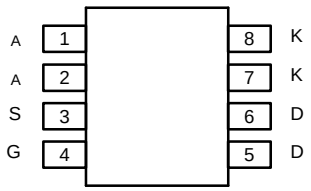
P-Channel 30-V (D-S) MOSFET with Schottky Diode

MOSFET PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
–30	0.085 @ V_{GS} = –10 V	±3.5
	0.180 @ V_{GS} = –4.5 V	±2.5

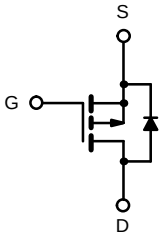
SCHOTTKY PRODUCT SUMMARY		
V_{KA} (V)	V_F (V) Diode Forward Voltage	I_F (A)
30	0.5 V @ 1.0 A	1.4

LITTLE FOOT Plus™

SO-8



Top View



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage (MOSFET)		V_{DS}	–30	V
Reverse Voltage (Schottky)		V_{KA}	30	
Gate-Source Voltage (MOSFET)		V_{GS}	±20	
Continuous Drain Current (T_J = 150°C) (MOSFET)[a, b]	T_A = 25°C	I_D	±3.5	A
	T_A = 70°C		±2.8	
Pulsed Drain Current (MOSFET)		I_{DM}	±20	
Continuous Source Current (MOSFET Diode Conduction)[a, b]		I_S	– 1.7	
Average Foward Current (Schottky)		I_F	1.4	
Pulsed Foward Current (Schottky)		I_{FM}	30	
Maximum Power Dissipation (MOSFET)[a, b]	T_A = 25°C	P_D	2	W
	T_A = 70°C		1.3	
Maximum Power Dissipation (Schottky)[a, b]	T_A = 25°C		1.9	
	T_A = 70°C		1.2	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150	°C

THERMAL RESISTANCE RATINGS					
Parameter	Device	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient (t ≤ 10 sec)[a]	MOSFET	R_{thJA}		62.5	°C/W
	Schottky			65	
Maximum Junction-to-Ambient (t = steady state)[a]	MOSFET		90		
	Schottky		92		

Notes
a. Surface Mounted on FR4 Board.
b. t ≤ 10 sec.

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = –250 µA	–1.0			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} = –30 V, V_{GS} = 0 V			–1	µA
		V_{DS} = –30 V, V_{GS} = 0 V, T_J = 55°C			–25	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ –5 V, V_{GS} = –10 V	–15			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = –10 V, I_D = –2.5 A		0.066	0.085	Ω
		V_{GS} = –4.5 V, I_D = –1.8 A		0.125	0.180	
Forward Transconductance[a]	g_{fs}	V_{DS} = –10 V, I_D = –2.5 A		5.0		S
Diode Forward Voltage[a]	V_{SD}	I_S = –1.7 A, V_{GS} = 0 V		–0.8	–1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = –10 V, V_{GS} = –10 V, I_D = –2.5 A		8.7	15	nC
Gate-Source Charge	Q_{gs}			1.9		
Gate-Drain Charge	Q_{gd}			1.3		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = –10 V, R_L = 10 Ω I_D ≅ –1 A, V_{GEN} = –10 V, R_G = 6 Ω		7	15	ns
Rise Time	t_r			9	18	
Turn-Off Delay Time	$t_{d(off)}$			14	27	
Fall Time	t_f			8	15	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = –1.7 A, di/dt = 100 A/µs		50	80	

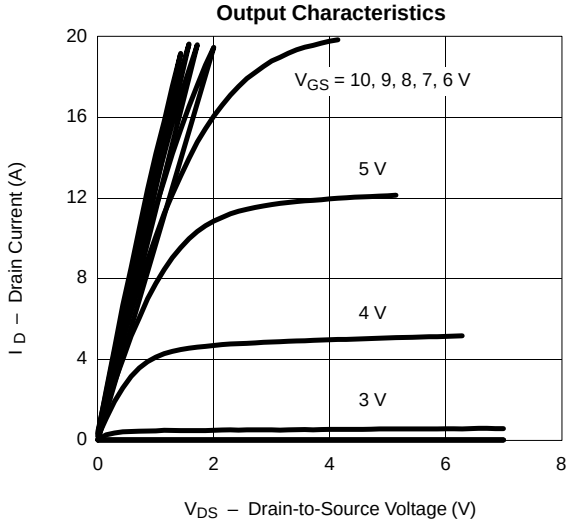
Notes
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

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

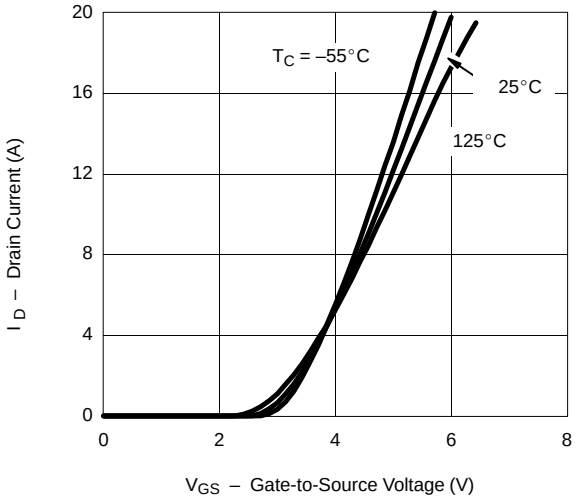
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Forward Voltage Drop	V_F	I_F = 1.0 A		0.45	0.5	V
		I_F = 1.0 A, T_J = 125°C		0.36	0.42	
Maximum Reverse Leakage Current	I_{rm}	V_r = 30 V		0.004	0.100	mA
		V_r = 30 V, T_J = 100°C		0.7	10	
		V_r = –30 V, T_J = 125°C		3.0	20	
Junction Capacitance	C_T	V_r = 10 V		62		pF

