



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 @ $V_{GS} = 10$ V	7.5
		0.030 @ $V_{GS} = 4.5$ V	6.5
Channel-2		0.022 @ $V_{GS} = 10$ V	7.5
		0.028 @ $V_{GS} = 4.5$ V	6.5

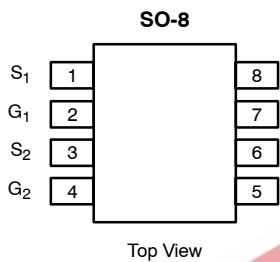
SCHOTTKY PRODUCT SUMMARY		
V_{DS} (V)	V_{SD} (V) Diode Forward Voltage	I_F (A)
30	0.50 V @ 1.0 A	2.0

FEATURES

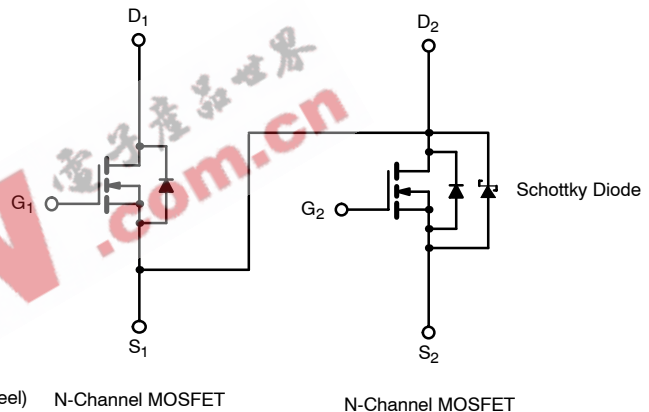
- LITTLE FOOT® Plus Schottky
- Si4830DY Pin Compatible
- PWM Optimized
- 100% R_g Tested

APPLICATIONS

- Asymmetrical Buck-Boost DC/DC Converter



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



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ 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 ($T_J = 150^\circ\text{C}$) ^a	I_D	$T_A = 25^\circ\text{C}$	7.5	5.7		A
		$T_A = 70^\circ\text{C}$	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	P_D	$T_A = 25^\circ\text{C}$	2.0	1.1		W
		$T_A = 70^\circ\text{C}$	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}	$t \leq 10$ sec	52	62.5	53	62.5	$^\circ\text{C/W}$
		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.

Si4370DY

Vishay Siliconix



MOSFET SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED).							
Parameter	Symbol	Test Condition	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}	V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 7.5 A	Ch-1		2.9		nC
			Ch-2		3.8		
Gate-Drain Charge	Q _{gd}	V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 7.5 A	Ch-1		2.5		nC
			Ch-2		3.5		
Gate Resistance	R _g	V _{DS} = 15 V, R _L = 15 Ω, I _D = 1 A, V _{GEN} = 10 V, R _g = 6 Ω	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
Rise Time	t _r		Ch-2		12	20	
			Ch-1		10	17	
Turn-Off Delay Time	t _{d(off)}		Ch-2		10	17	
			Ch-1		19	30	
Fall Time	t _f		Ch-2		40	66	
			Ch-1		9	15	
Source-Drain Reverse Recovery Time	t _{rr}		I _F = 1.7 A, di/dt = 100 A/μs	Ch-1		35	
		Ch-2			28	45	

