

N- and P-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY

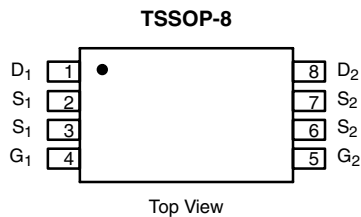
	V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
N-Channel	30	0.032 at V _{GS} = 10 V	4.3
		0.046 at V _{GS} = 4.5 V	3.7
P-Channel	- 30	0.043 at V _{GS} = - 10 V	- 3.8
		0.073 at V _{GS} = - 4.5 V	- 2.8

FEATURES

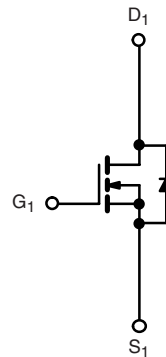
- Halogen-free
- TrenchFET® Power MOSFETS



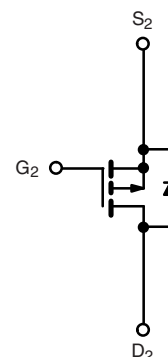
RoHS
COMPLIANT



Ordering Information: Si6544BDQ-T1-GE3 (Lead (Pb)-free and Halogen-free)



N-Channel MOSFET



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted

Parameter		Symbol	N-Channel		P-Channel		Unit
			10 s	Steady State	10 s	Steady State	
Drain-Source Voltage		V _{DS}	30		- 30		V
Gate-Source Voltage		V _{GS}	± 20				
Continuous Drain Current (T _J = 150 °C) ^a	T _A = 25 °C	I _D	4.3	3.7	- 3.8	- 3.8	A
	T _A = 70 °C		3.5	3.0	- 3.0	- 2.6	
Pulsed Drain Current		I _{DM}	20		- 20		
Continuous Source Current (Diode Conduction) ^a		I _S	1.0	0.7	- 1.0	- 0.7	
Maximum Power Dissipation ^a	T _A = 25 °C	P _D	1.14	0.83	1.14	0.83	W
	T _A = 70 °C		0.73	0.53	0.73	0.53	
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 ^a	R _{thJA}	88	110	°C/W
		120	150	
Maximum Junction-to-Foot (Drain)	R _{thJF}	65	80	

Notes:

a. Surface Mounted on FR4 board, t ≤ 10 s.

SPECIFICATIONS T _J = 25 °C, unless otherwise noted								
Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit	
Static								
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	N-Ch	1.0		3.0	V	
		V _{DS} = V _{GS} , I _D = - 250 μA	P-Ch	- 1.0		- 3.0		
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	n-ch N-Ch			± 100 ± 100	nA	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V	P-Ch			1	μA	
		V _{DS} = - 30 V, V _{GS} = 0 V	N-Ch			- 1		
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 55 °C	P-Ch			5		
		V _{DS} = - 30 V, V _{GS} = 0 V, T _J = 55 °C	N-Ch			- 5		
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	P-Ch	20			A	
		V _{DS} ≥ - 5 V, V _{GS} = - 10 V	N-Ch	- 20				
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 4.3 A	P-Ch		0.025	0.032	Ω	
		V _{GS} = - 10 V, I _D = - 3.8 A	N-Ch		0.034	0.043		
		V _{GS} = 4.5 V, I _D = 3.7 A	P-Ch		0.037	0.046		
		V _{GS} = - 4.5 V, I _D = - 2.8 A	N-Ch		0.058	0.073		
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 4.3 A	P-Ch		11		S	
		V _{DS} = - 15 V, I _D = - 3.8 A	N-Ch		11			
Diode Forward Voltage ^a	V _{SD}	I _S = 1.25 A, V _{GS} = 0 V	P-Ch		0.77	1.1	V	
		I _S = - 1.25 A, V _{GS} = 0 V	N-Ch		- 0.77	- 1.1		
Dynamic ^b								
Total Gate Charge	Q _g	N-Channel V _{DS} = 15 V, V _{GS} = 10 V, I _D = 4.3 A	N-Ch P-Ch		9.5 16	15 25	nC	
Gate-Source Charge	Q _{gs}		N-Ch P-Ch		1.8 2.3			
Gate-Drain Charge	Q _{gd}	P-Channel V _{DS} = - 15 V, V _{GS} = - 10 V, I _D = - 3.8 A	N-Ch P-Ch		1.55 4.5			
Gate Resistance	R _g		N-Ch P-Ch		0.45 8.8		Ω	
Turn-On Delay Time	t _{d(on)}	N-Channel V _{DD} = 15 V, R _L = 15 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _G = 6 Ω	N-Ch P-Ch		13 14	25 25	ns	
Rise Time	t _r		N-Ch P-Ch		14 14	25 25		
Turn-Off Delay Time	t _{d(off)}	P-Channel V _{DD} = - 15 V, R _L = 15 Ω I _D ≅ - 1 A, V _{GEN} = - 10 V, R _G = 6 Ω	N-Ch P-Ch		30 40	50 65		
Fall Time	t _f		N-Ch P-Ch		10 30	20 50		
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 1.25 A, dI/dt = 100 A/μs	N-Ch		30	60		
		I _F = - 1.25 A, dI/dt = 100 A/μs	P-Ch		30			

