

N- and P-Channel 60-V (D-S), 175 °C MOSFET

PRODUCT SUMMARY

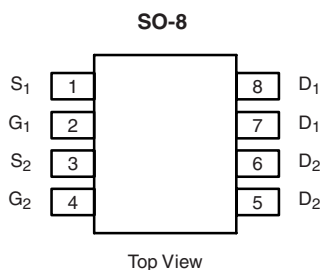
	V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
N-Channel	60	0.055 at V _{GS} = 10 V	± 4.5
		0.075 at V _{GS} = 4.5 V	± 3.9
P-Channel	- 60	0.120 at V _{GS} = - 10 V	± 3.1
		0.150 at V _{GS} = - 4.5 V	± 2.8

FEATURES

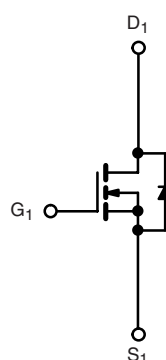
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFETs
- 175 °C Maximum Junction Temperature
- Compliant to RoHS Directive 2002/95/EC



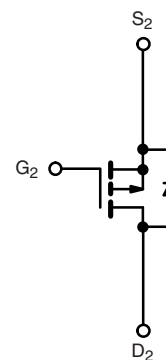
RoHS
COMPLIANT
HALOGEN
FREE
Available



Ordering Information: Si4559EY-T1-E3 (Lead (Pb)-free)
Si4559EY-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
Drain-Source Voltage		V _{DS}	60	- 60	V
Gate-Source Voltage		V _{GS}	± 20	± 20	
Continuous Drain Current (T _J = 175 °C) ^a	T _A = 25 °C	I _D	± 4.5	± 3.1	A
	T _A = 70 °C		± 3.8	± 2.6	
Pulsed Drain Current		I _{DM}	± 30	± 30	
Continuous Source Current (Diode Conduction) ^a		I _S	2.0	- 2.0	
Maximum Power Dissipation ^a	T _A = 25 °C	P _D	2.4		W
	T _A = 70 °C		1.7		
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 175		°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	N- or P-Channel	Unit
Maximum Junction-to-Ambient ^a	R _{thJA}	62.5	°C/W

Notes:

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

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

Parameter	Symbol	Test Conditions		Min.	Typ. ^a	Max.	Unit
Static							
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	N-Ch	1			V
		V _{DS} = V _{GS} , I _D = - 250 μA	P-Ch	- 1			
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	N-Ch			± 100	nA
			P-Ch			± 100	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 60 V, V _{GS} = 0 V	N-Ch			2	μA
		V _{DS} = - 60 V, V _{GS} = 0 V	P-Ch			- 2	
		V _{DS} = 60 V, V _{GS} = 0 V, T _J = 55 °C	N-Ch			25	
		V _{DS} = - 60 V, V _{GS} = 0 V, T _J = 55 °C	P-Ch			- 25	
On-State Drain Current ^b	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	N-Ch	20			A
		V _{DS} ≤ - 5 V, V _{GS} = - 10 V	P-Ch	- 20			
Drain-Source On-State Resistance ^b	R _{DS(on)}	V _{GS} = 10 V, I _D = 4.5 A	N-Ch		0.045	0.055	Ω
		V _{GS} = - 10 V, I _D = - 3.1 A	P-Ch		0.100	0.120	
		V _{GS} = 4.5 V, I _D = 3.9 A	N-Ch		0.055	0.075	
		V _{GS} = - 4.5 V, I _D = - 2.8 A	P-Ch		0.125	0.150	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 4.5 A	N-Ch		13		S
		V _{DS} = - 15 V, I _D = - 3.1 A	P-Ch		7.5		
Diode Forward Voltage ^b	V _{SD}	I _S = 2.0 A, V _{GS} = 0 V	N-Ch		0.9	1.2	V
		I _S = - 2.0 A, V _{GS} = 0 V	P-Ch		- 0.8	- 1.2	
Dynamic ^a							
Total Gate Charge	Q _g	N-Channel V _{DS} = 30 V, V _{GS} = 10 V, I _D = 4.5 A	N-Ch		19	30	nC
Gate-Source Charge	Q _{gs}		P-Ch		16	25	
Gate-Drain Charge	Q _{gd}	P-Channel V _{DS} = - 30 V, V _{GS} = - 10 V I _D = - 3.1 A	N-Ch		4		
			P-Ch		4		
Turn-On Delay Time	t _{d(on)}	N-Channel V _{DD} = 30 V, R _L = 30 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _g = 6 Ω	N-Ch		13	20	ns
			P-Ch		8	15	
Rise Time	t _r		N-Ch		11	20	
			P-Ch		10	20	
Turn-Off Delay Time	t _{d(off)}	N-Ch		36	60		
		P-Ch		12	25		
Fall Time	t _f	I _D ≅ - 1 A, V _{GEN} = - 10 V, R _g = 6 Ω	N-Ch		11	20	
			P-Ch		35	50	
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 2 A, dI/dt = 100 A/μs	N-Ch		35	60	
		I _F = - 2 A, dI/dt = 100 A/μs	P-Ch		60	90	

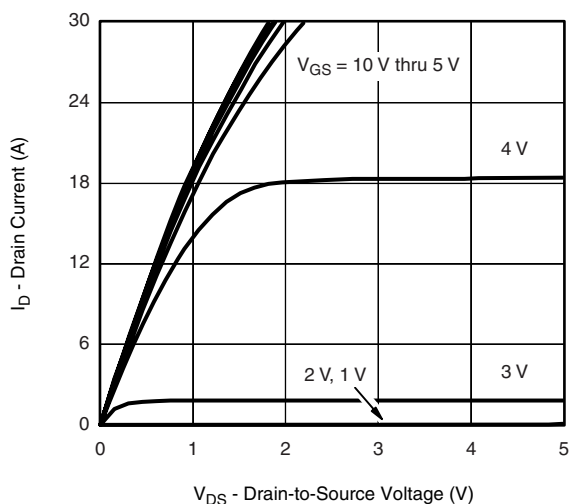
Notes:

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

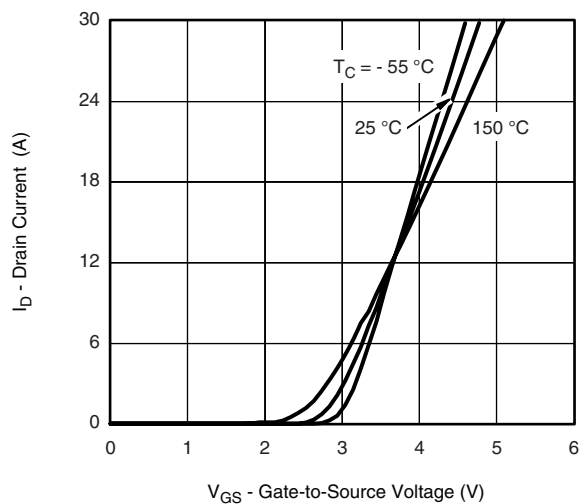
b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

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.

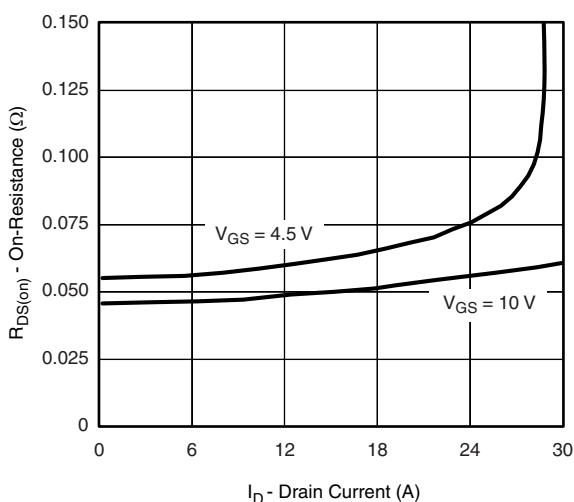
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



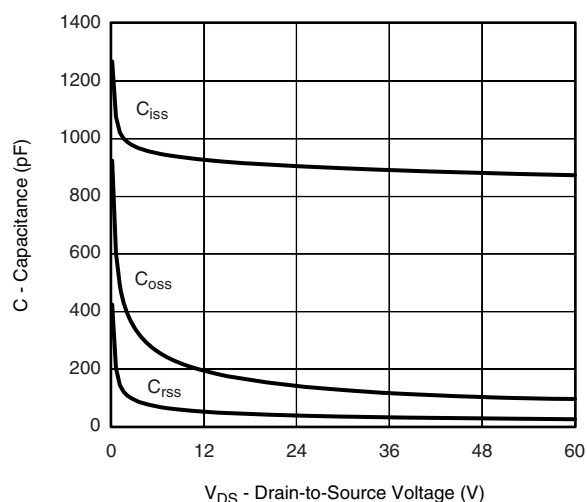
Output Characteristics



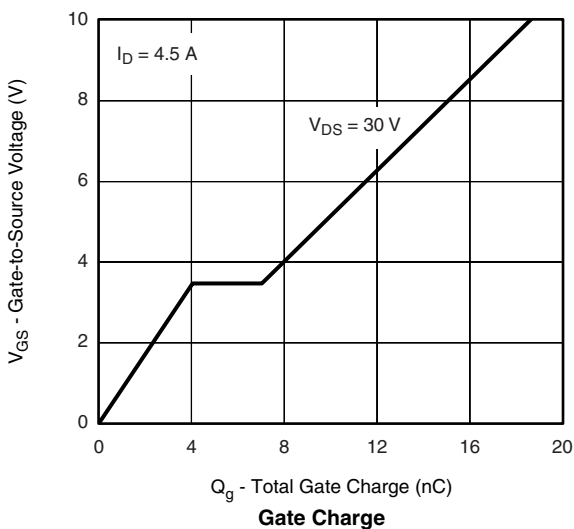
Transfer Characteristics



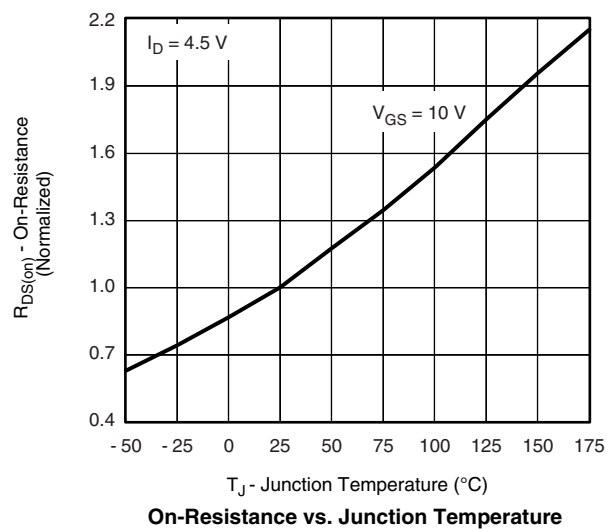
On-Resistance vs. Drain Current



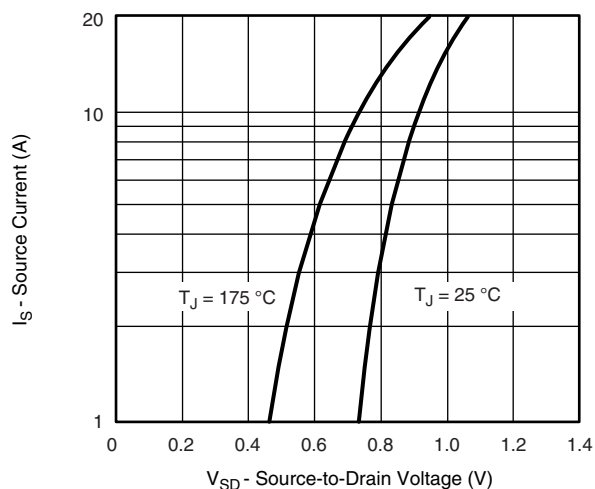
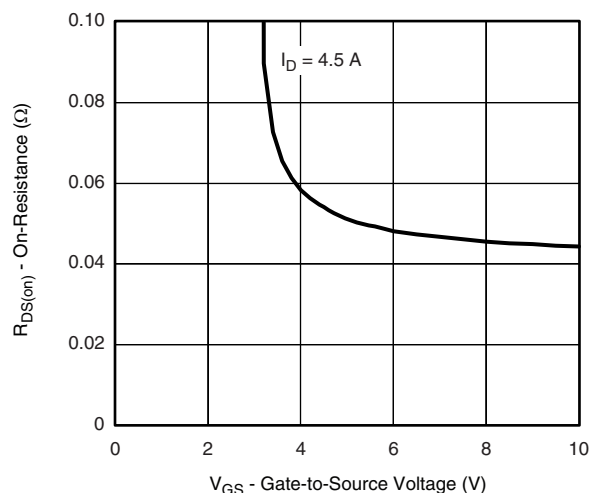
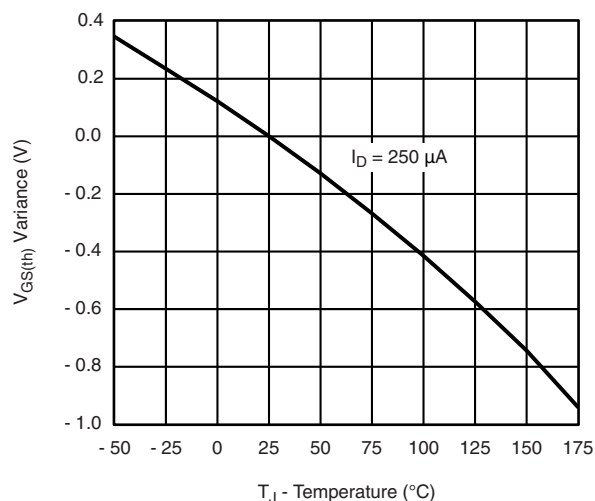
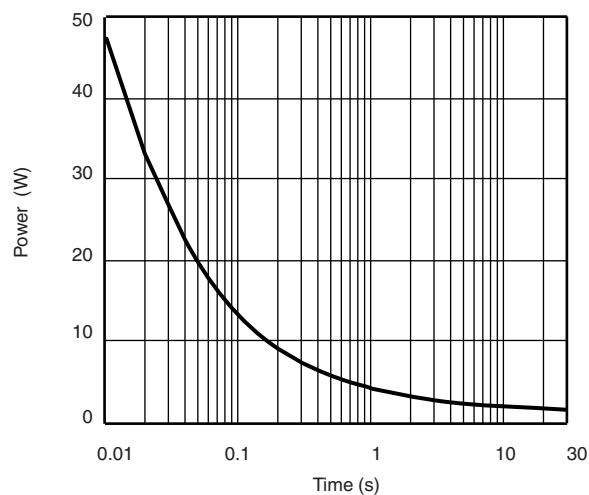
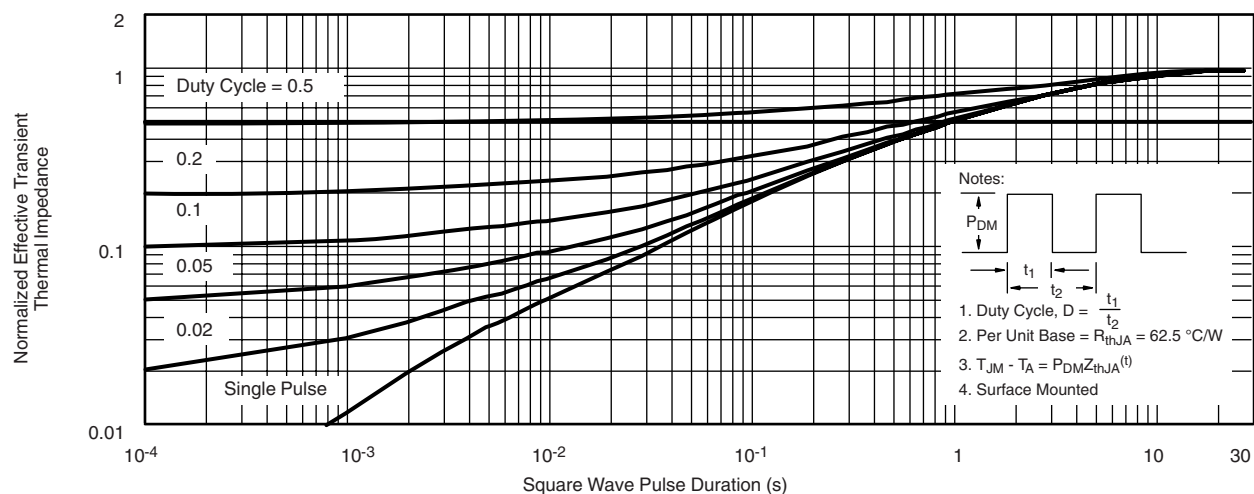
Capacitance



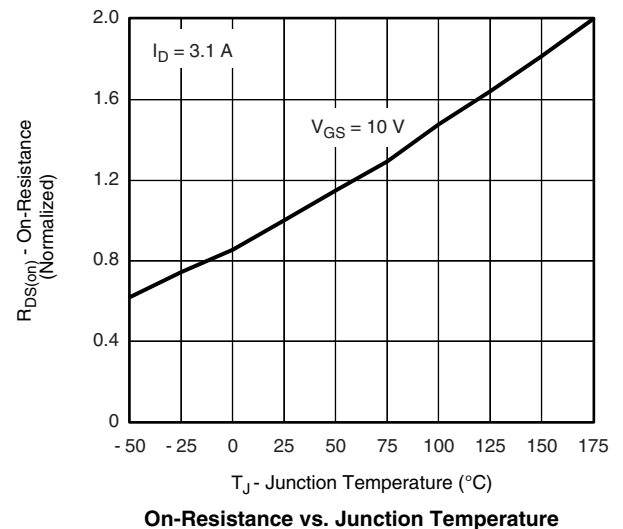
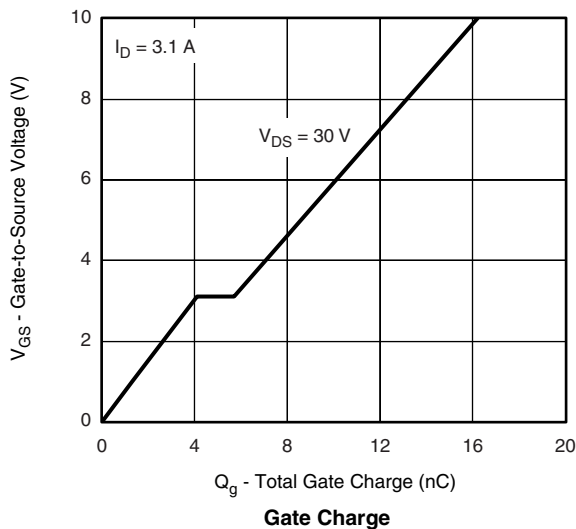
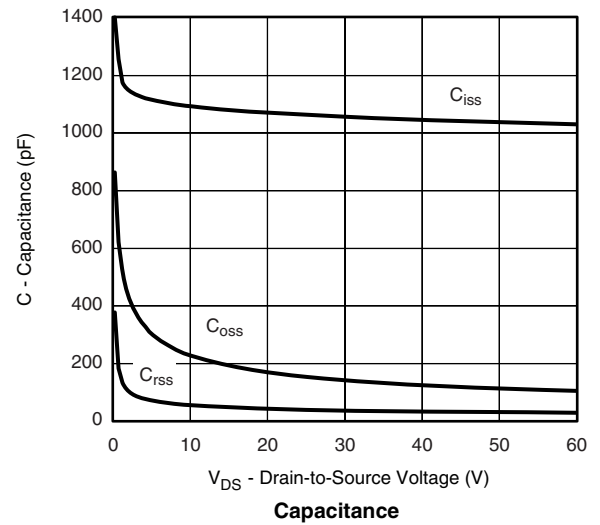
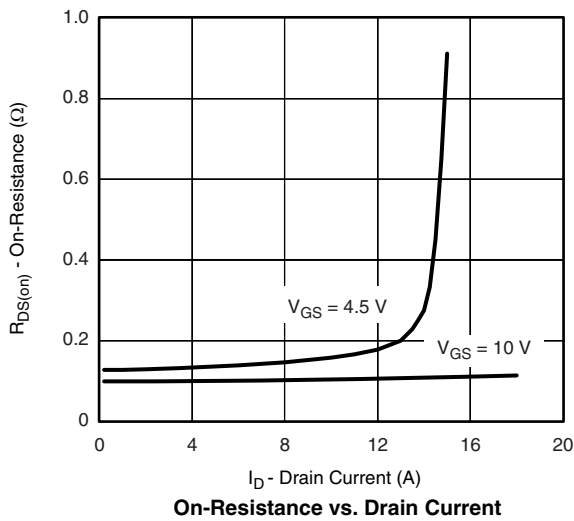
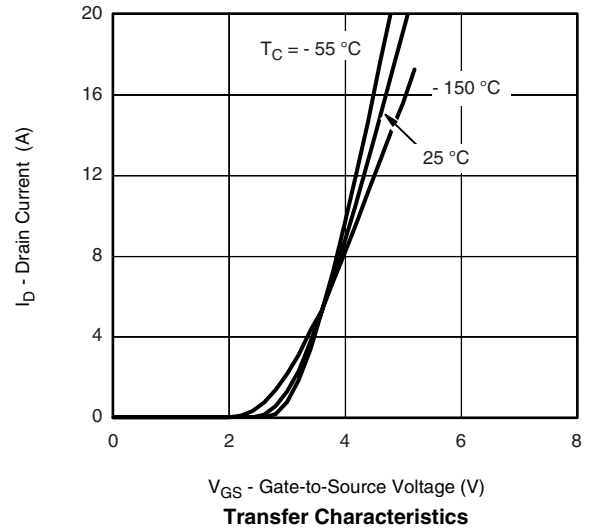
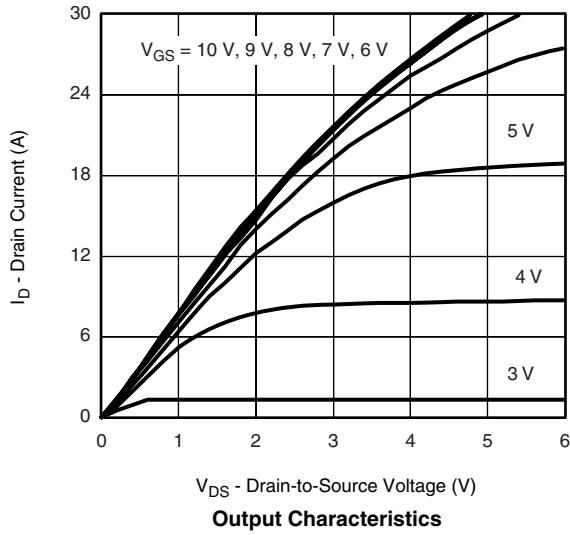
Gate Charge

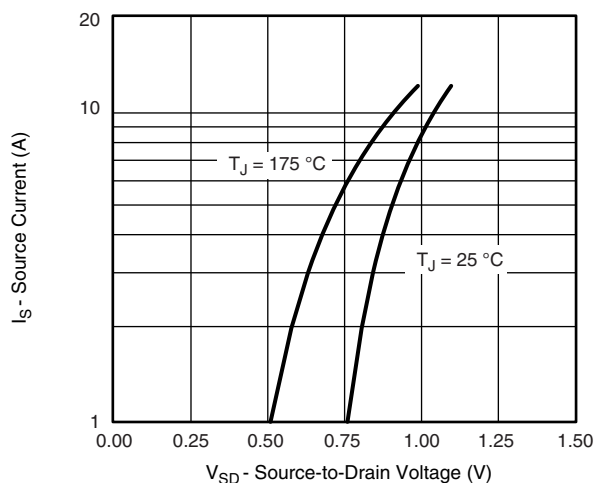
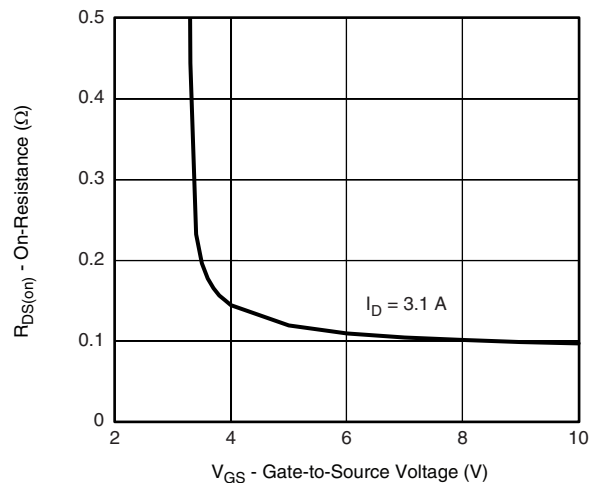
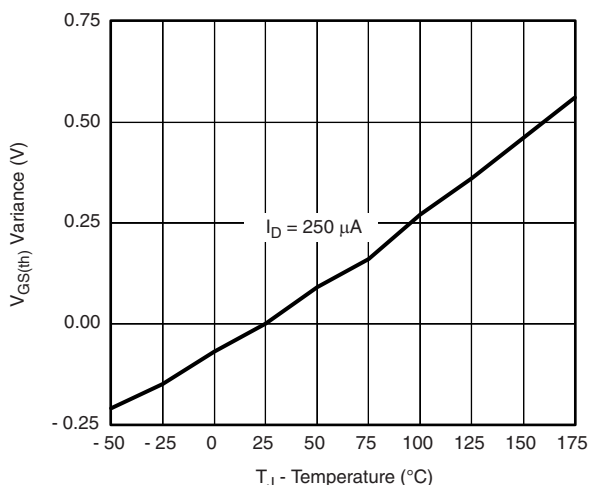
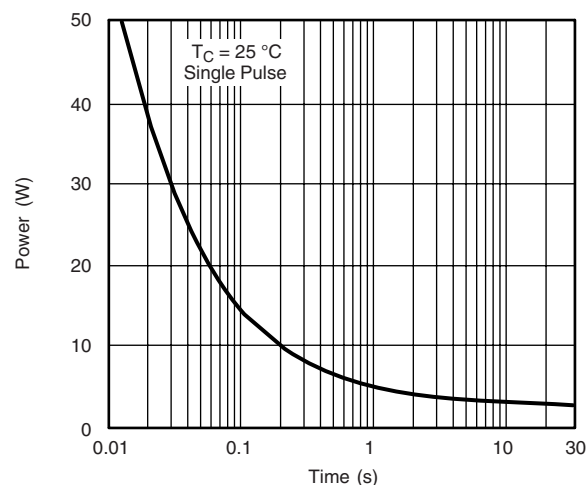
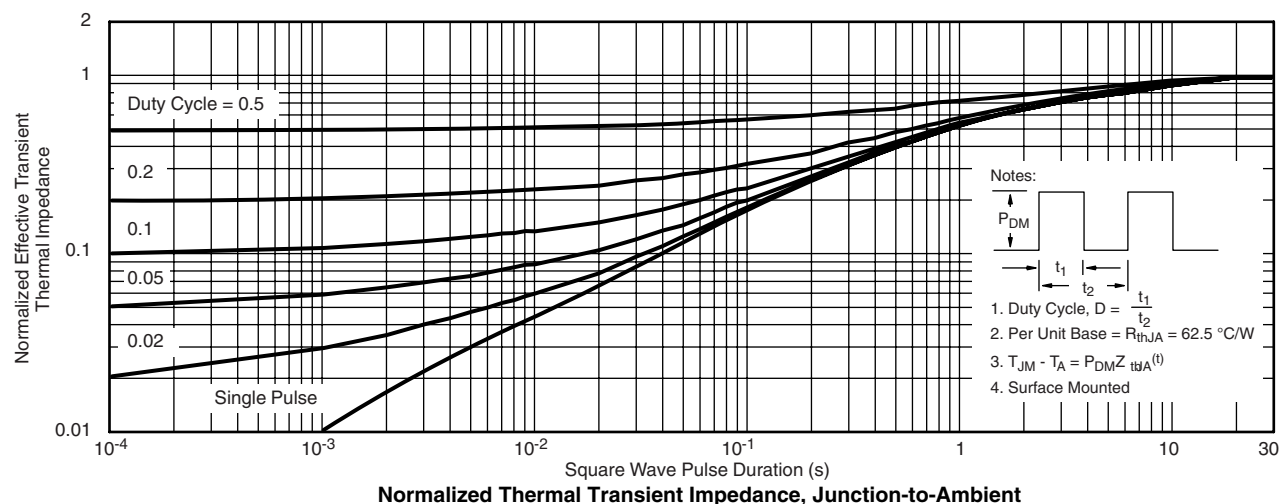


On-Resistance vs. Junction Temperature

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****Normalized Thermal Transient Impedance, Junction-to-Ambient**

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



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****Normalized Thermal Transient Impedance, Junction-to-Ambient**

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