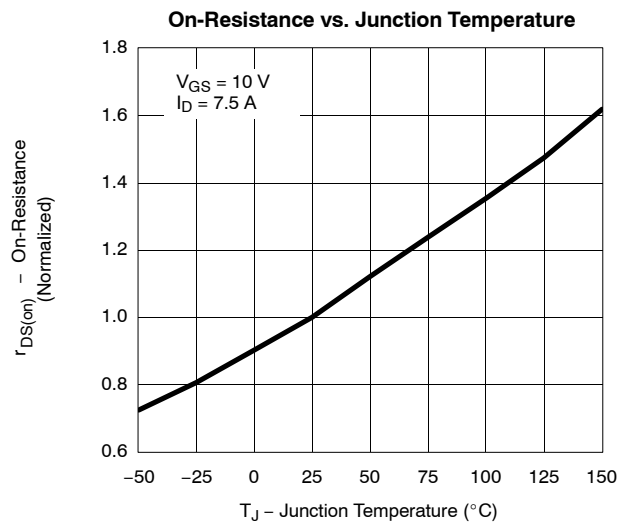
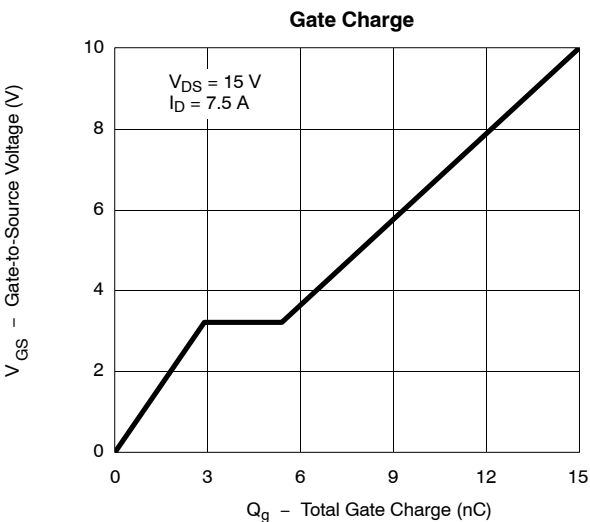
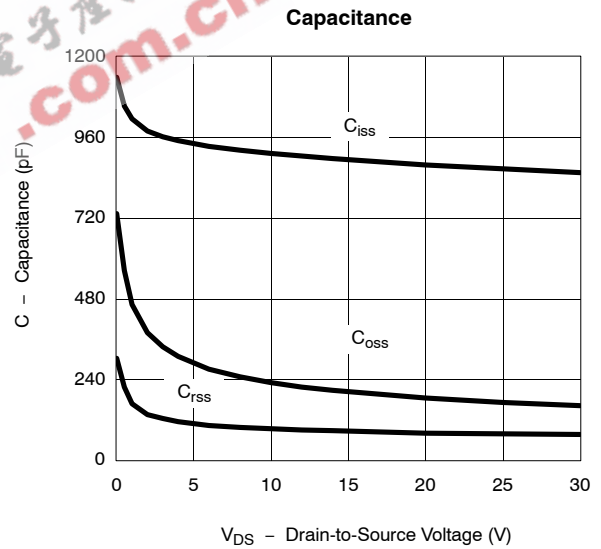
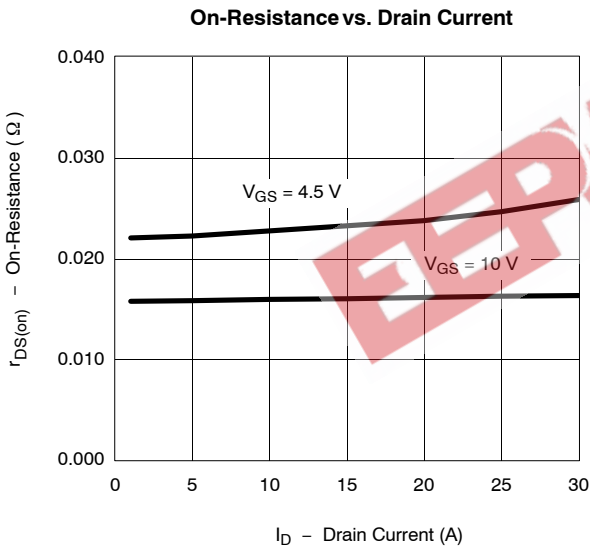
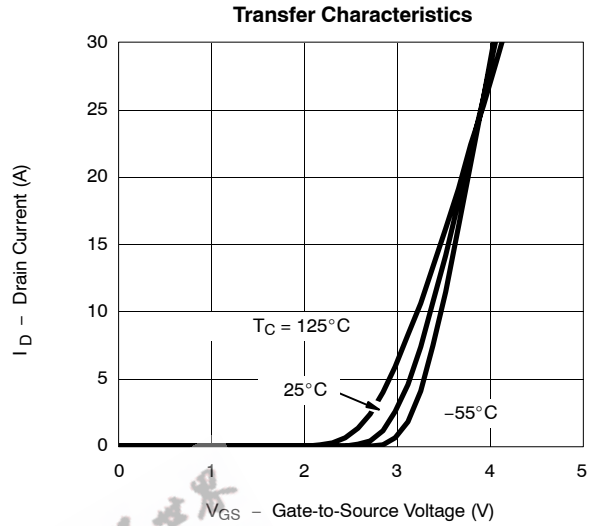
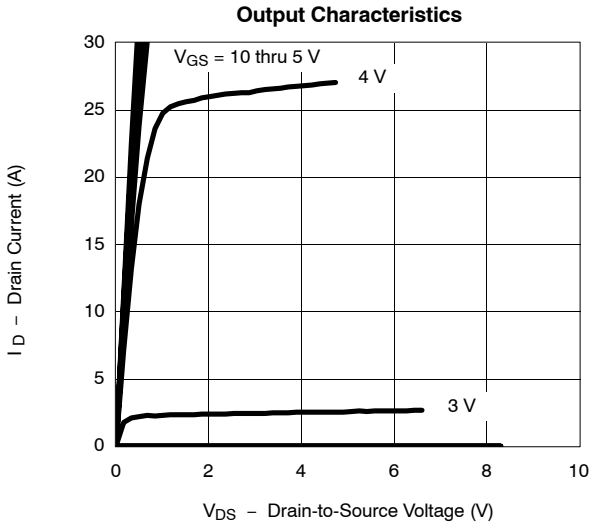
Notes

