

Complementary 20 V (D-S) Low-Threshold MOSFET

PRODUCT SUMMARY

	V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
N-Channel	20	0.280 at $V_{GS} = 4.5$ V	1.28
		0.360 at $V_{GS} = 2.5$ V	1.13
		0.450 at $V_{GS} = 1.8$ V	1
P-Channel	- 20	0.490 at $V_{GS} = - 4.5$ V	- 1
		0.750 at $V_{GS} = - 2.5$ V	- 0.81
		1.10 at $V_{GS} = - 1.8$ V	- 0.67

FEATURES

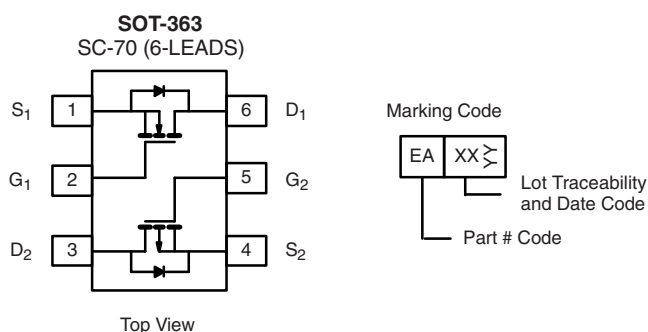
- TrenchFET® Power MOSFETS: 1.8 V Rated
- ESD Protected: 2000 V
- Thermally Enhanced SC-70 Package
- Material categorization:
For definitions of compliance please see www.vishay.com/doc?99912



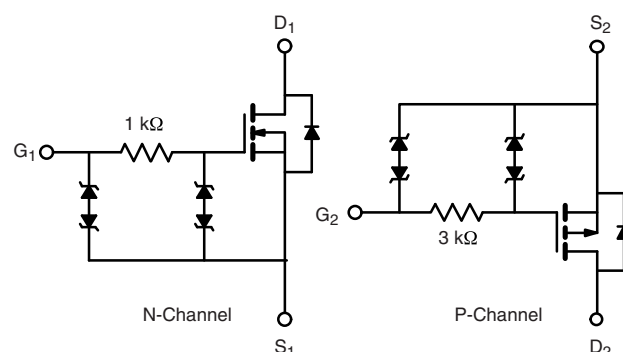
RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- Load Switching
- PA Switch
- Level Switch



Ordering Information: Si1563EDH-T1-E3 (Lead (Pb)-free)
Si1563EDH-T1-GE3 (Lead (Pb)-free and Halogen-free)



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	N-Channel		P-Channel		Unit
		5 s	Steady State	5 s	Steady State	
Drain-Source Voltage	V_{DS}	20		- 20		V
Gate-Source Voltage	V_{GS}	± 12		± 12		
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	I_D	1.28	1.13	- 1	- 0.88	A
		0.92	0.81	- 0.72	- 0.63	
Pulsed Drain Current	I_{DM}	4		- 3		
Continuous Source Current (Diode Conduction) ^a	I_S	0.61	0.48	- 0.61	- 0.48	
Maximum Power Dissipation ^a	P_D	0.74	0.57	0.30	0.57	W
		0.38	0.30	0.16	0.3	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150				$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	$t \leq 5$ s	R_{thJA}	130	170	$^\circ\text{C/W}$
	Steady State		170	220	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	80	100	

Notes:

a. Surface mounted on 1" x 1" FR4 board.

SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static							
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 100 μA	N-Ch	0.45		1	V
		V _{DS} = V _{GS} , I _D = - 100 μA	P-Ch	- 0.45		- 1	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 4.5 V	N-Ch			± 1	μA
			P-Ch			± 1	
		V _{DS} = 0 V, V _{GS} = ± 12 V	N-Ch			± 10	mA
			P-Ch			± 10	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 16 V, V _{GS} = 0 V	N-Ch			1	μA
		V _{DS} = - 16 V, V _{GS} = 0 V	P-Ch			- 1	
		V _{DS} = 16 V, V _{GS} = 0 V, T _J = 85 °C	N-Ch			5	
		V _{DS} = - 16 V, V _{GS} = 0 V, T _J = 85 °C	P-Ch			- 5	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 4.5 V	N-Ch	2			A
		V _{DS} ≤ - 5 V, V _{GS} = - 4.5 V	P-Ch	- 2			
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 1.13 A	N-Ch		0.220	0.280	Ω
		V _{GS} = - 4.5 V, I _D = - 0.88 A	P-Ch		0.400	0.490	
		V _{GS} = 2.5 V, I _D = 0.99 A	N-Ch		0.281	0.360	
		V _{GS} = - 2.5 V, I _D = - 0.71 A	P-Ch		0.610	0.750	
		V _{GS} = 1.8 V, I _D = 0.20 A	N-Ch		0.344	0.450	
		V _{GS} = - 1.8 V, I _D = - 0.20 A	P-Ch		0.850	1.10	
Forward Transconductance ^a	g _{fs}	V _{DS} = 10 V, I _D = 1.13 A	N-Ch		2.6		S
		V _{DS} = - 10 V, I _D = - 0.88 A	P-Ch		1.5		
Diode Forward Voltage ^a	V _{SD}	I _S = 0.48 V, V _{GS} = 0 V	N-Ch		0.8	1.2	V
		I _S = - 0.48 V, V _{GS} = 0 V	P-Ch		- 0.8	- 1.2	
Dynamic ^b							
Total Gate Charge	Q _g	N-Channel V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 1.13 A P-Channel V _{DS} = - 10 V, V _{GS} = - 4.5 V, I _D = - 0.88 A	N-Ch		0.65	1	nC
Gate-Source Charge	Q _{gs}		P-Ch		1.2	1.8	
			N-Ch		0.2		
Gate-Drain Charge	Q _{gd}		P-Ch		0.3		
		N-Ch		0.23			
Turn-On Delay Time	t _{d(on)}	N-Channel V _{DD} = 10 V, R _L = 20 Ω I _D ≡ 0.5 A, V _{GEN} = 4.5 V, R _g = 6 Ω P-Channel V _{DD} = - 10 V, R _L = 20 Ω I _D ≡ - 0.5 A, V _{GEN} = - 4.5 V, R _g = 6 Ω	P-Ch		0.3		
			N-Ch		45	70	
P-Ch			150	230			
Rise Time	t _r		N-Ch		85	130	
			P-Ch		480	720	
Turn-Off Delay Time	t _{d(off)}		N-Ch		350	530	
			P-Ch		840	1200	
Fall Time	t _f		N-Ch		210	320	
		P-Ch		850	1200		

