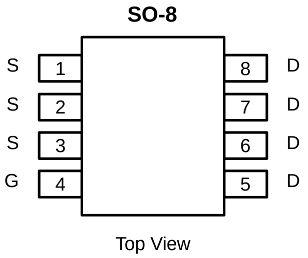
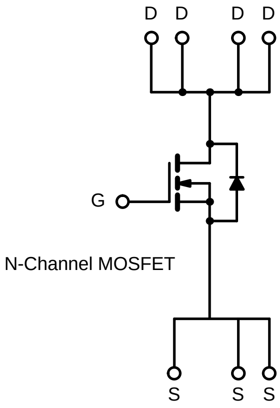
N-Channel Reduced Q_g, Fast Switching MOSFET

TrenchFET®
Power MOSFETs
High-Efficiency
PWM Optimized
100% R_G Tested

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.007 @ V_{GS} = 10 V	16
	0.010 @ V_{GS} = 4.5 V	13



Top View



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	16	11	A
	T_A = 70°C		13	8	
Pulsed Drain Current		I_{DM}	±50		
Continuous Source Current (Diode Conduction)[a]		I_S	3.0	1.40	
Maximum Power Dissipation[a]	T_A = 25°C	P_D	3.5	16	W
	T_A = 70°C		2.2	1.0	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150		°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient (MOSFET)[a]	t ≤ 10 sec	R_{thJA}	29	35	°C/W
	Steady State		65	80	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	15	18	

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

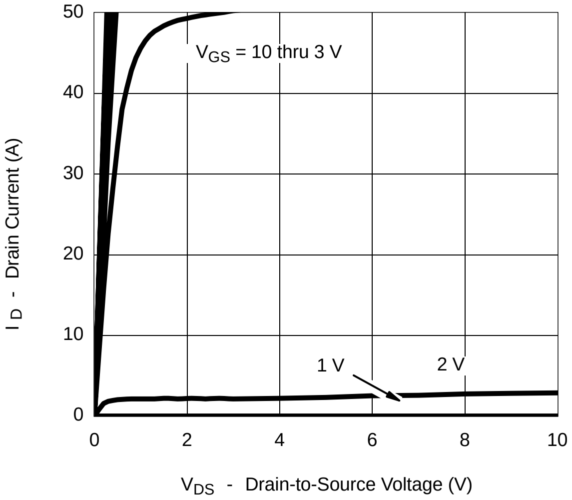
MOSFET SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\ \mu A$	0.80		1.6	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 20$ V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 24$ V, $V_{GS} = 0$ V			1	µA
		$V_{DS} = 24$ V, $V_{GS} = 0$ V, $T_J = 70°C$			5	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq 5$ V, $V_{GS} = 10$ V	40			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 16$ A		0.0058	0.007	Ω
		$V_{GS} = 4.5$ V, $I_D = 13$ A		0.008	0.010	
Forward Transconductance[a]	g_{fs}	$V_{DS} = 15$ V, $I_D = 16$ A		38		S
Diode Forward Voltage[a]	V_{SD}	$I_S = 3$ A, $V_{GS} = 0$ V		0.74	1.1	V
Dynamic[b]						
Total Gate Charge	Q_g	$V_{DS} = 15$ V, $V_{GS} = 5.0$ V, $I_D = 16$ A		16.3	24	nC
Gate-Source Charge	Q_{gs}			4		
Gate-Drain Charge	Q_{gd}			5.9		
Gate Resistance	R_G		0.5	1.5	2.6	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15$ V, $R_L = 15\ \Omega$ $I_D \cong 1$ A, $V_{GEN} = 10$ V, $R_G = 6\ \Omega$		14	20	ns
Rise Time	t_r			10	15	
Turn-Off Delay Time	$t_{d(off)}$			44	70	
Fall Time	t_f			20	30	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 3$ A, di/dt = 100 A/µs		40	70	

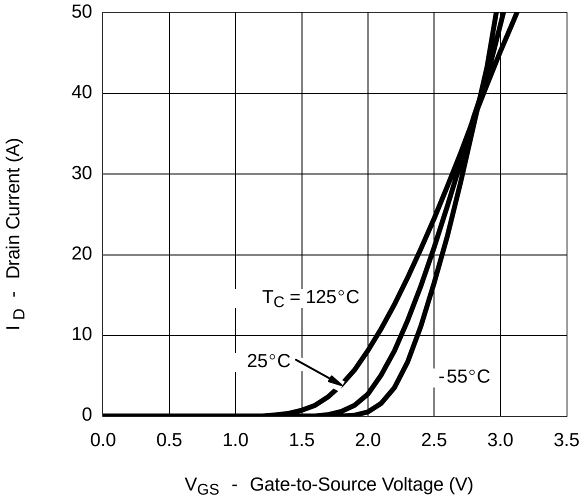
Notes
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