- a. Guaranteed by design, not subject to production testing.
- b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.

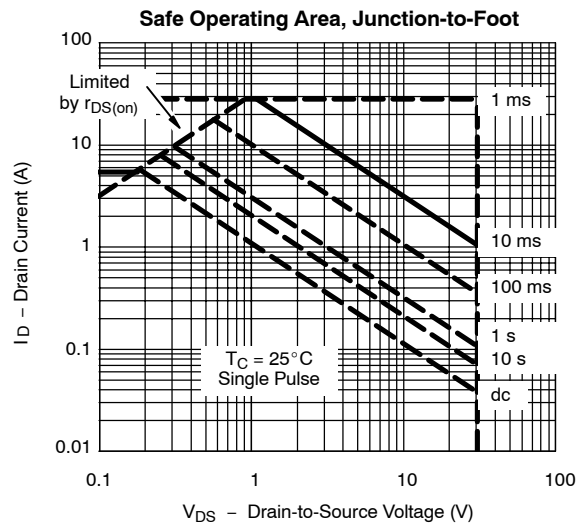
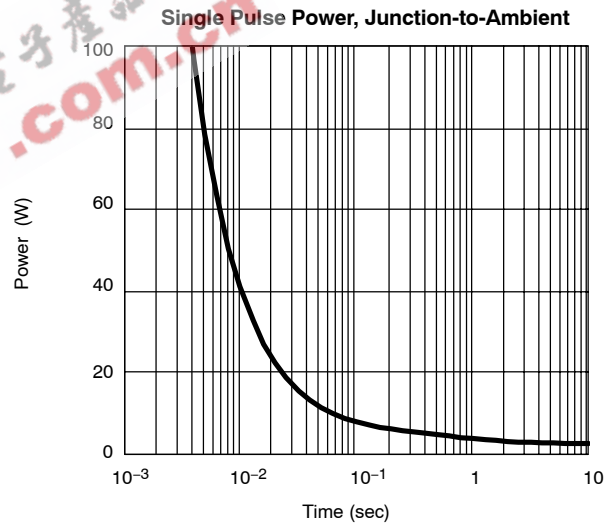
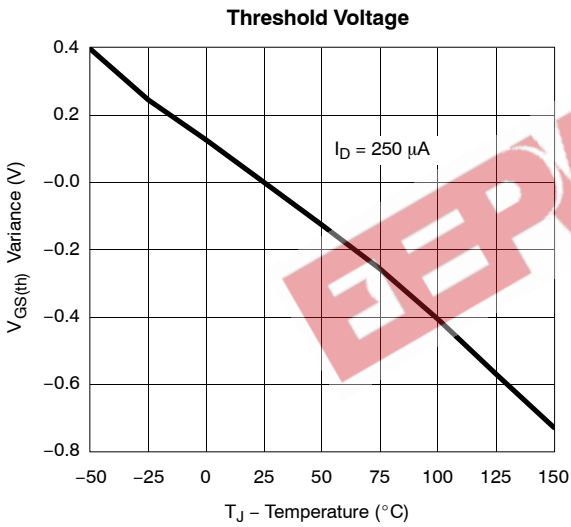
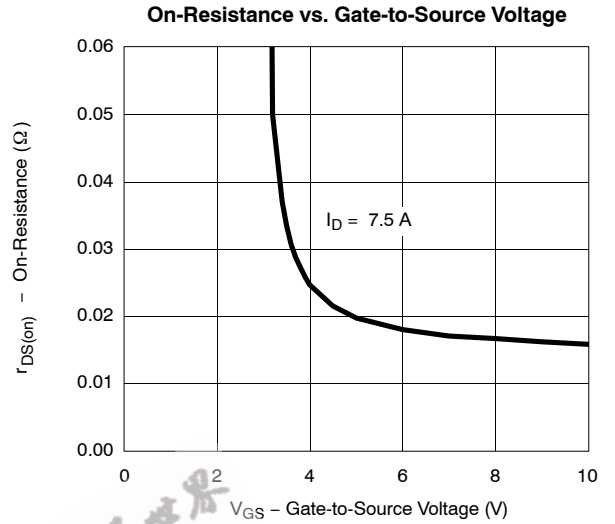
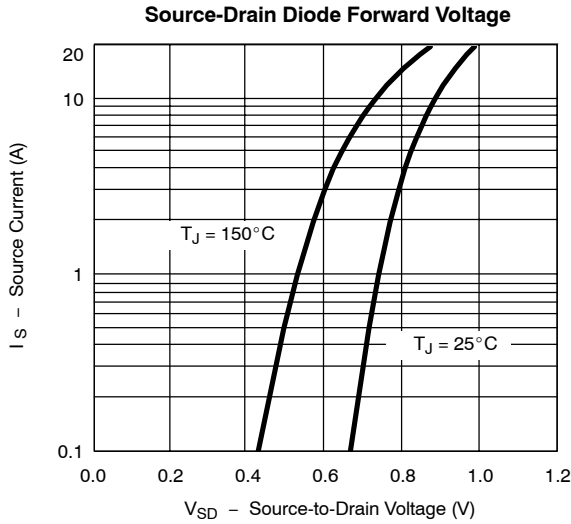
SCHOTTKY SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Forward Voltage Drop	V _F	I _F = 1.0 A		0.47	0.50	V
		I _F = 1.0 A, T _J = 125 °C		0.36	0.42	
Maximum Reverse Leakage Current	I _{rm}	V _r = 30 V		0.004	0.100	mA
		V _r = 30 V, T _J = 100 °C		0.7	10	
		V _r = -30 V, T _J = 125 °C		3.0	20	
Junction Capacitance	C _T	V _r = 10 V		50		pF