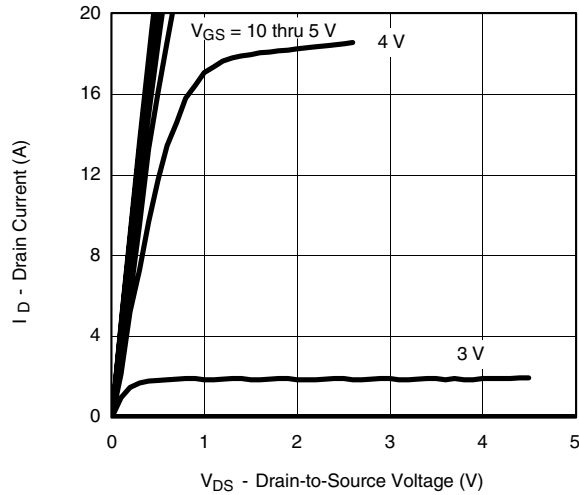
Notes:

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

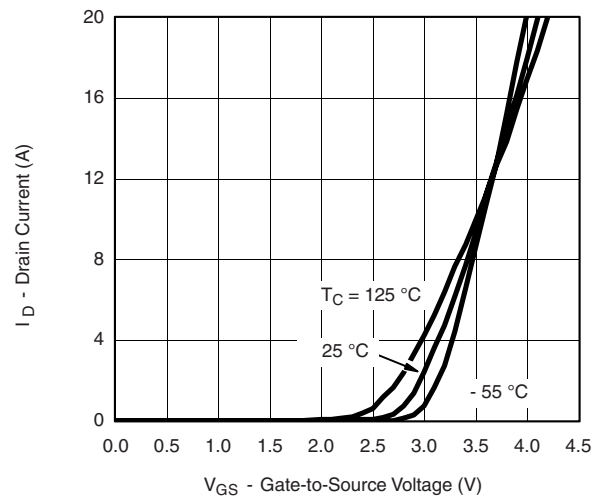
b. Guaranteed by design, not subject to production testing.

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.

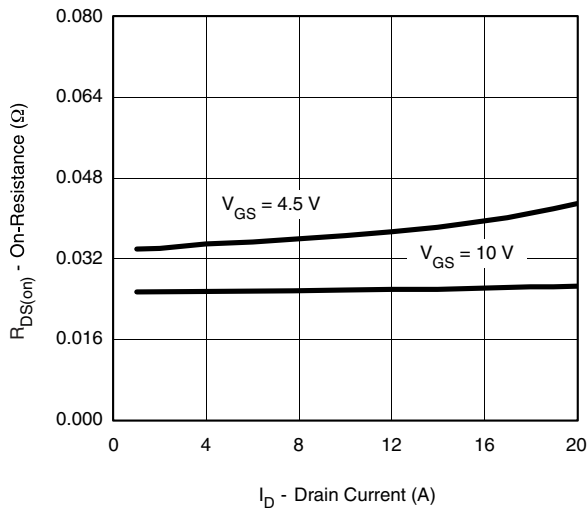
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