Output Characteristics

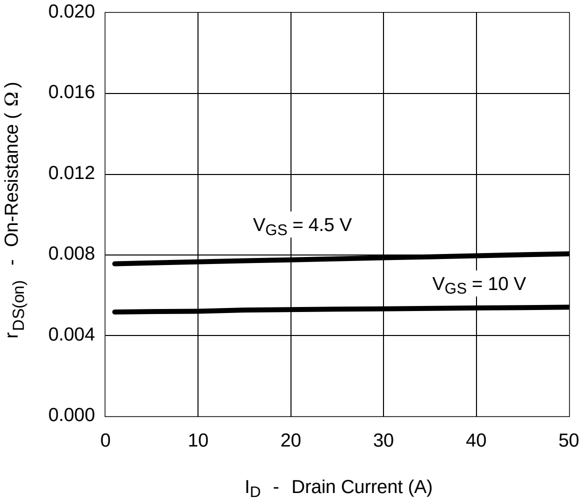


Transfer Characteristics

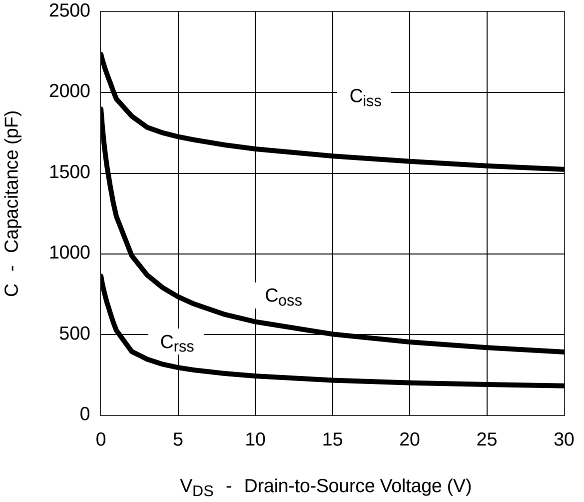


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

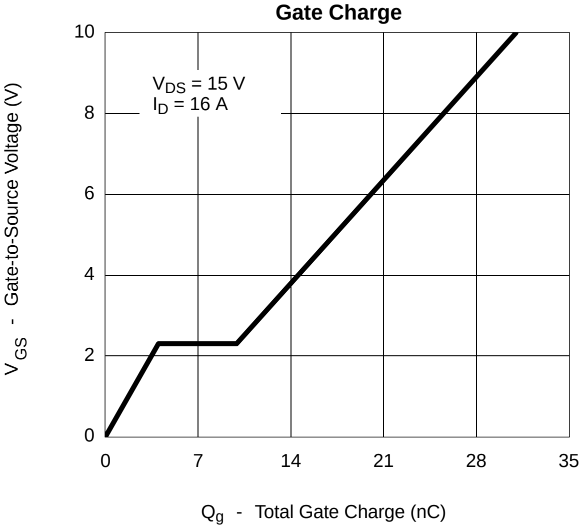
On-Resistance vs. Drain Current



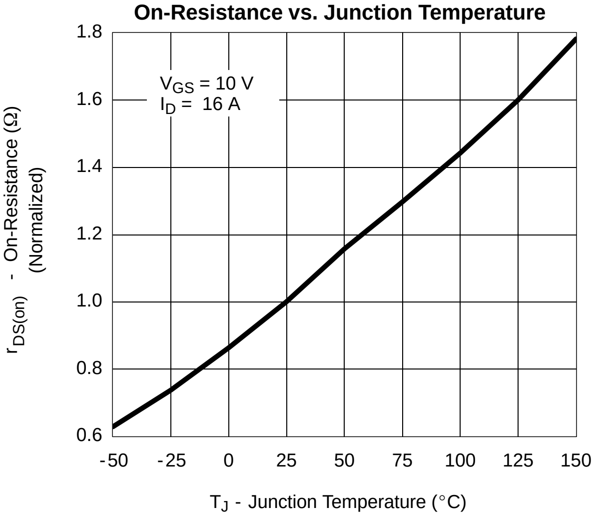