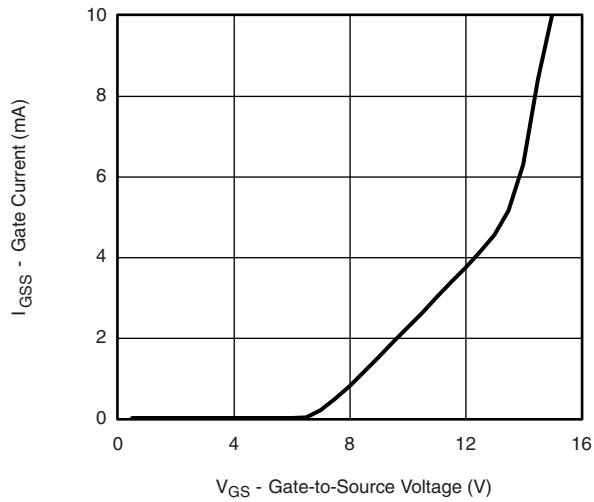
Notes:

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

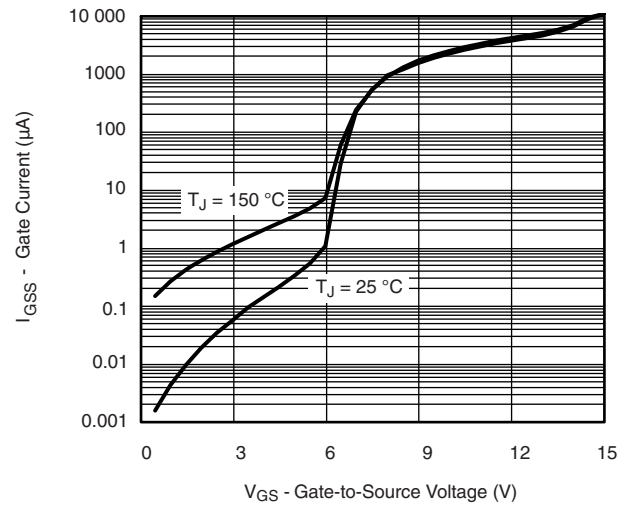
b. Guaranteed by design, not subject to production testing.

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.

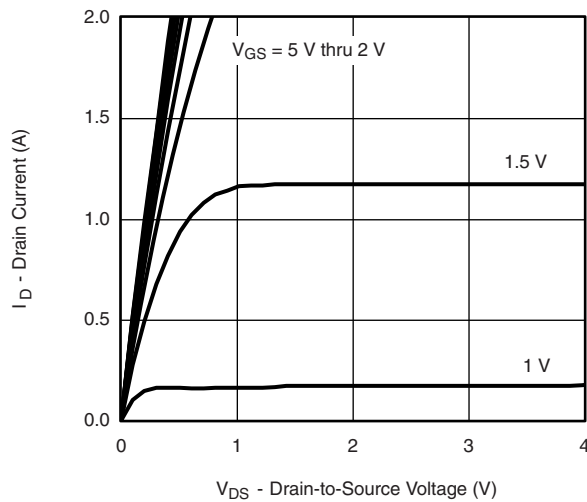
N-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