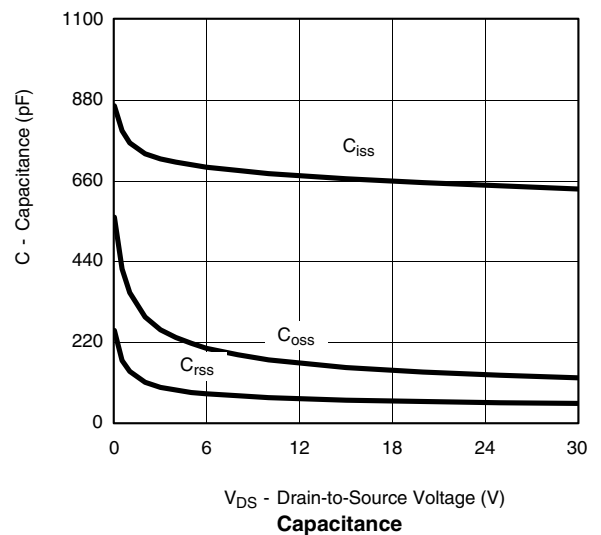
Output Characteristics



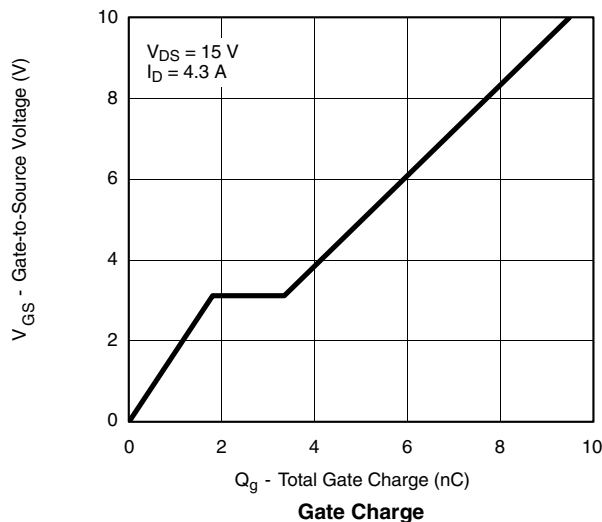
Transfer Characteristics



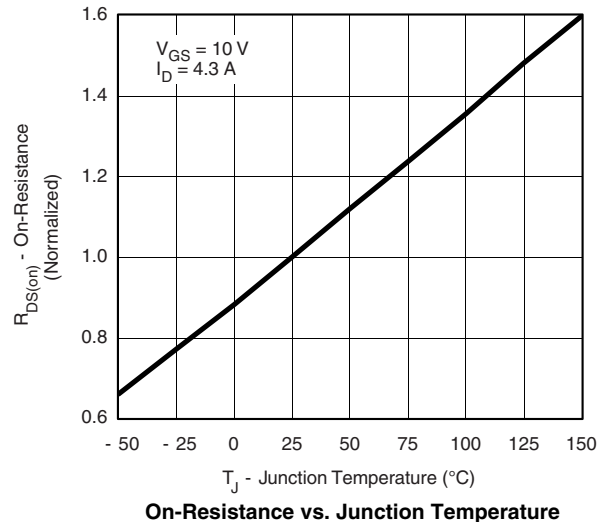
On-Resistance vs. Drain Current