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



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

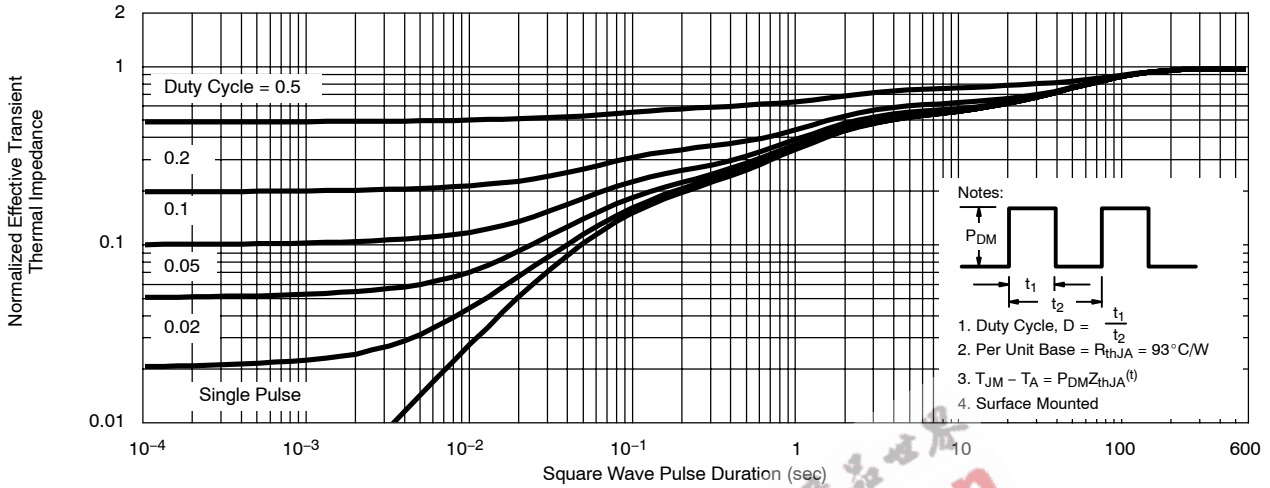




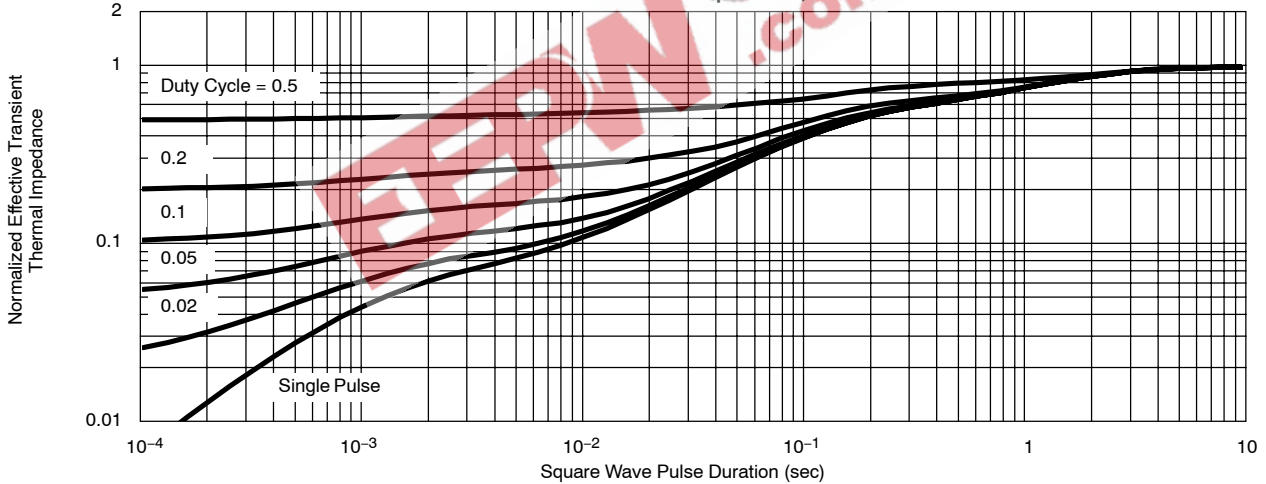
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

