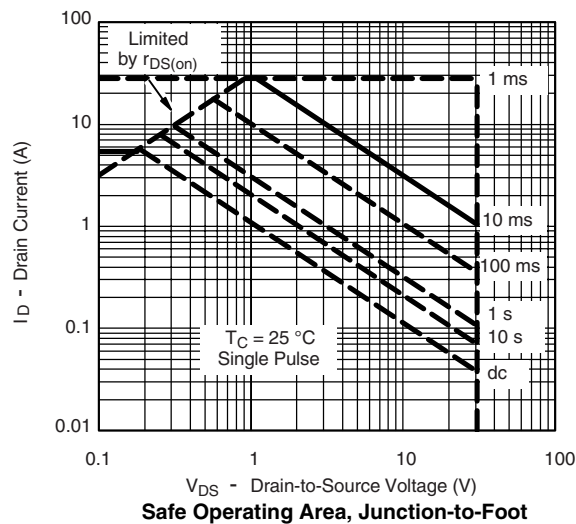
On-Resistance vs. Gate-to-Source Voltage



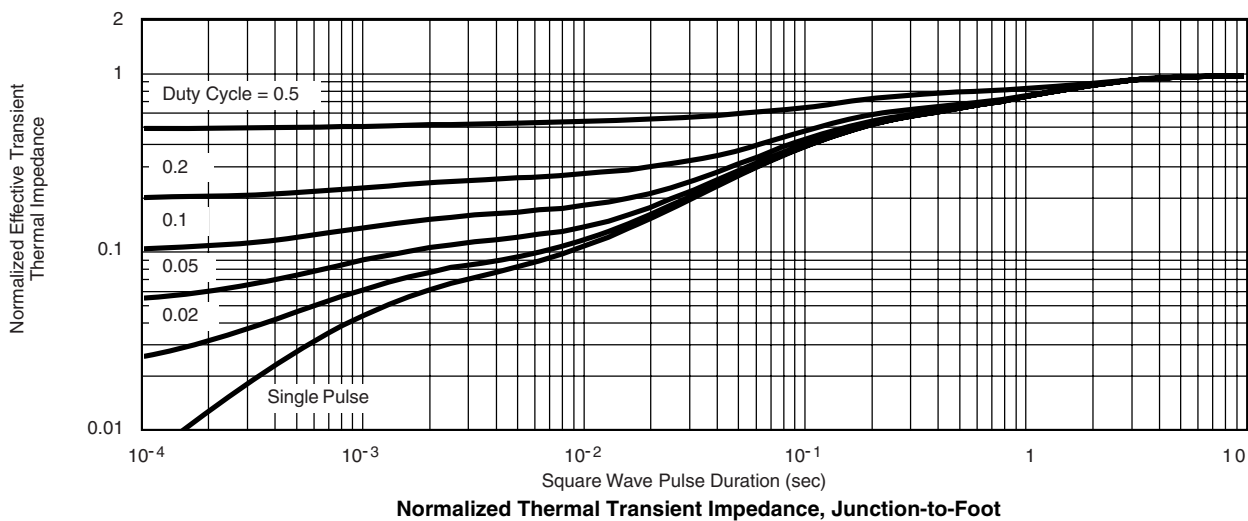
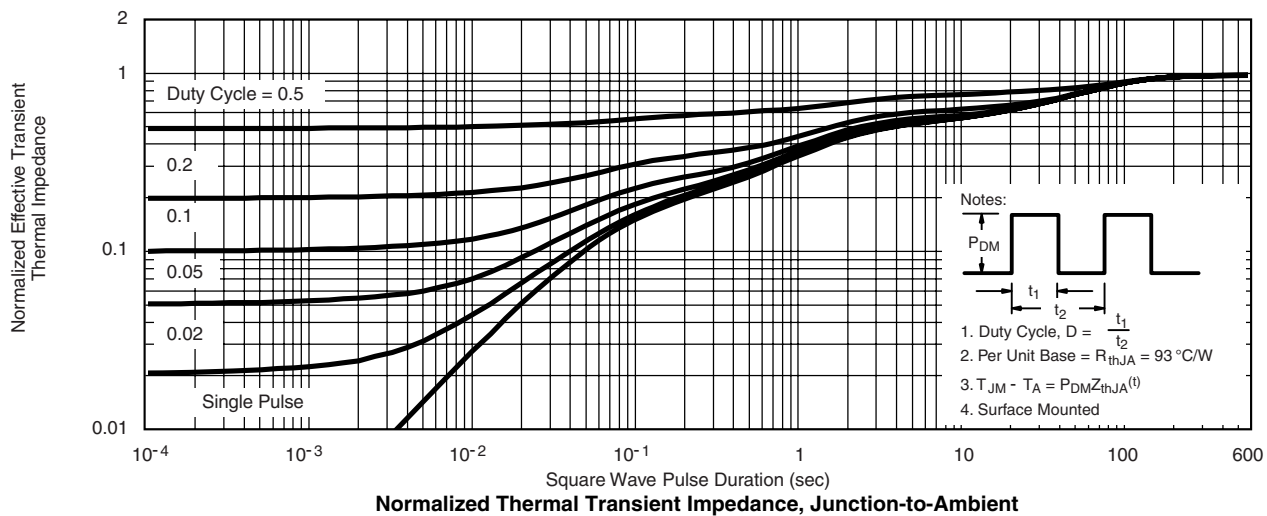
Threshold Voltage



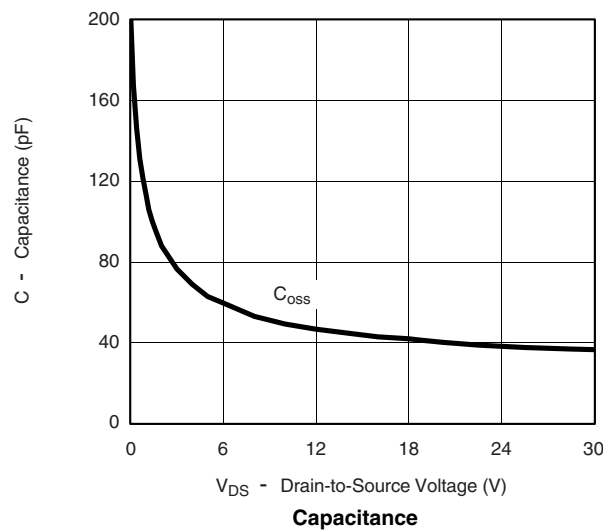
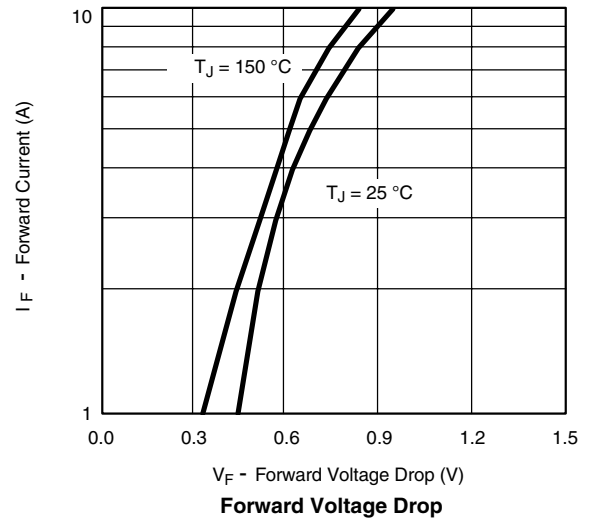
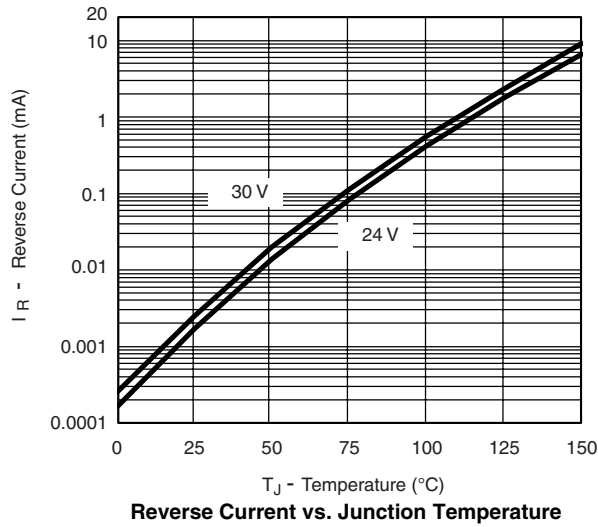
Single Pulse Power, Junction-to-Ambient



Safe Operating Area, Junction-to-Foot

MOSFET CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

SCHOTTKY TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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