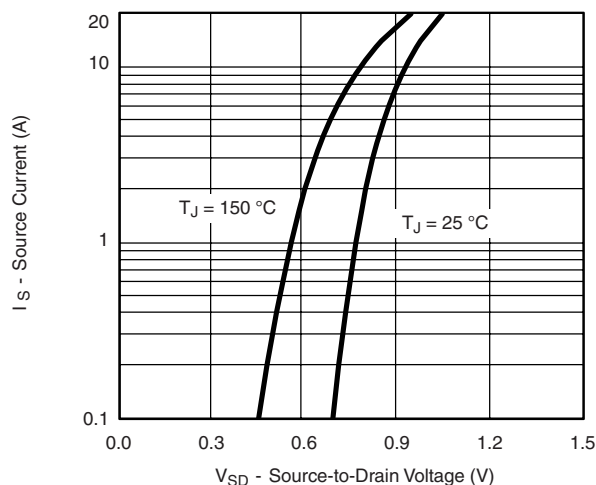
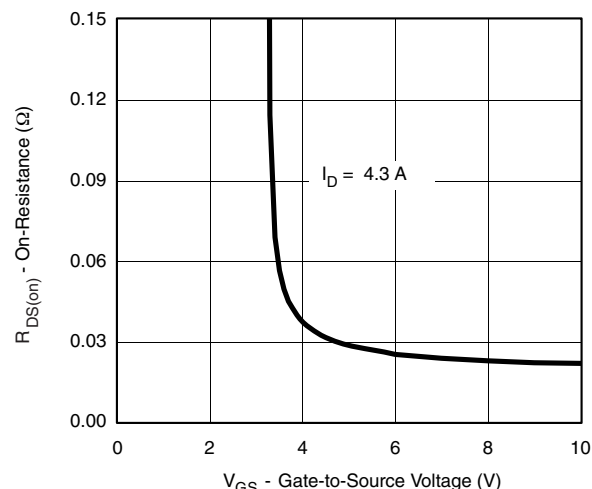
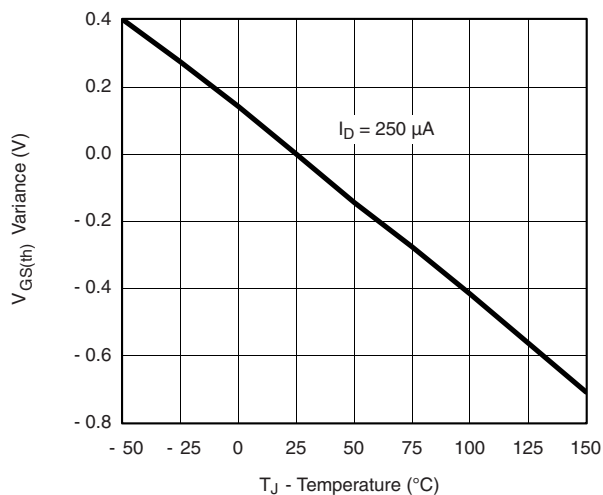
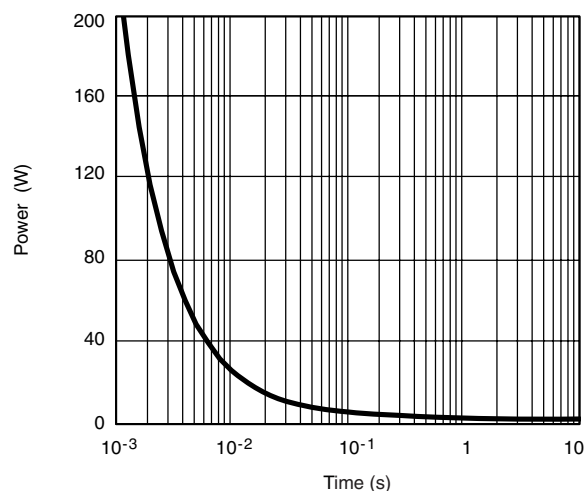
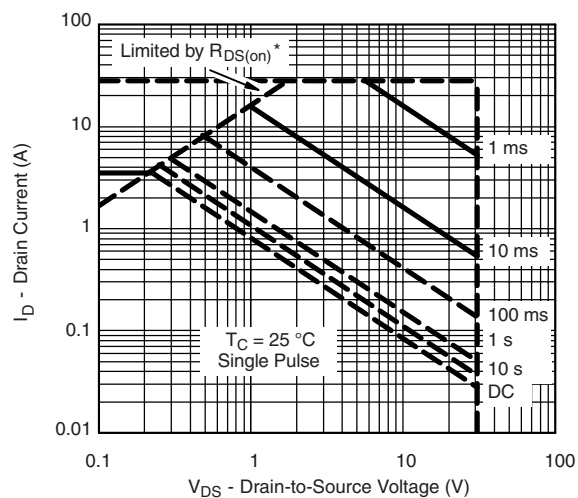
Capacitance



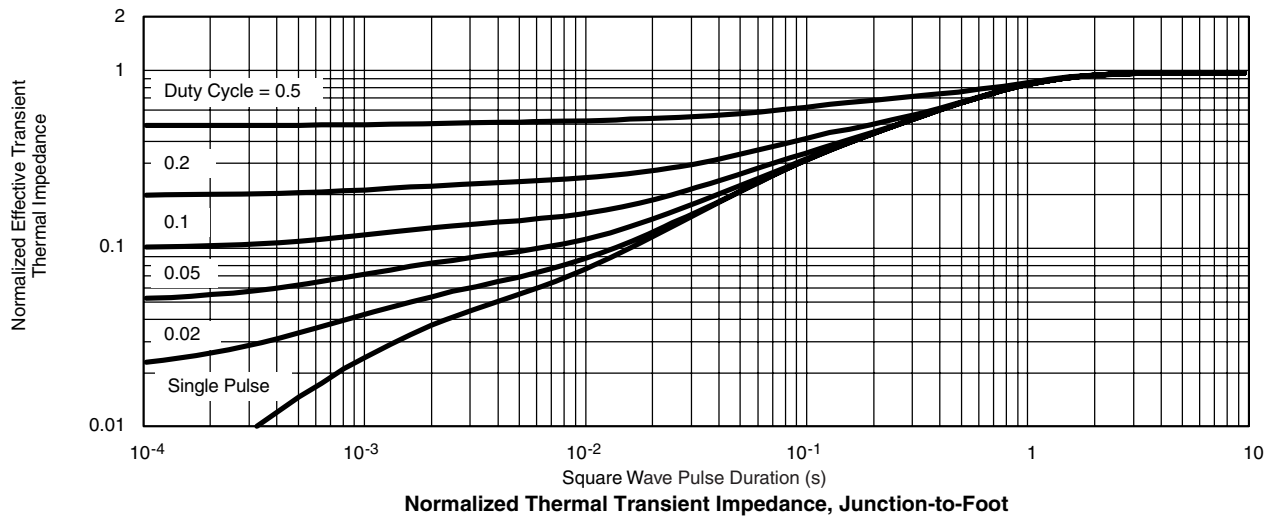
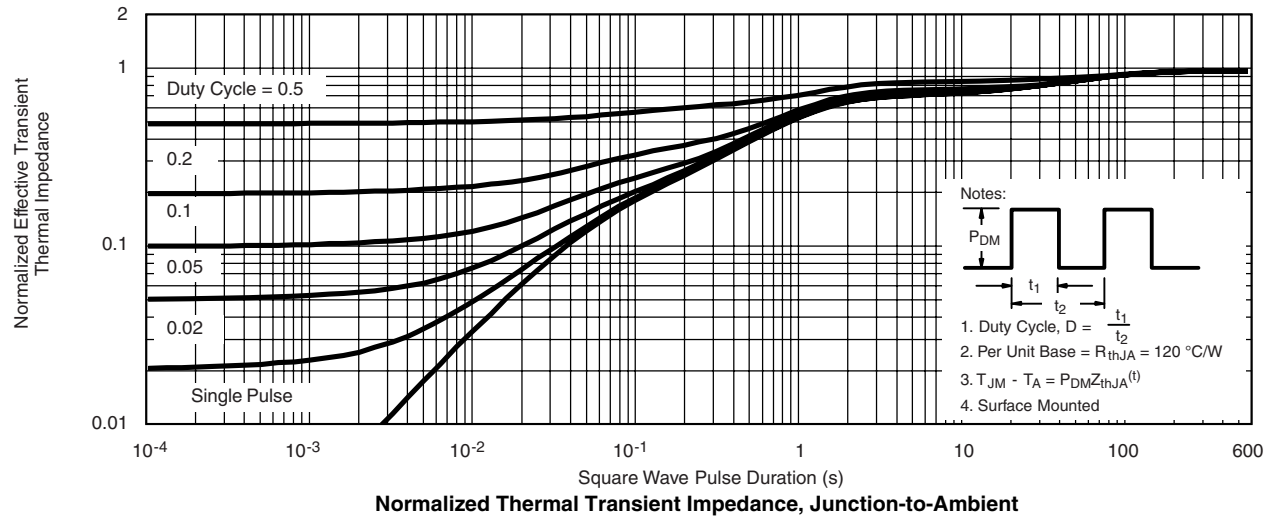
Gate Charge

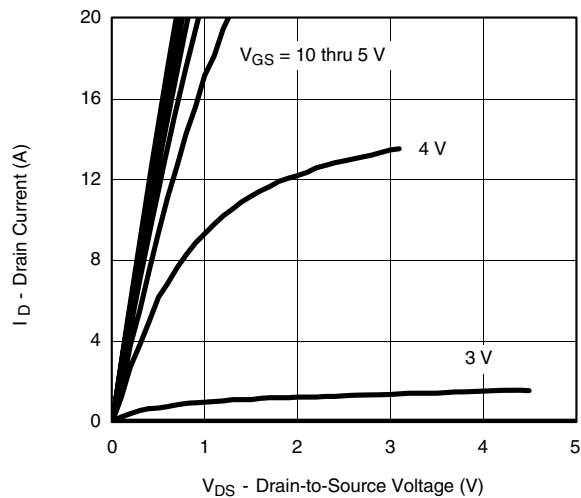
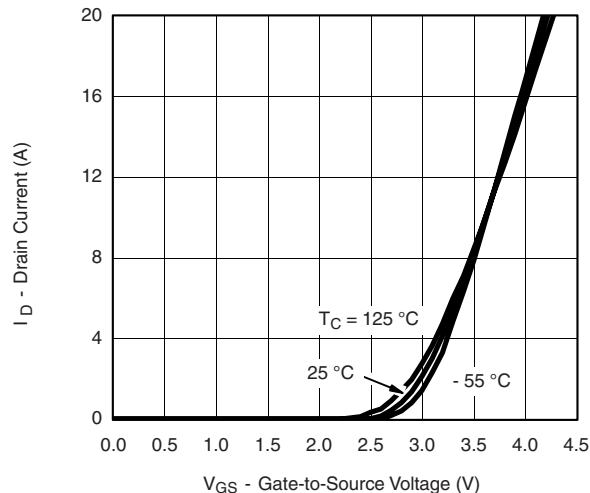
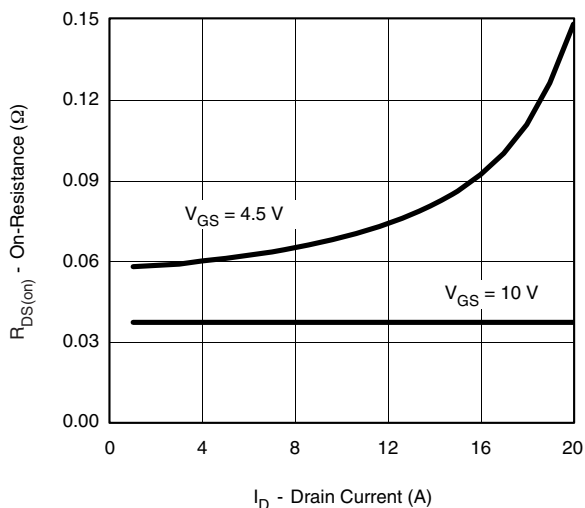
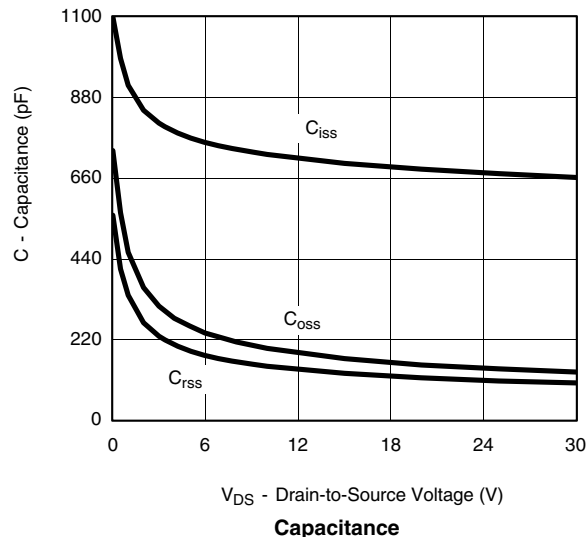
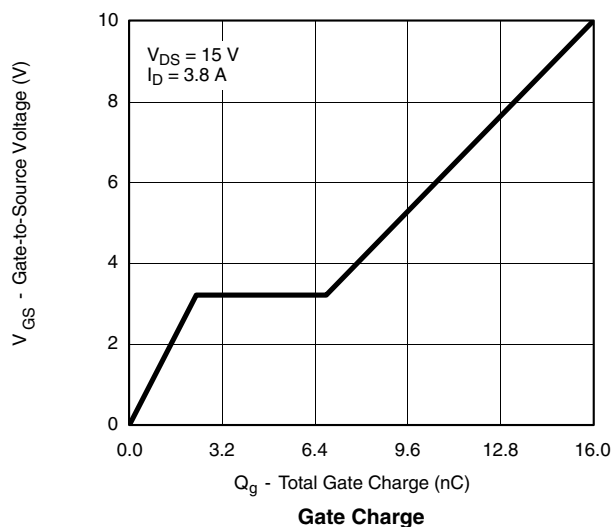
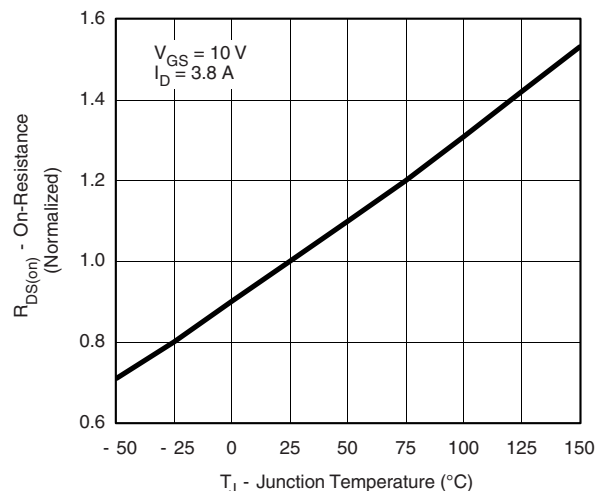