MOSFET CHANNEL 1

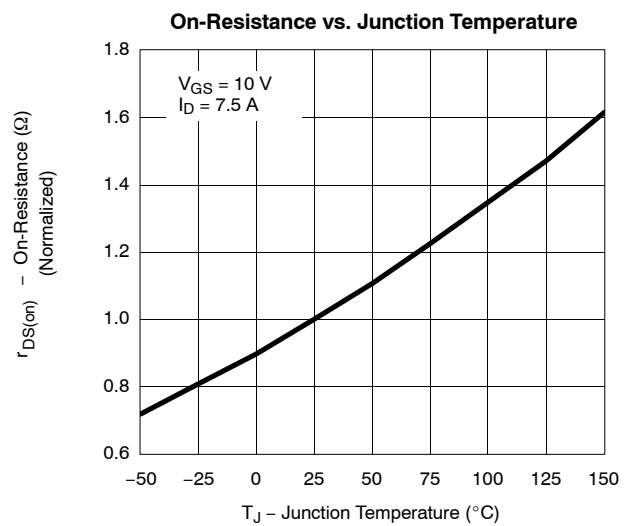
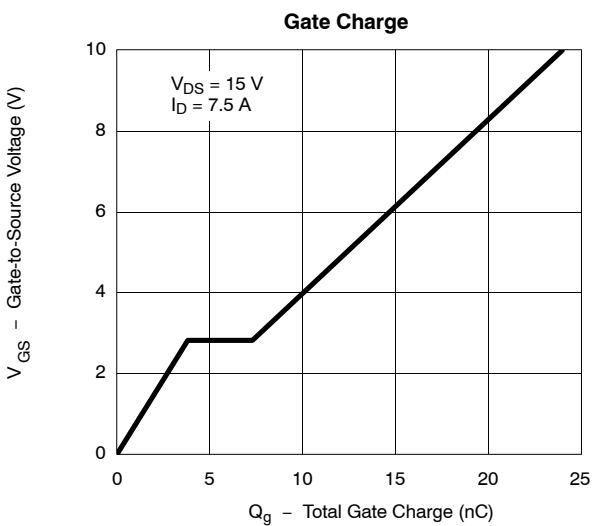
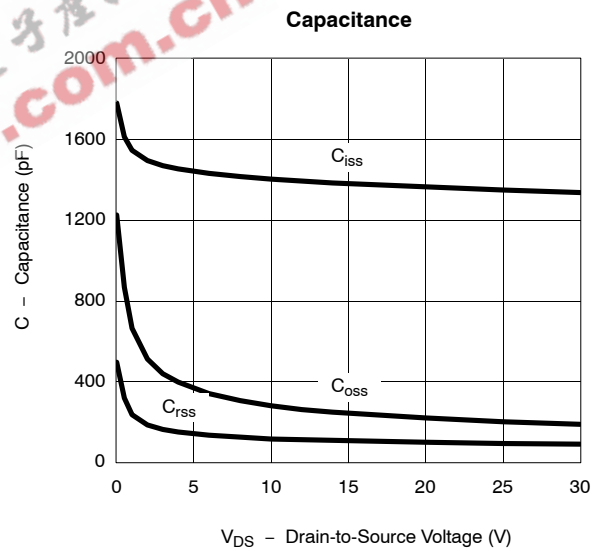
