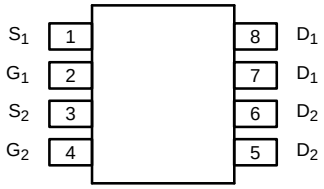
Dual N-Channel 30-V (D-S) MOSFET with Schottky Diode

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.022 @ V_{GS} = 10 V	7.5
	0.030 @ V_{GS} = 4.5 V	6.5

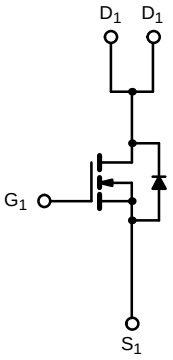
SCHOTTKY PRODUCT SUMMARY		
V_{DS} (V)	V_{SD} (V) Diode Forward Voltage	I_F (A)
30	0.50 V @ 1.0 A	2.0

LITTLE FOOT Plus™

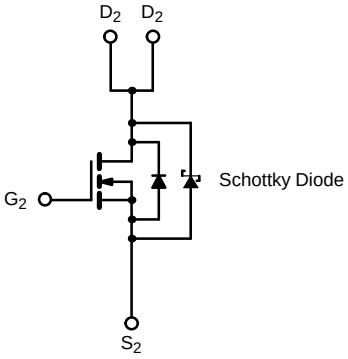
SO-8



Top View



N-Channel MOSFET



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	10 secs	Steady State	Unit
Drain-Source Voltage		V_{DS}	30		V
Gate-Source Voltage		V_{GS}	±20		
Continuous Drain Current (T_J = 150°C)[a]	T_A = 25°C	I_D	7.5	5.7	A
	T_A = 70°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°C	P_D	2.0	1.1	W
	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]	t ≤ 10 sec	R_{thJA}	52	62.5	53	62.5	°C/W
	Steady-State		93	110	93	110	
Maximum Junction-to-Foot (Drain)	Steady-State	R_{thJC}	35	40	35	40	

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

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		0.8			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V				±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24 V, V_{GS} = 0 V	Ch-1			1	μA
			Ch-2			100	
		V_{DS} = 24 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		20			A
Drain-Source On-State Resistance[b]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 7.5 A			0.018	0.022	Ω
		V_{GS} = 4.5 V, I_D = 6.5 A			0.024	0.030	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 7.5 A			22		S
Diode Forward Voltage[b]	V_{SD}	I_S = 1 A, V_{GS} = 0 V	Ch-1		0.8	1.2	V
			Ch-2		0.47	0.5	
Dynamic[a]							
Total Gate Charge	Q_g	V_{DS} = 15 V, V_{GS} = 10 V, I_D = 7.5 A			13	20	nC
Gate-Source Charge	Q_{gs}				2		
Gate-Drain Charge	Q_{gd}				2.7		
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			8	16	ns
Rise Time	t_r				10	20	
Turn-Off Delay Time	$t_{d(off)}$				21	40	
Fall Time	t_f				10	20	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 1.7 A, di/dt = 100 A/μs	Ch-1		40	80	
			Ch-2		32	70	

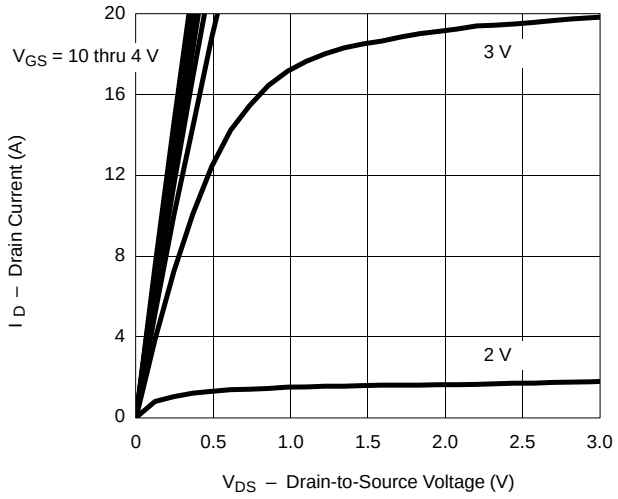
Notes
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.