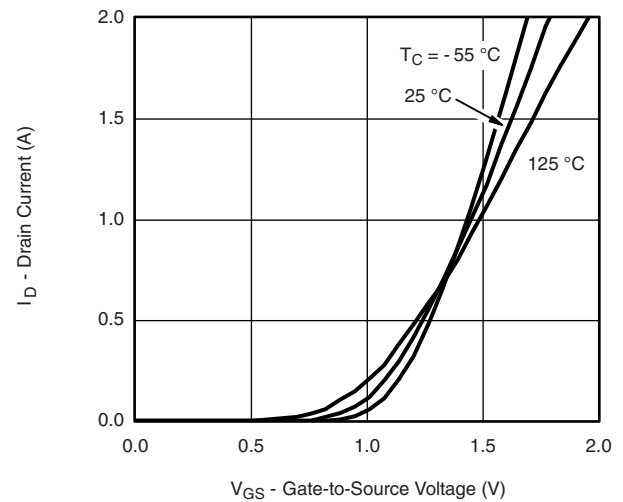
Gate-Current vs. Gate-Source Voltage



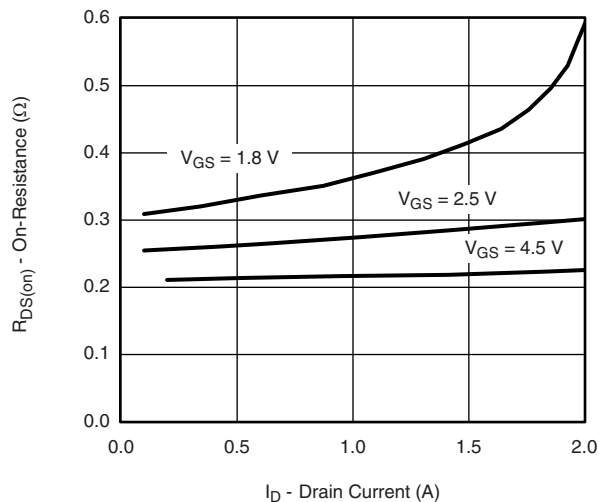
Gate-Current vs. Gate-Source Voltage



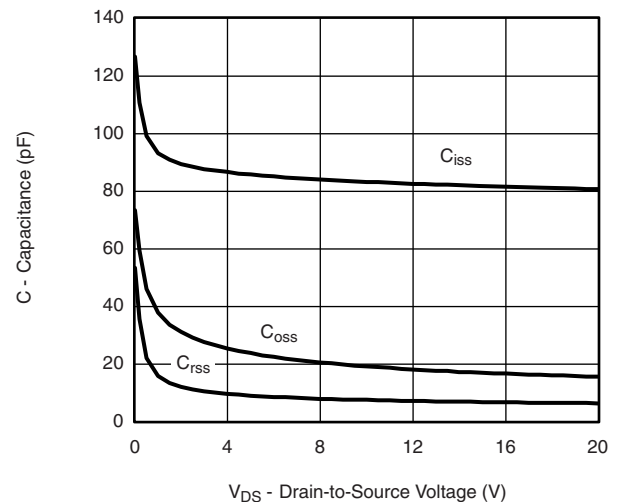
Output Characteristics



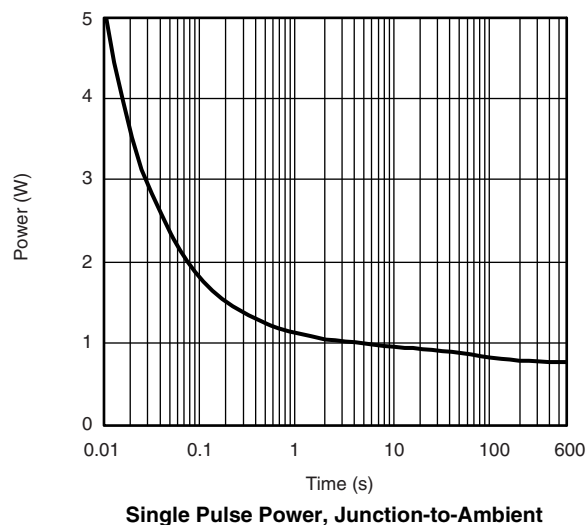