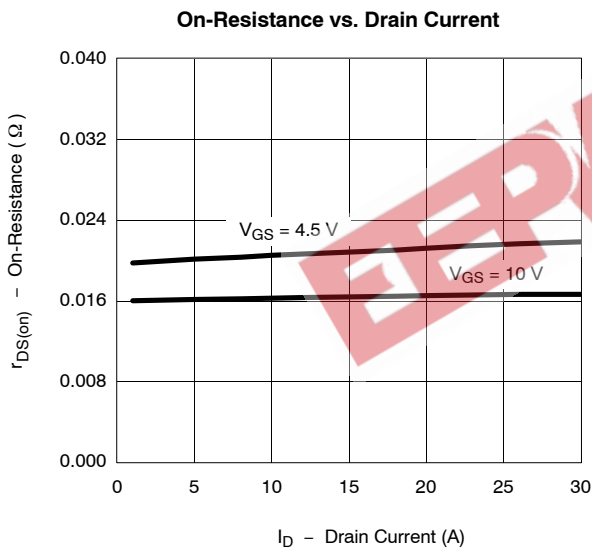
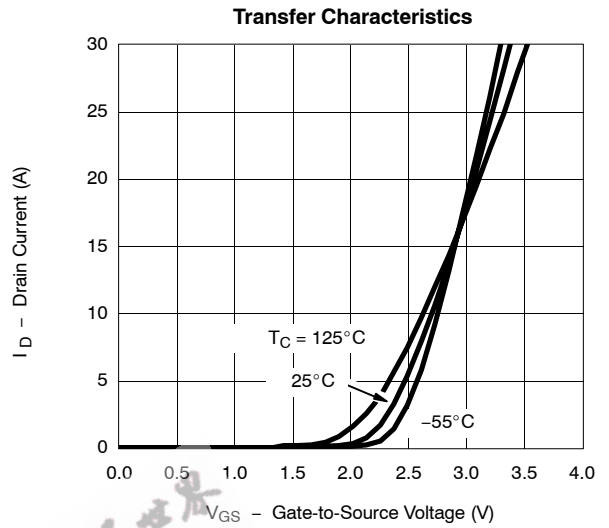
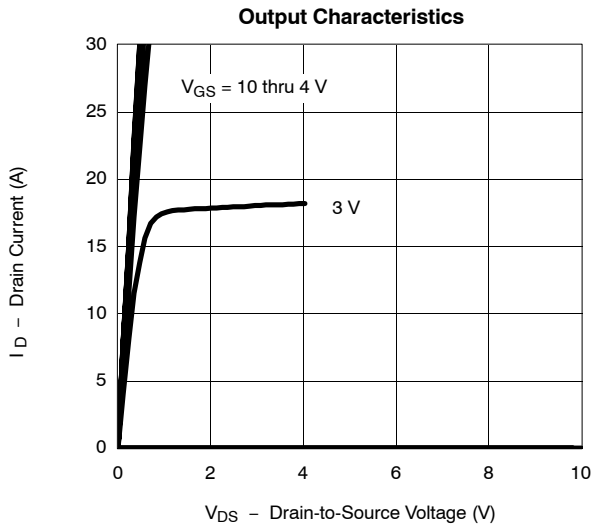
Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot



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

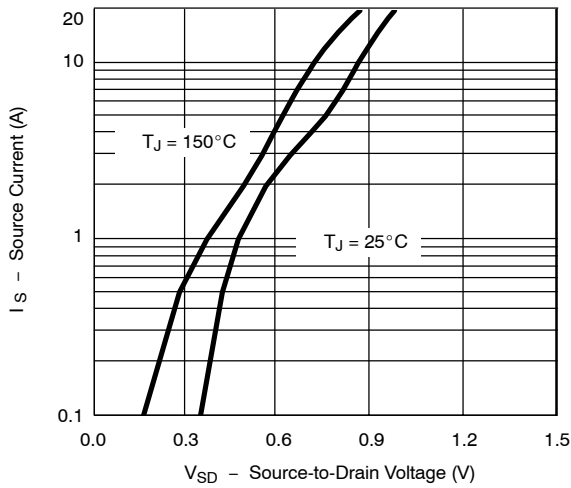




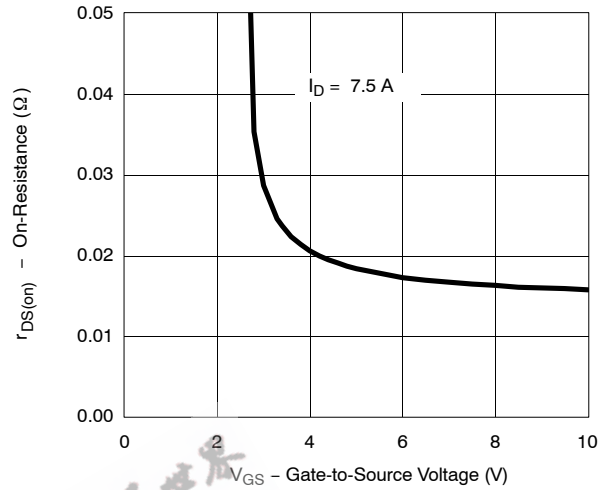
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

MOSFET CHANNEL-2

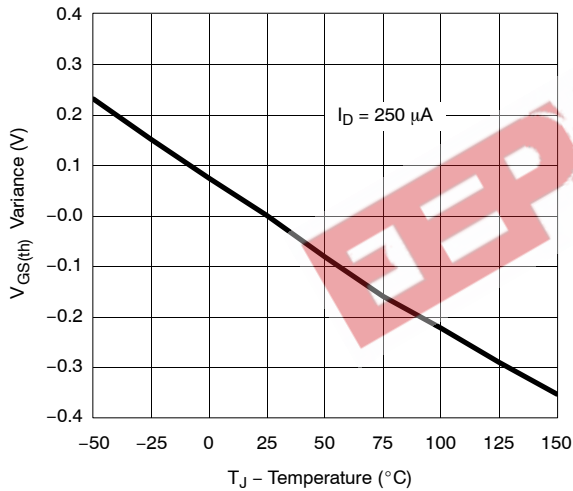
Source-Drain Diode Forward Voltage



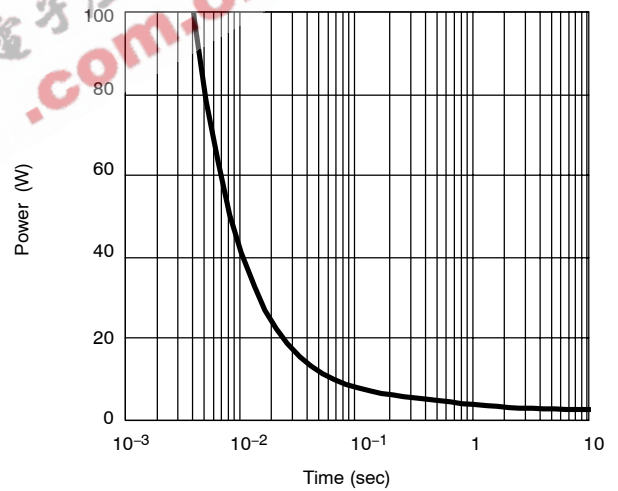
On-Resistance vs. Gate-to-Source Voltage