SCHOTTKY SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

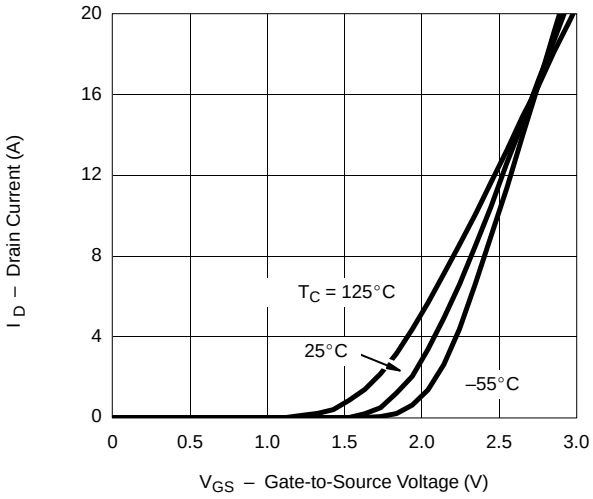
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Forward Voltage Drop	V_F	I_F = 1.0 A		0.47	0.50	V
		I_F = 1.0 A, T_J = 125°C		0.36	0.42	
Maximum Reverse Leakage Current	I_{rm}	V_r = 30 V		0.004	0.100	mA
		V_r = 30 V, T_J = 100°C		0.7	10	
		V_r = –30 V, T_J = 125°C		3.0	20	
Junction Capacitance	C_T	V_r = 10 V		50		pF

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) MOSFET

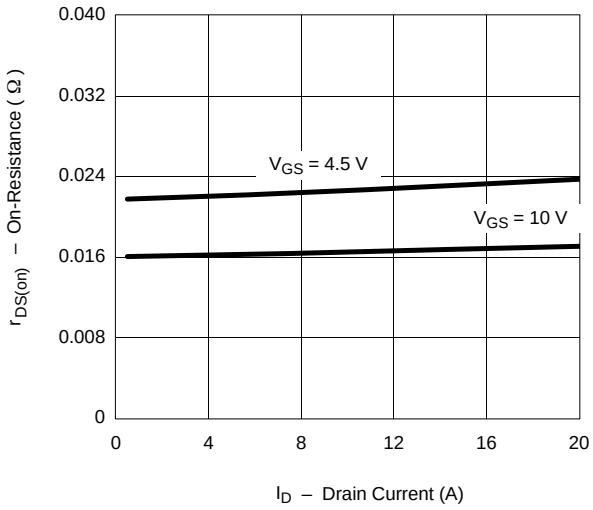
Output Characteristics



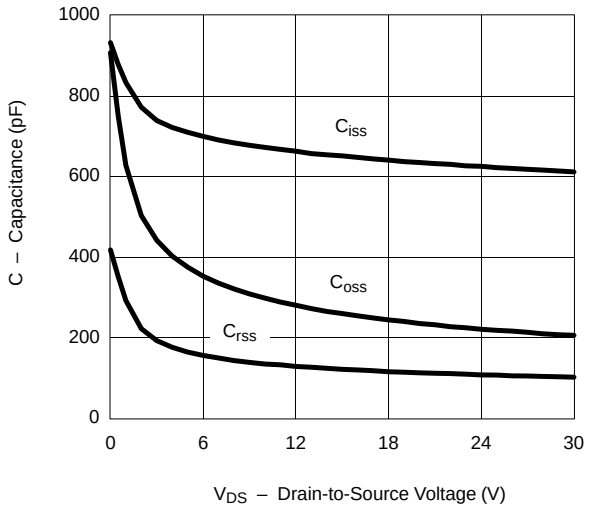
Transfer Characteristics



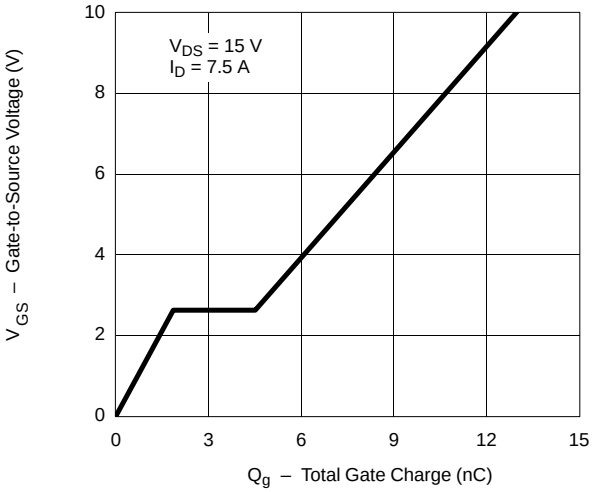
On-Resistance vs. Drain Current



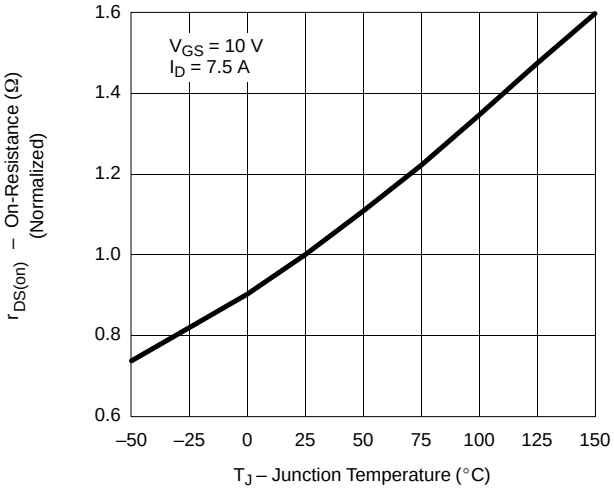
Capacitance



Gate Charge

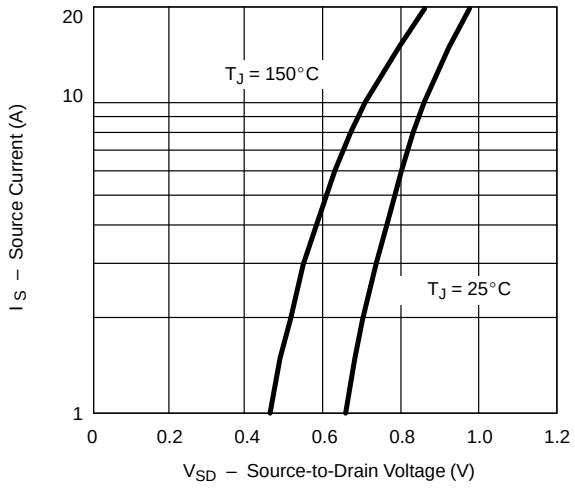


On-Resistance vs. Junction Temperature

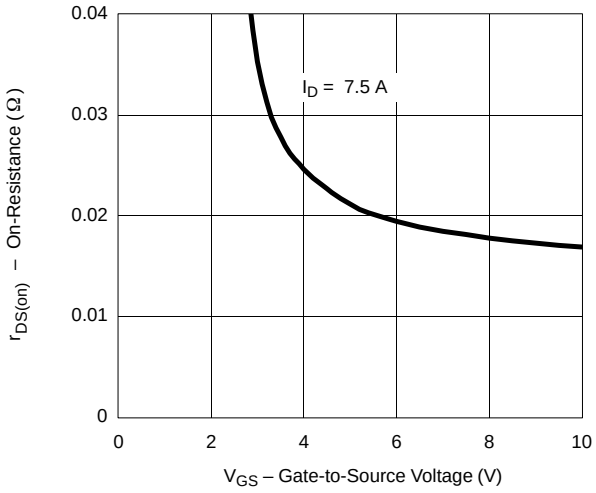


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) MOSFET

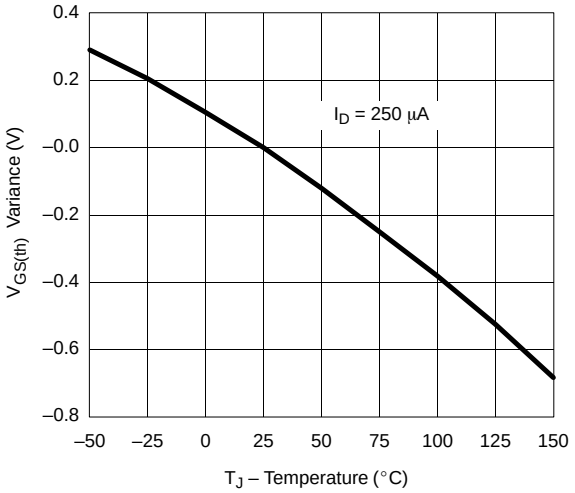
Source-Drain Diode Forward Voltage



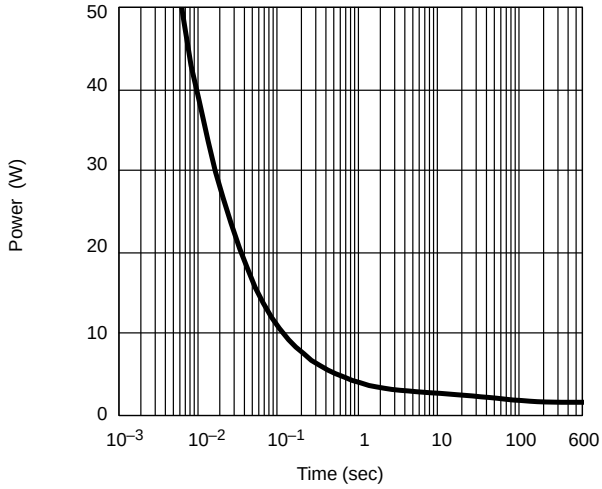
On-Resistance vs. Gate-to-Source Voltage