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) MOSFET

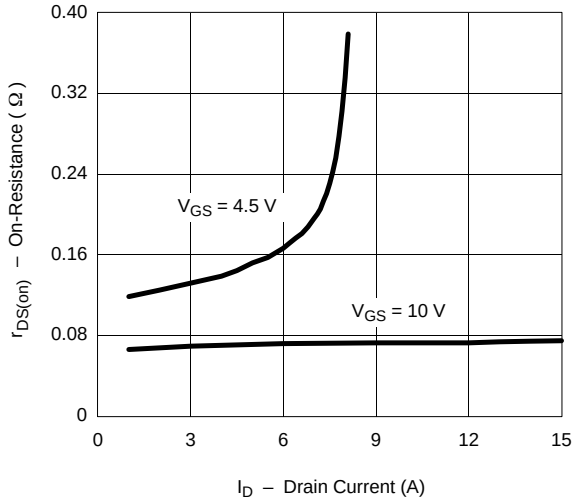
Output Characteristics



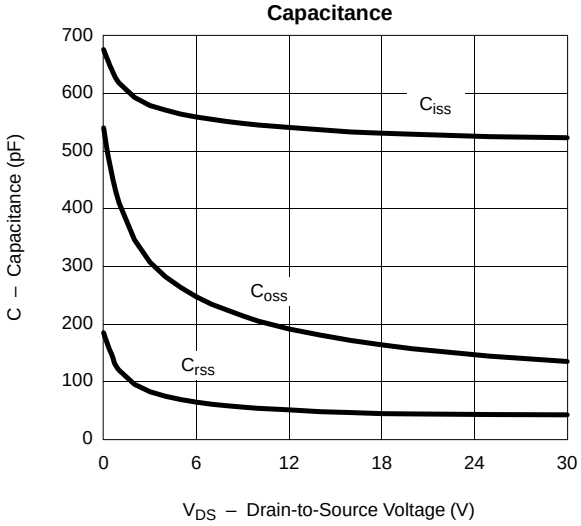
Transfer Characteristics



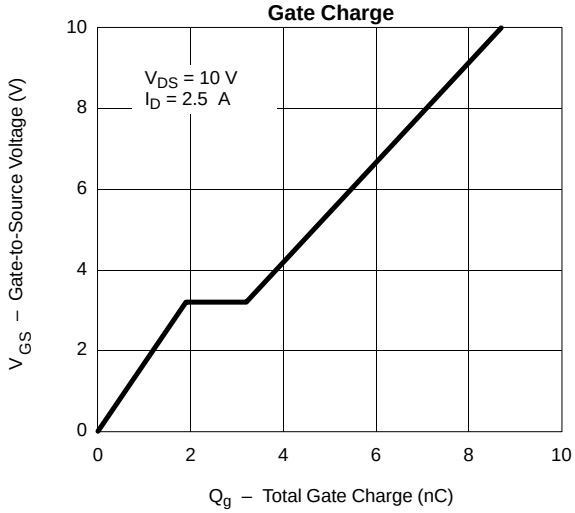
On-Resistance vs. Drain Current



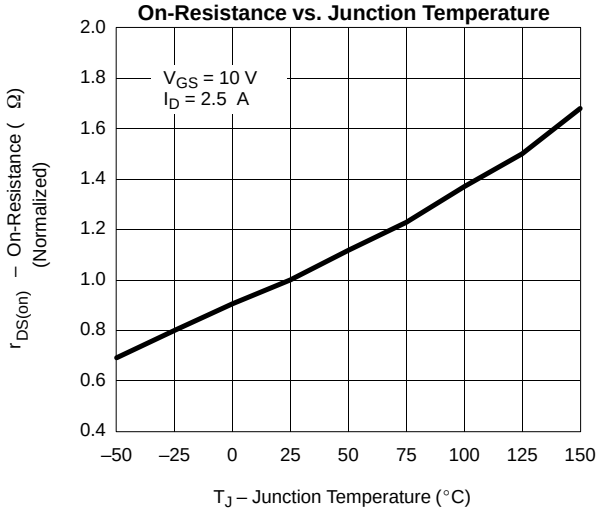
Capacitance



Gate Charge

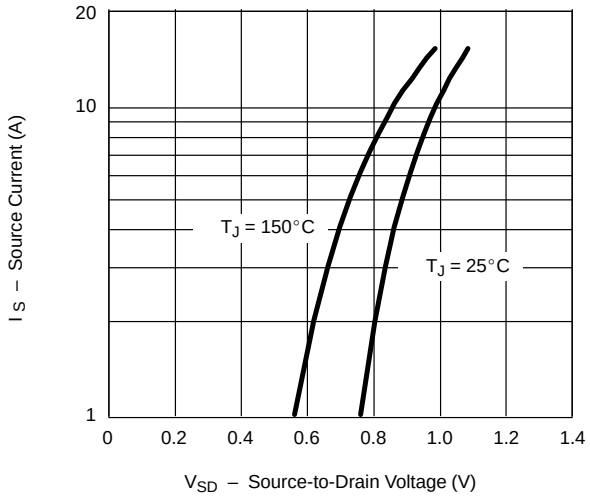


On-Resistance vs. Junction Temperature

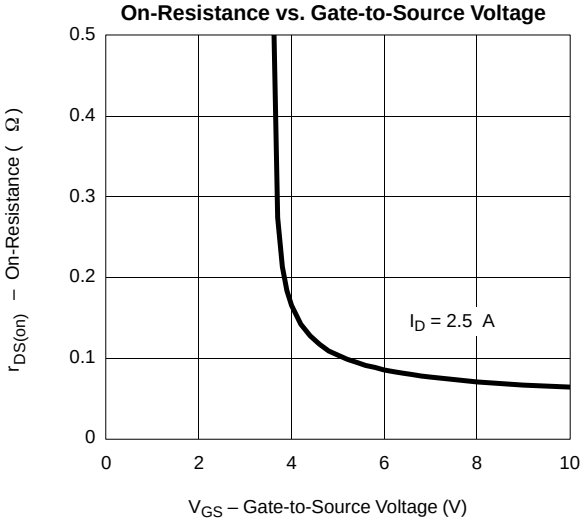


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) MOSFET

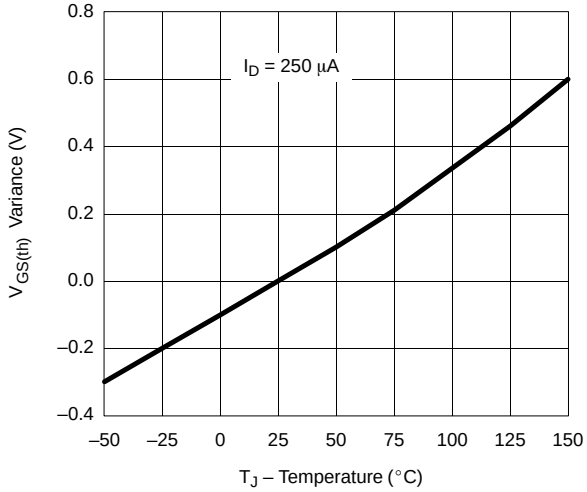
Source-Drain Diode Forward Voltage



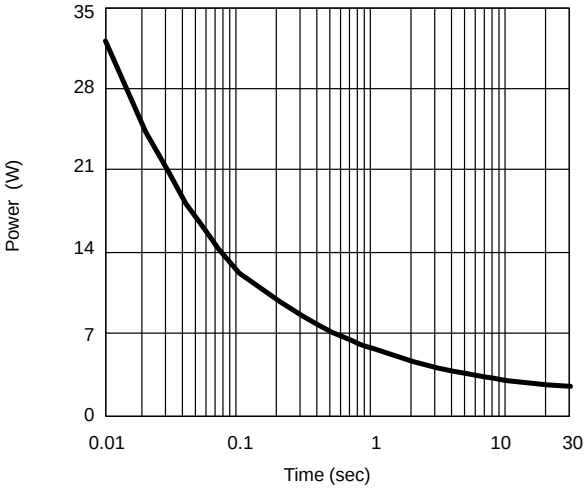
On-Resistance vs. Gate-to-Source Voltage



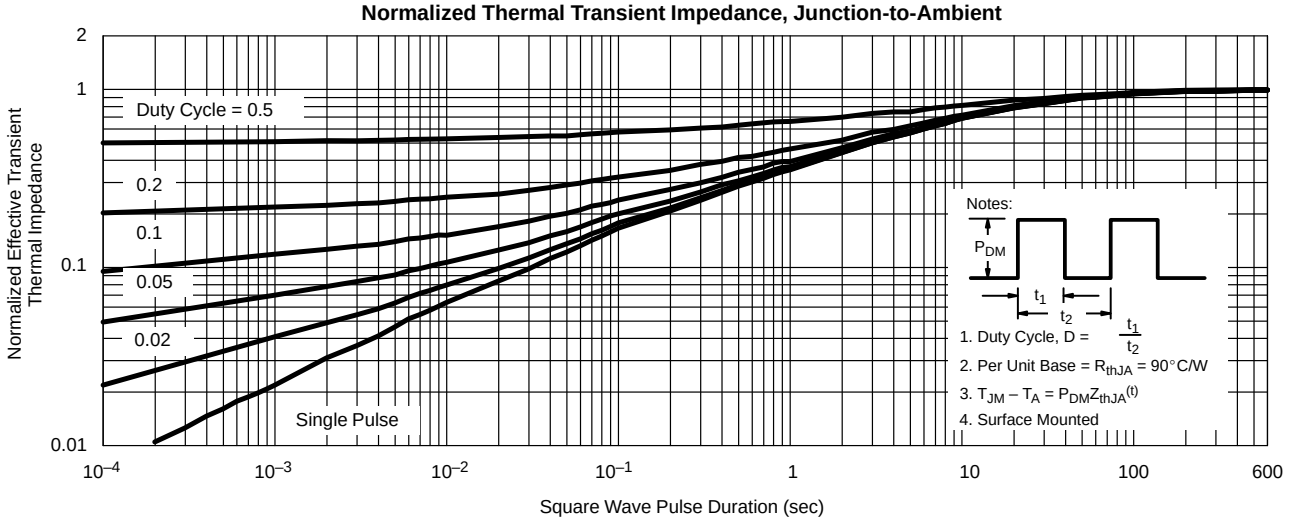
Threshold Voltage



Single Pulse Power

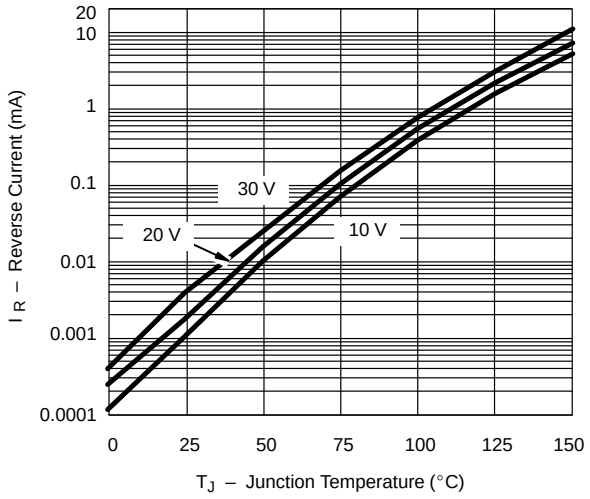


Normalized Thermal Transient Impedance, Junction-to-Ambient

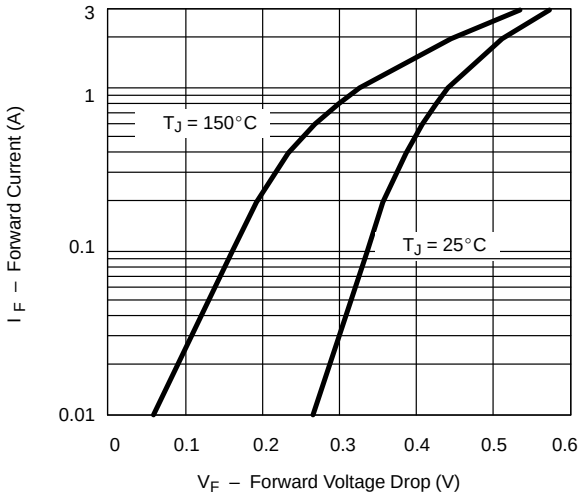


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) SCHOTTKY

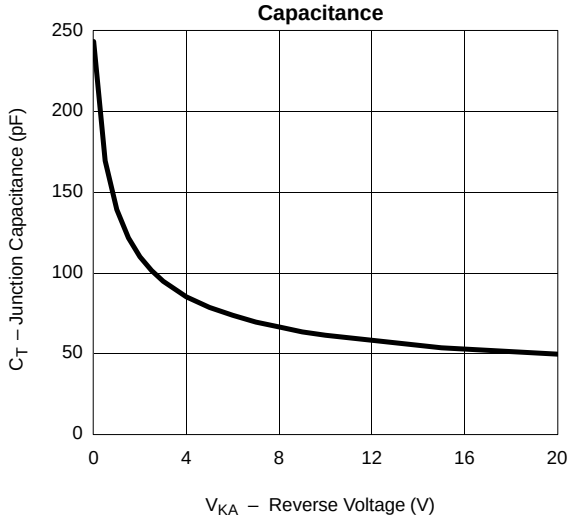
Reverse Current vs. Junction Temperature



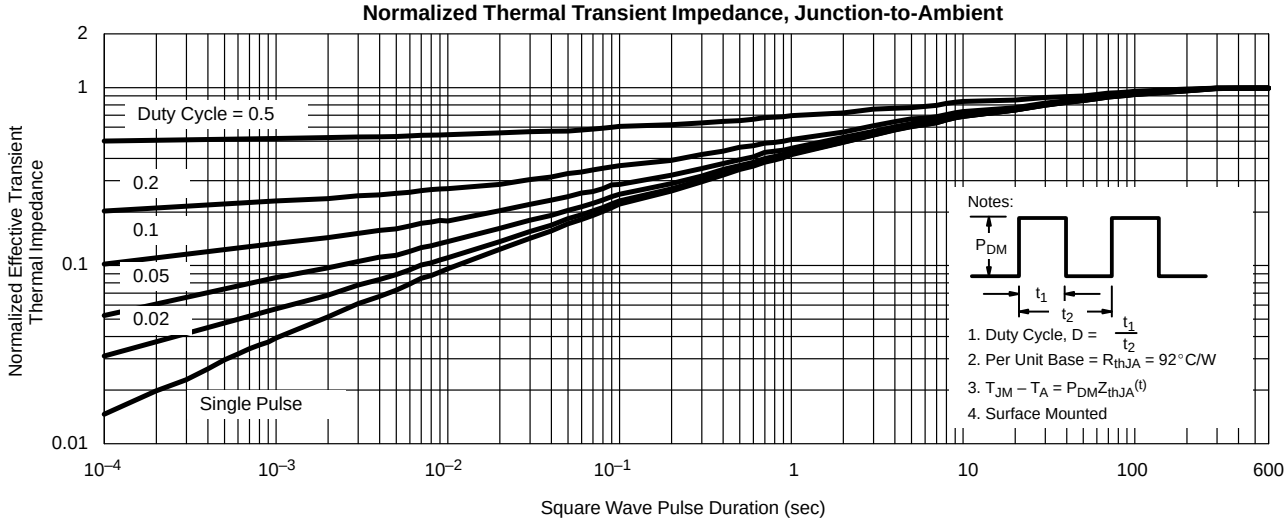
Forward Voltage Drop



Capacitance



Normalized Thermal Transient Impedance, Junction-to-Ambient



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