On-Resistance vs. Junction Temperature

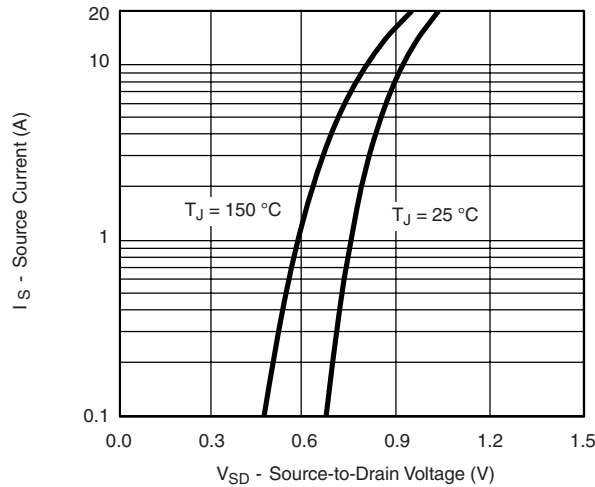
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted**Source-Drain Diode Forward Voltage****On-Resistance vs. Gate-to-Source Voltage****Threshold Voltage****Single Pulse Power, Junction-to-Ambient*** $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified**Safe Operating Area, Junction-to-Case**

N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

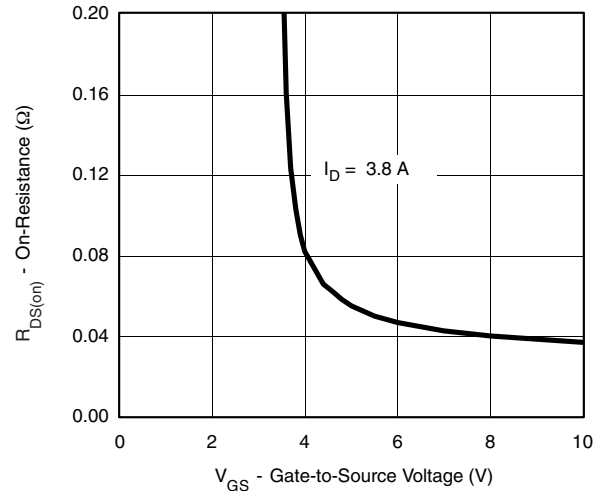


P-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted**Output Characteristics****Transfer Characteristics****On-Resistance vs. Drain Current****Capacitance****Gate Charge****On-Resistance vs. Junction Temperature**

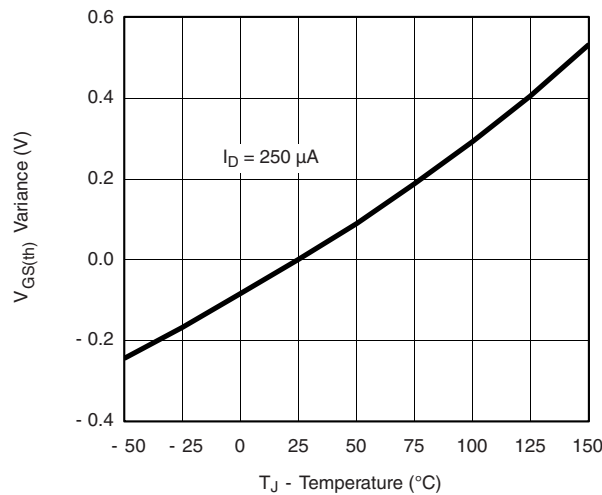
P-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



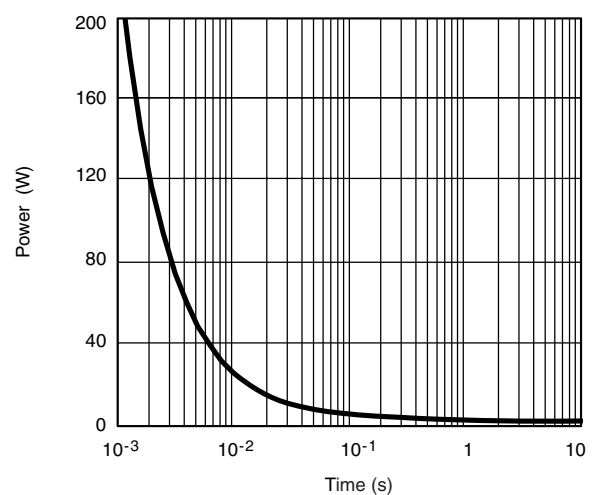
Source-Drain Diode Forward Voltage



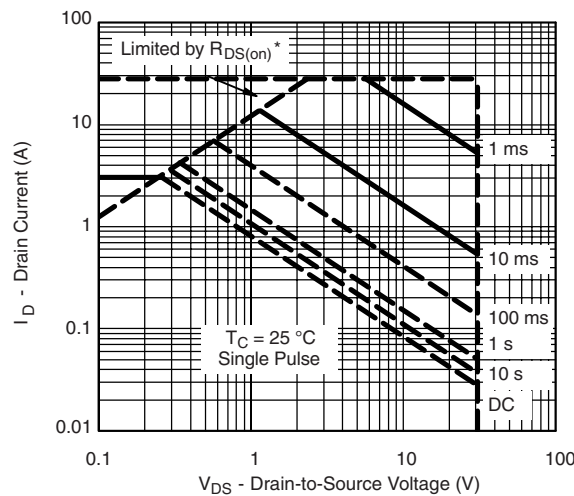
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