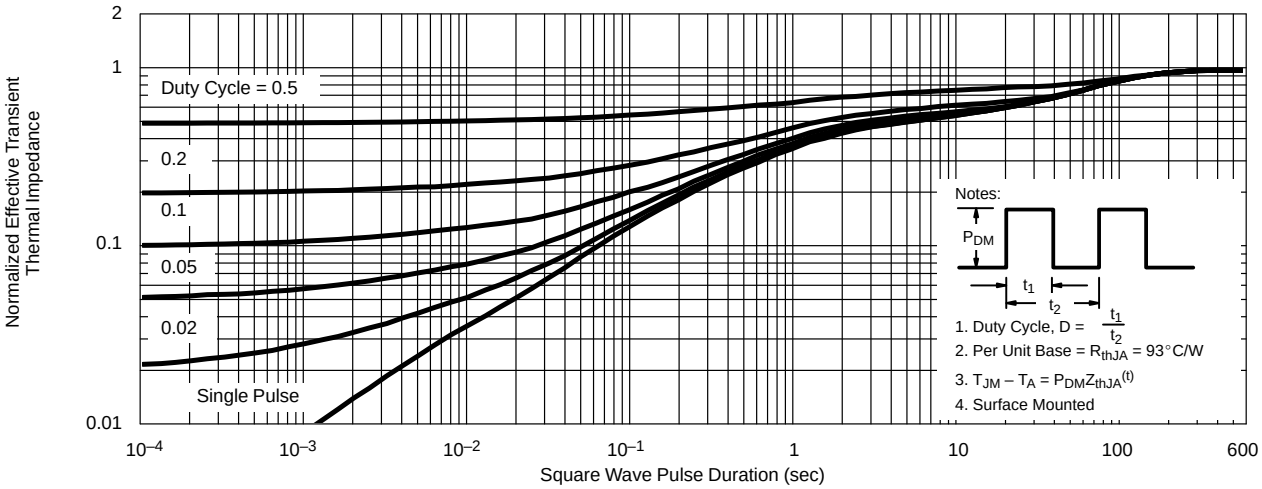
Threshold Voltage



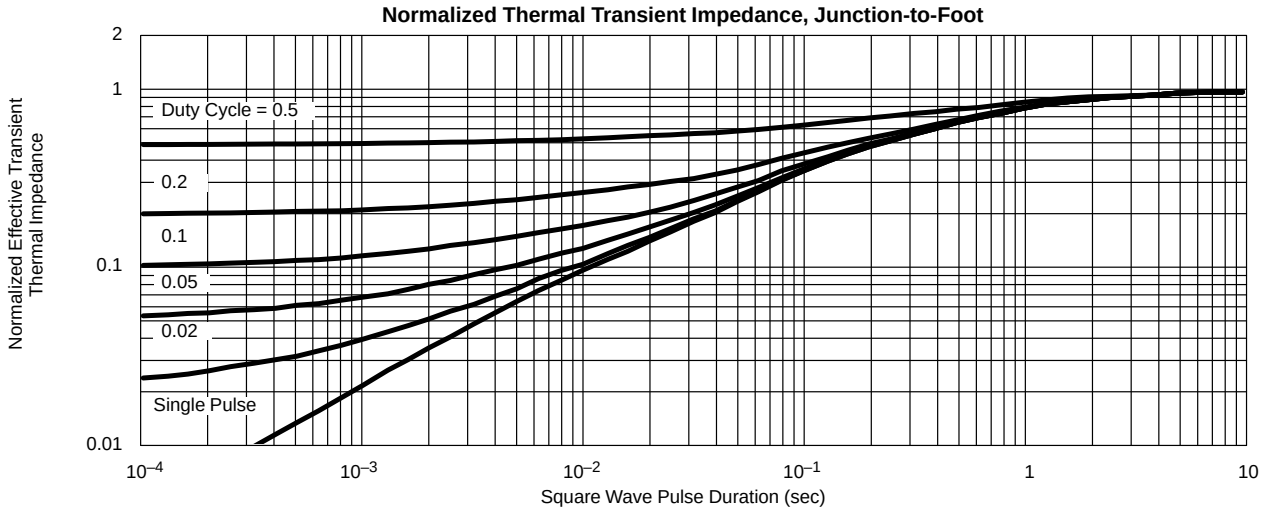
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) MOSFET



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) SCHOTTKY