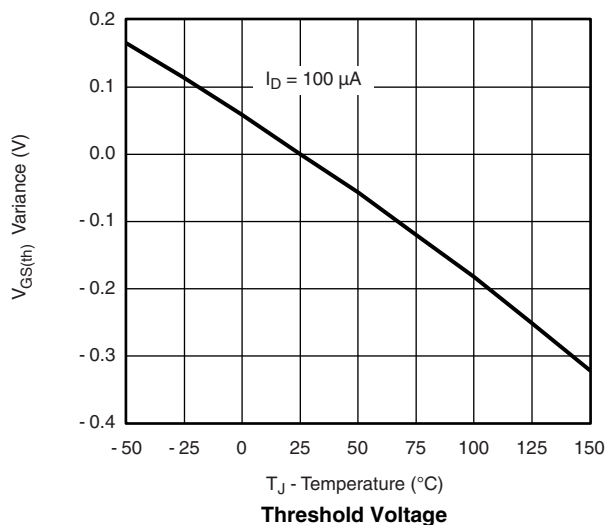
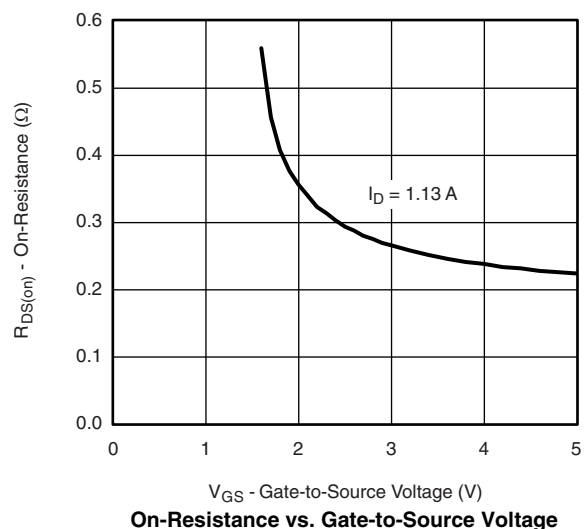
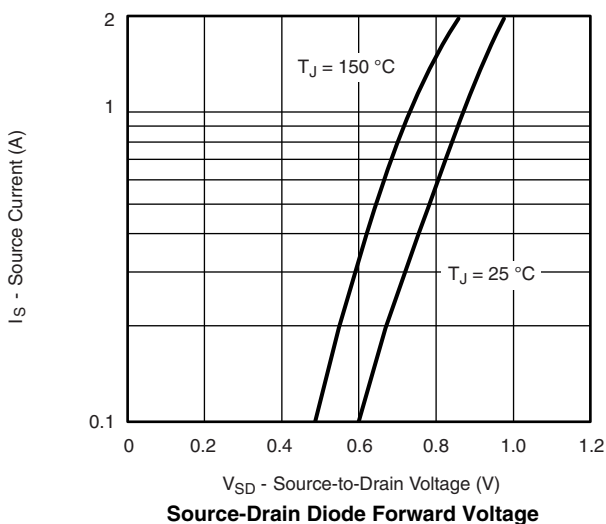
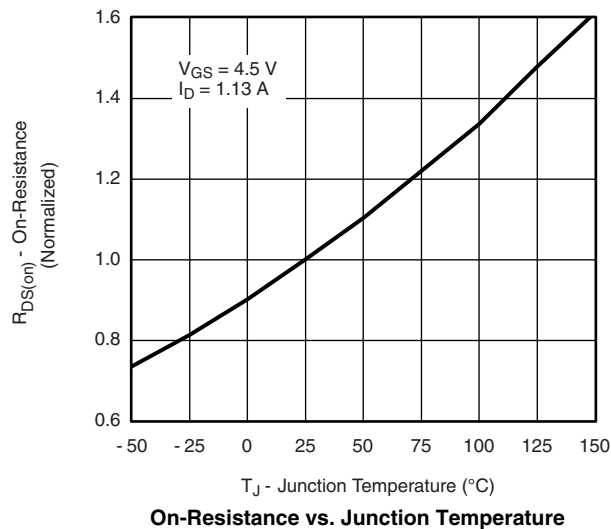
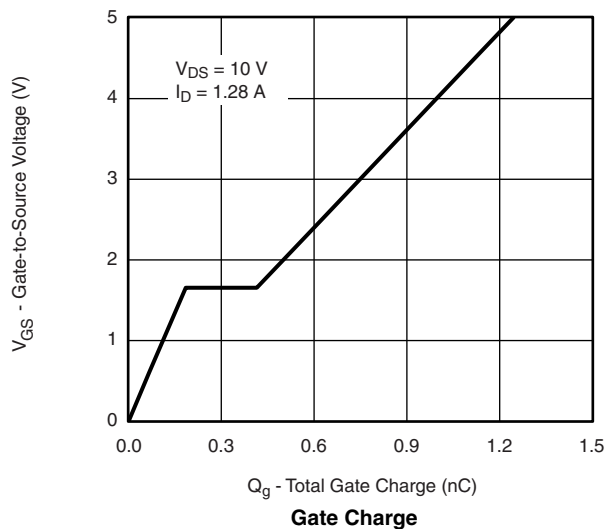
Transfer Characteristics



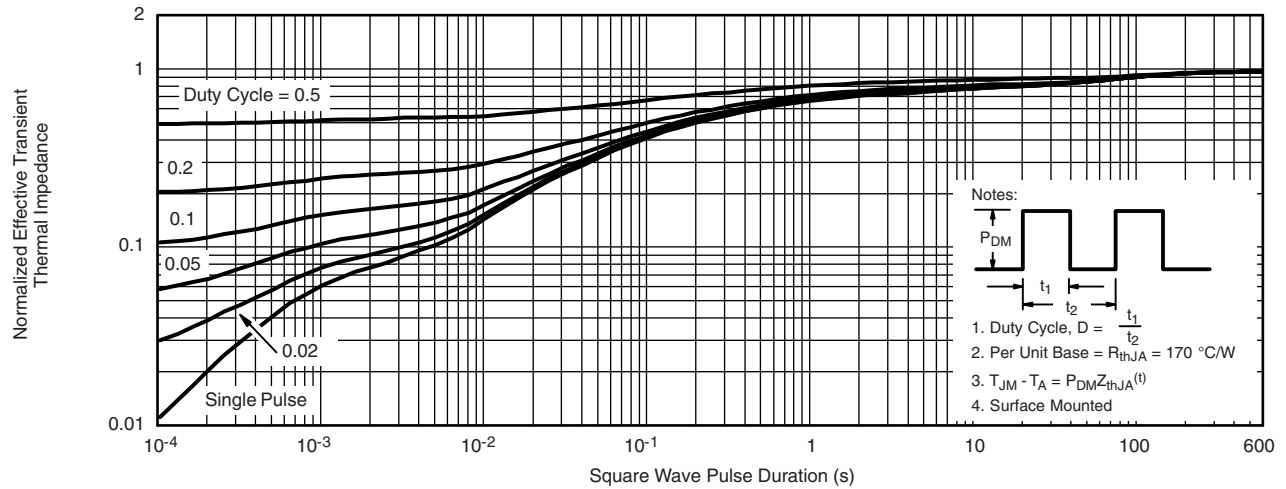
On-Resistance vs. Drain Current



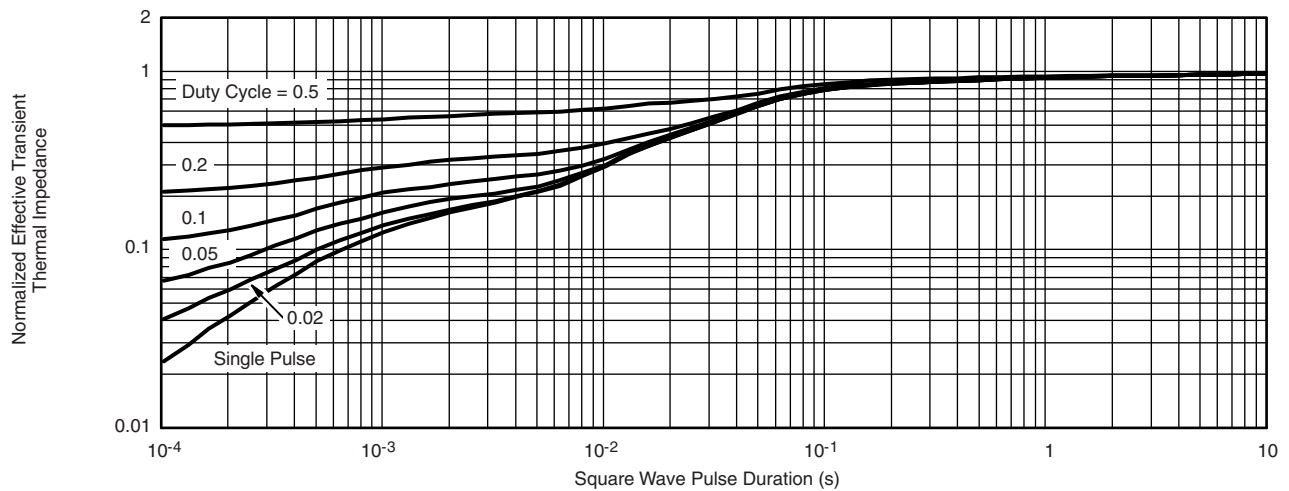
Capacitance

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

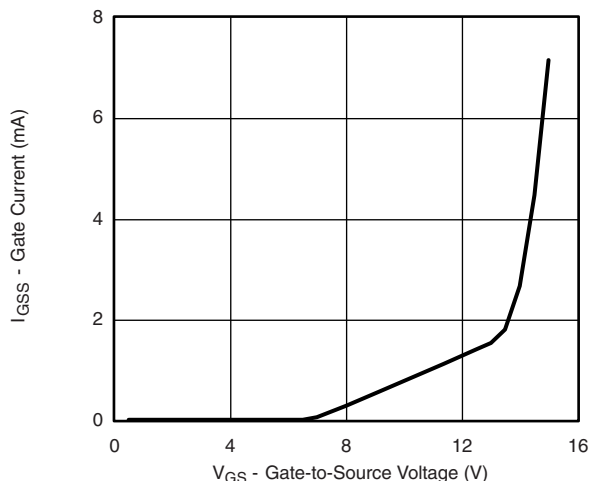
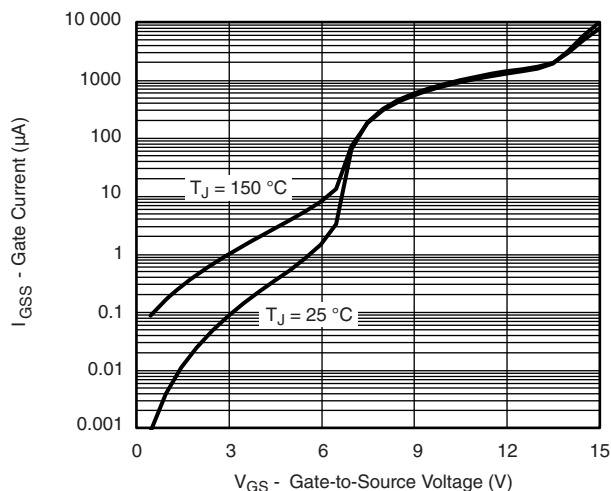
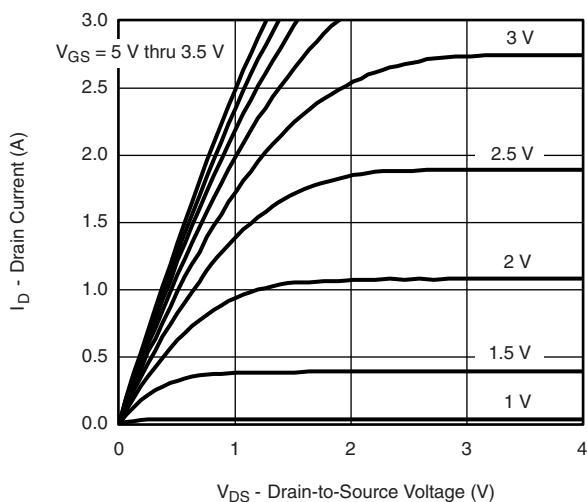
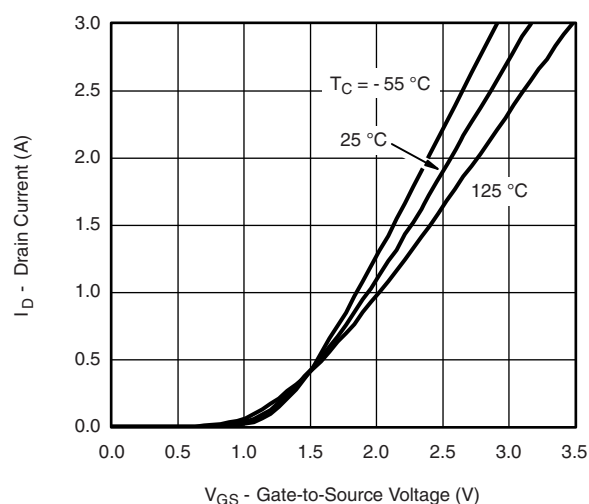
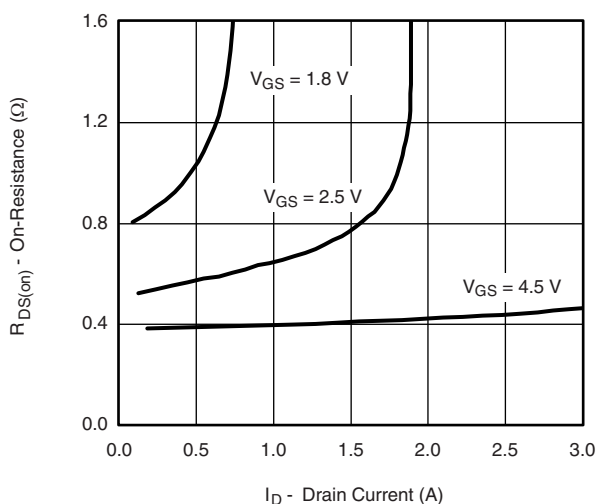
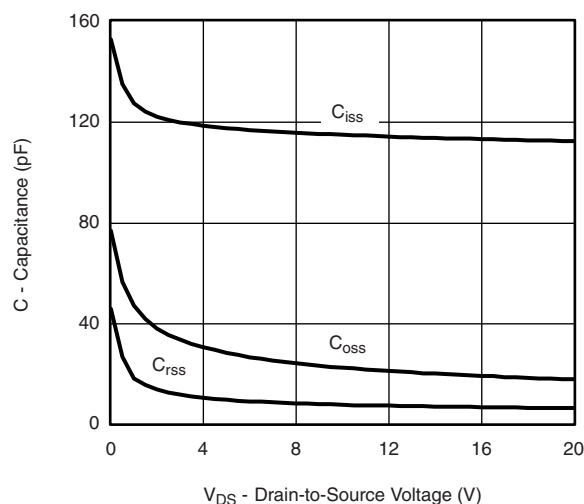
N-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



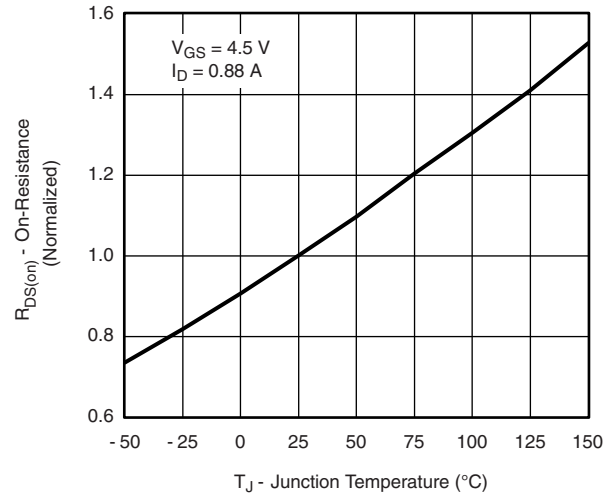
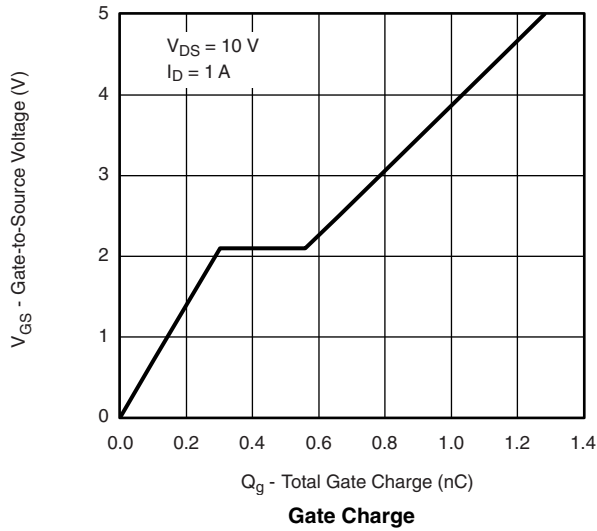
Normalized Thermal Transient Impedance, Junction-to-Ambient



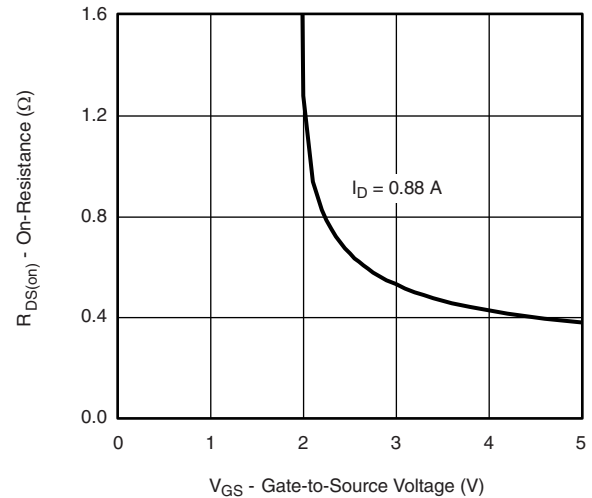
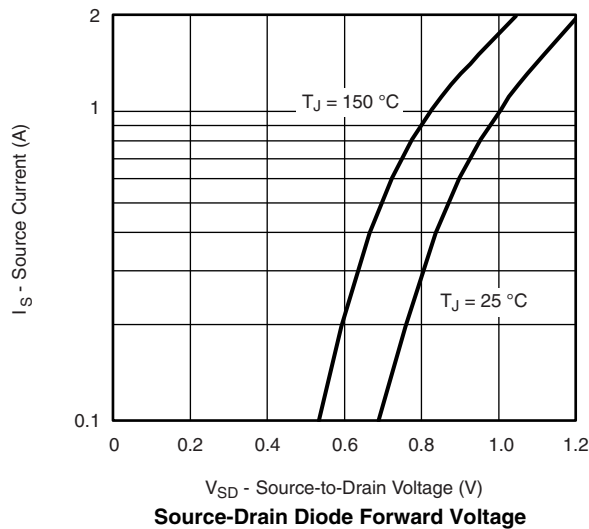
Normalized Thermal Transient Impedance, Junction-to-Foot

P-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)**Gate-Current vs. Gate-Source Voltage****Gate-Current vs. Gate-Source Voltage****Output Characteristics****Transfer Characteristics****On-Resistance vs. Drain Current****Capacitance**

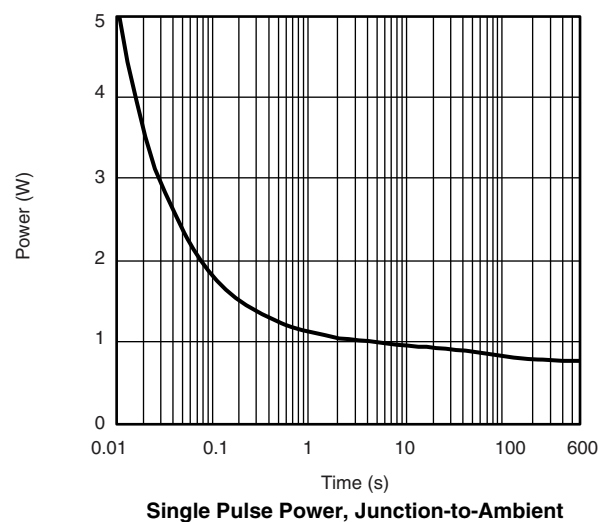
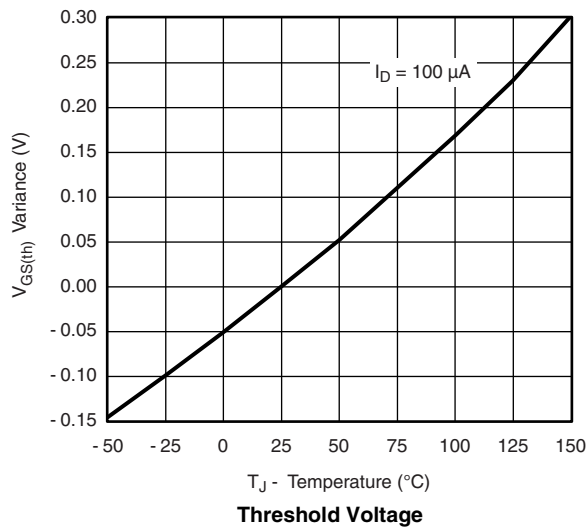
P-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

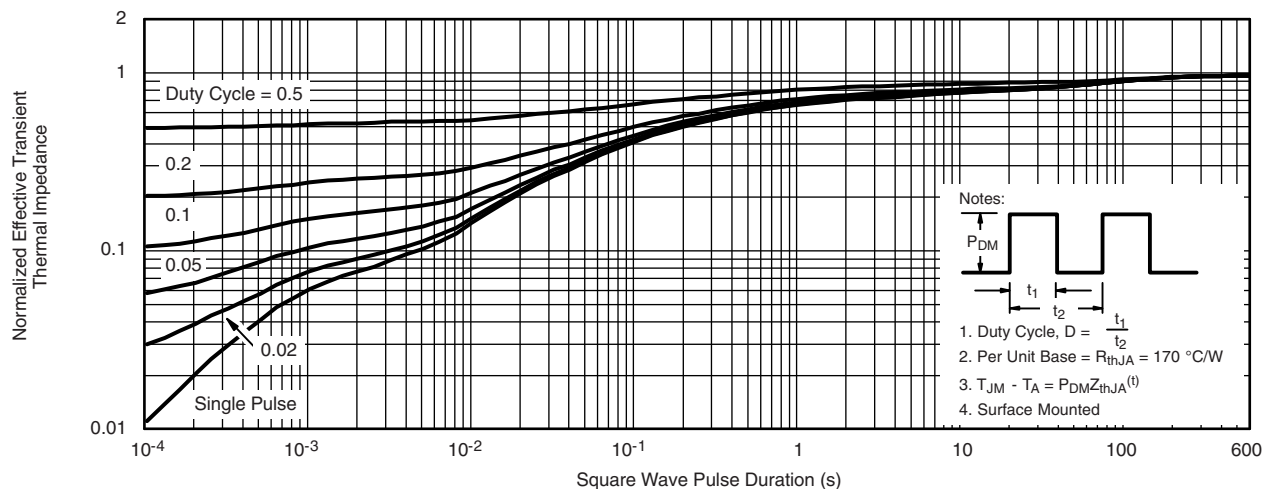
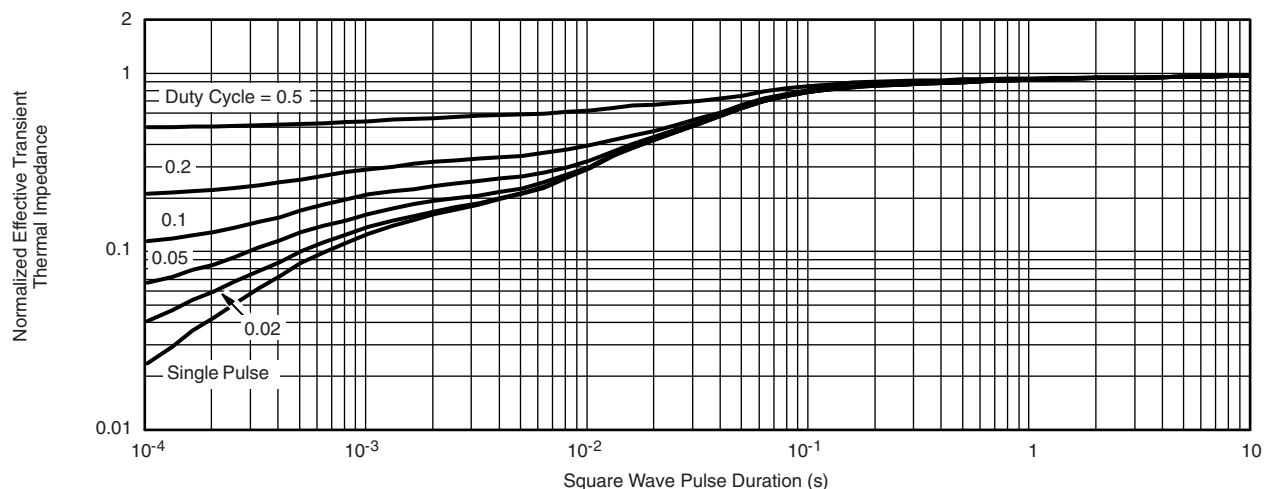


On-Resistance vs. Junction Temperature



On-Resistance vs. Gate-to-Source Voltage



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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