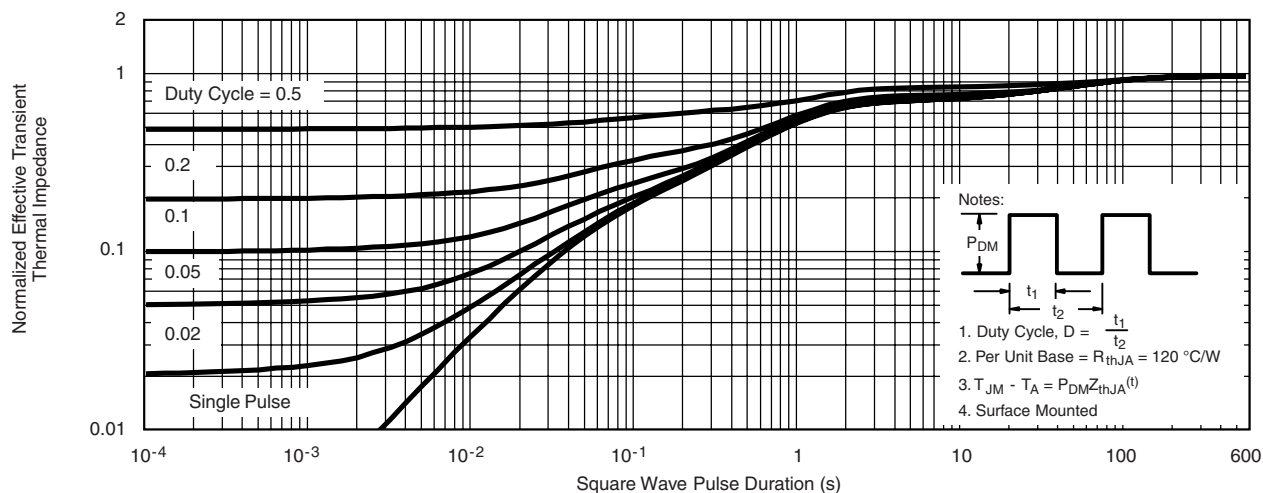
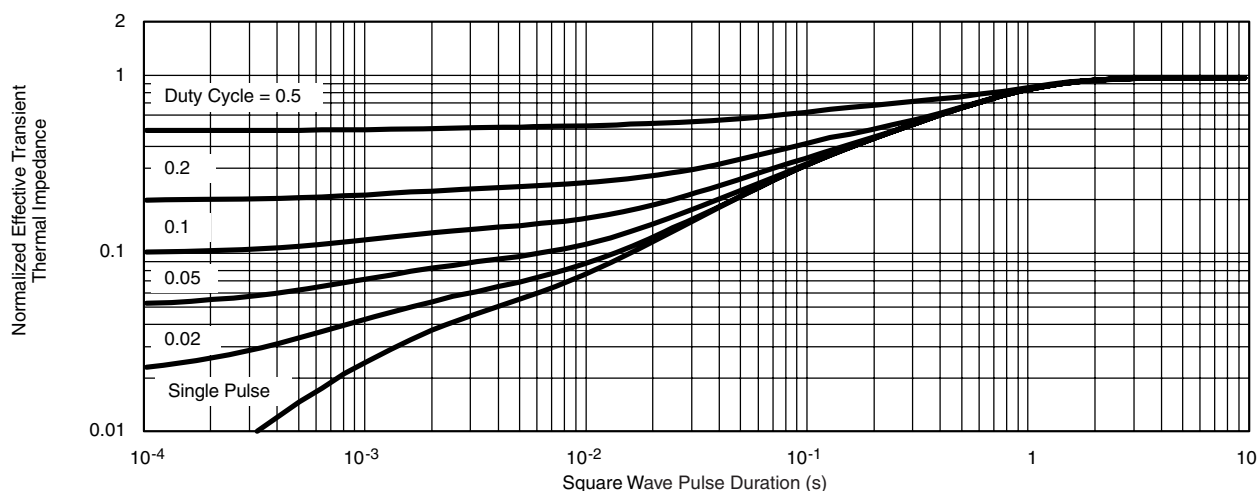


Single Pulse Power, Junction-to-Ambient



* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Case

P-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted**Normalized Thermal Transient Impedance, Junction-to-Ambient****Normalized Thermal Transient Impedance, Junction-to-Foot**

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