Capacitance



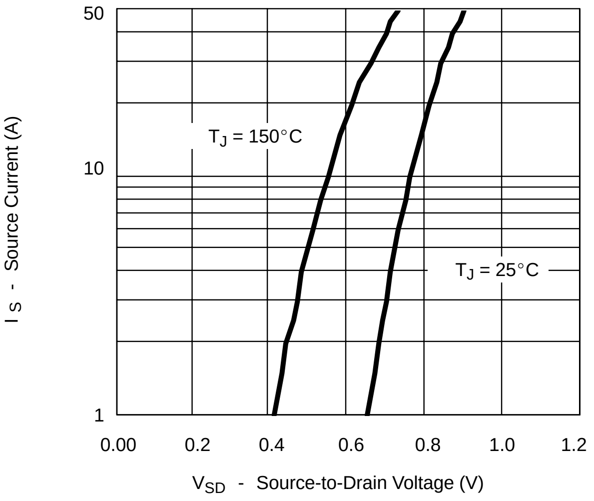
Gate Charge



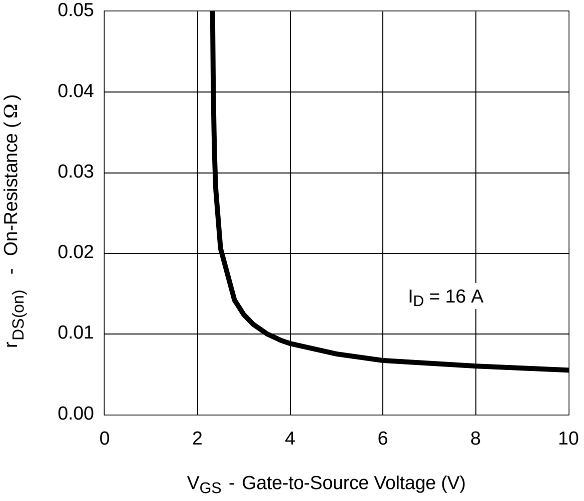
On-Resistance vs. Junction Temperature



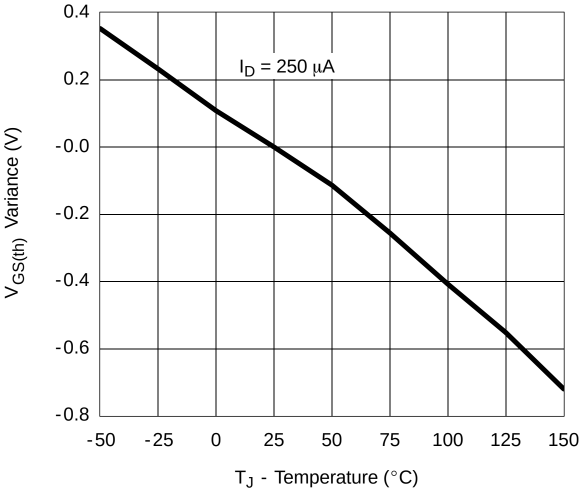
Source-Drain Diode Forward Voltage



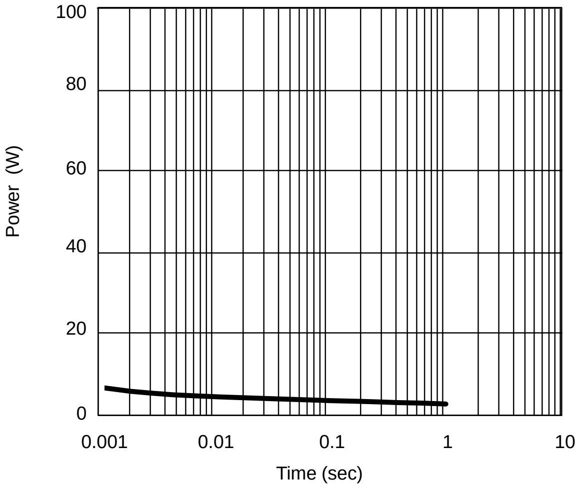
On-Resistance vs. Gate-to-Source Voltage