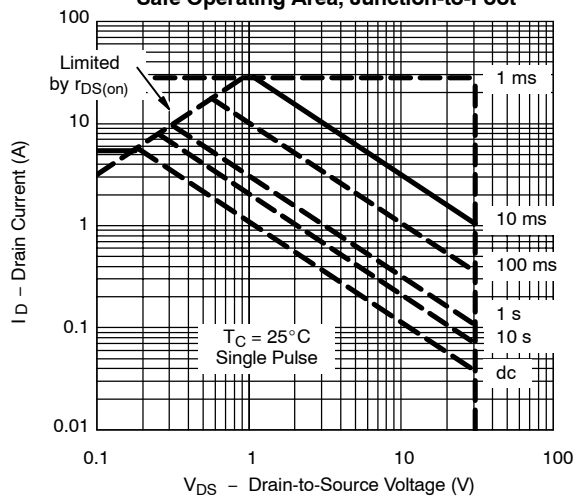
Threshold Voltage



Single Pulse Power, Junction-to-Ambient

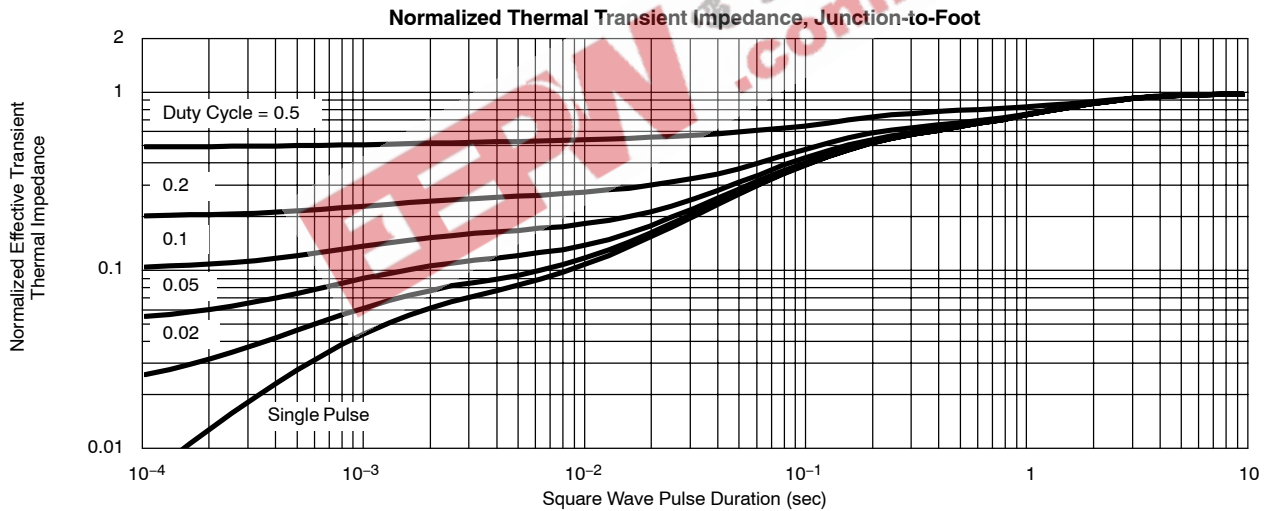
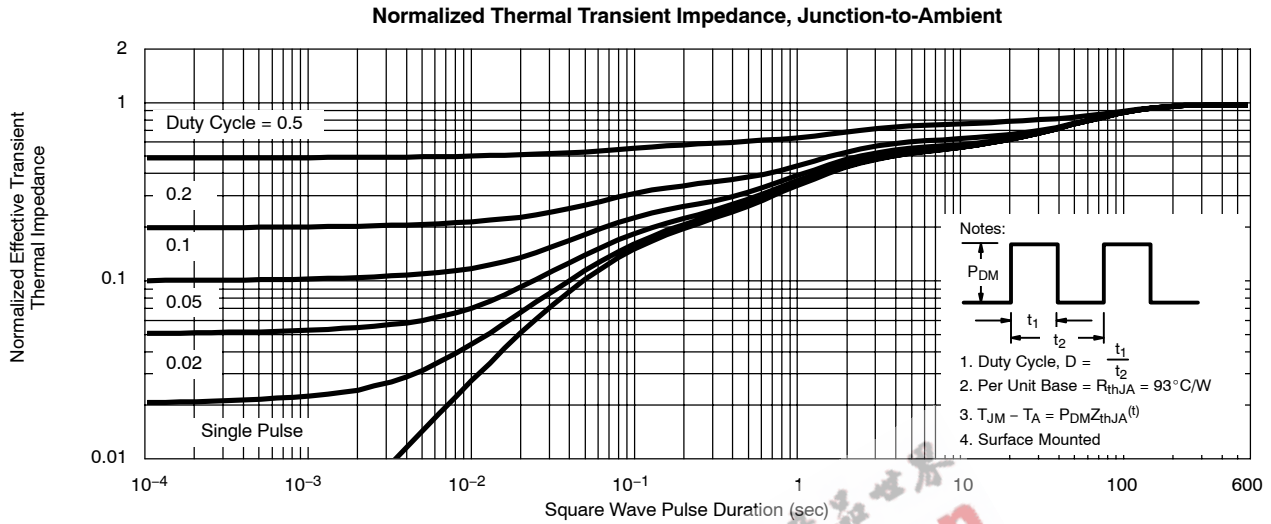


Safe Operating Area, Junction-to-Foot



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

MOSFET CHANNEL-2





TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

SCHOTTKY