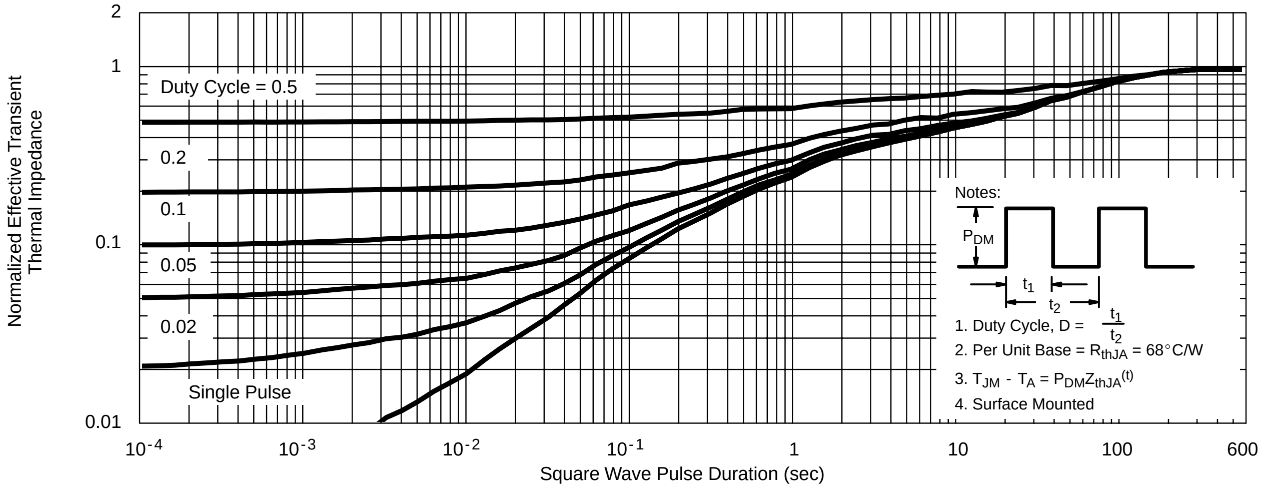
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



Threshold Voltage



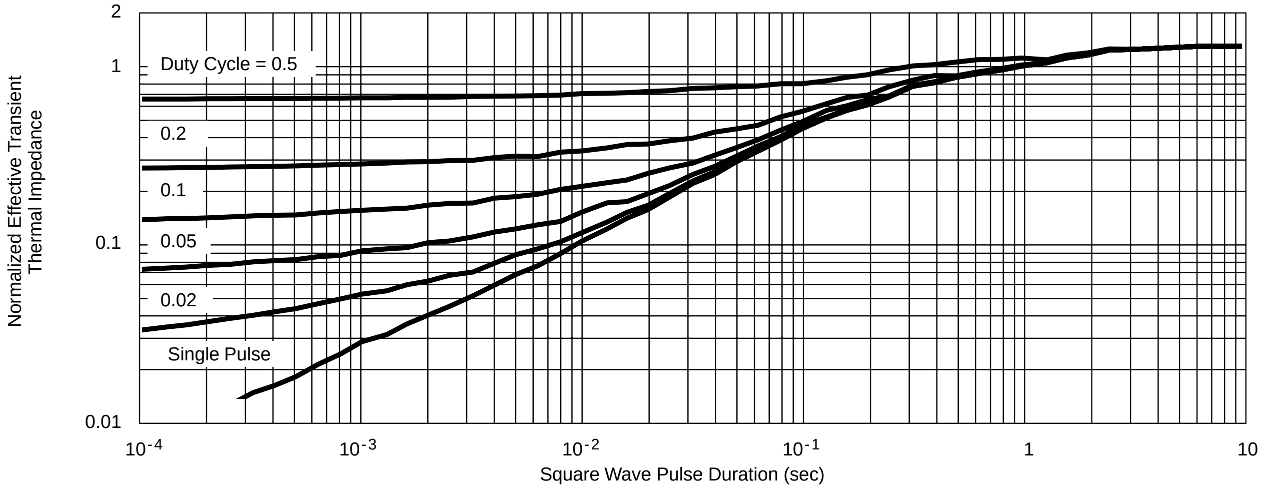
Single Pulse Power



Notes:

1. Duty Cycle, D = $\frac{t_1}{t_2}$
2. Per Unit Base = R_{thJA} = 68°C/W
3. T_{JM} - T_A = $P_{DM}Z_{thJA}^{(t)}$
4. Surface Mounted

Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot