

Dual N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY			
	V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
Channel-1	30	0.019 at V _{GS} = 10 V	8.0
		0.026 at V _{GS} = 4.5 V	6.9
Channel-2		0.035 at V _{GS} = 10 V	6.0
		0.048 at V _{GS} = 4.5 V	5.0

FEATURES

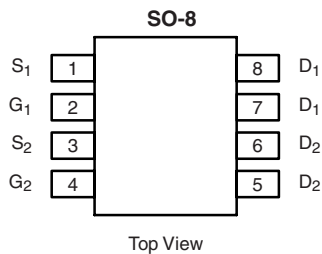
- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET® Power MOSFETs
- 100 % R_g Tested



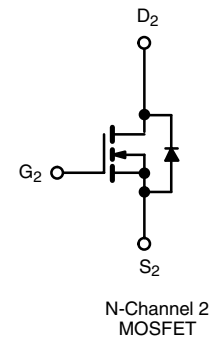
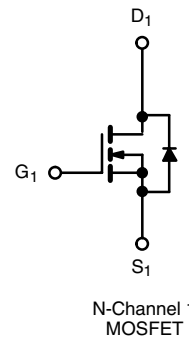
RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- Logic DC/DC
- Notebook PC



Ordering Information: Si4974DY-T1-E3 (Lead (Pb)-free)
Si4974DY-T1-GE3 (Lead (Pb)-free and Halogen-free)



ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted							
Parameter	Symbol	Channel-1		Channel-2		Unit	
		10 s	Steady State	10 s	Steady State		
Drain-Source Voltage	V _{DS}	30				V	
Gate-Source Voltage	V _{GS}	± 20					
Continuous Drain Current (T _J = 150 °C) ^a	I _D	T _A = 25 °C	8.0	6.0	6.0	4.4	A
		T _A = 70 °C	6.5	4.7	4.8	3.5	
Pulsed Drain Current	I _{DM}	40		30			
Continuous Source Current (Diode Conduction) ^a	I _S	1.8	1.0	1.8	1.0		
Single Pulse Avalanche Current	L = 0.1 mH	I _{AS}	15		7		
Avalanche Energy		E _{AS}	11		2.45		mJ
Maximum Power Dissipation ^a	T _A = 25 °C	P _D	2	1.1	2	1.1	W
			T _A = 70 °C	1.3	0.7	1.3	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150				°C	

THERMAL RESISTANCE RATINGS							
Parameter	Symbol	Channel-1		Channel-2		Unit	
		Typ.	Max.	Typ.	Max.		
Maximum Junction-to-Ambient ^a	t ≤ 10 s	R _{thJA}	50	62.5	52	62.5	°C/W
	Steady State		90	110	91	110	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	30	40	32	40	

Notes:

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

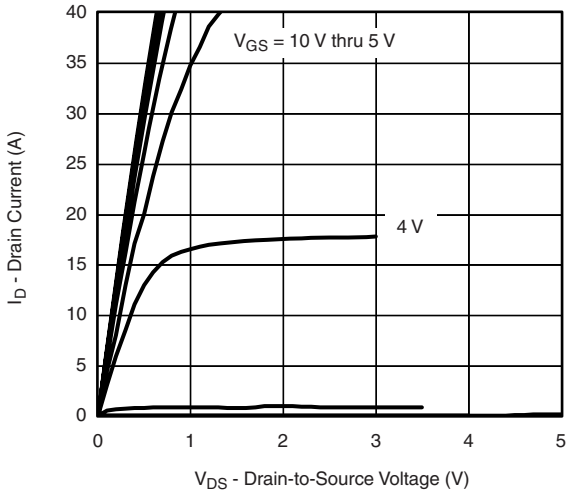
MOSFET SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted							
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit	
Static							
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	Ch-1	1.0		3.0	V
			Ch-2	1.0		3.0	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$	Ch-1			± 100	nA
			Ch-2			± 100	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$	Ch-1			1	μA
			Ch-2			1	
		$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 85\text{ }^\circ\text{C}$	Ch-1			15	
			Ch-2			15	
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} = 5\text{ V}$, $V_{GS} = 10\text{ V}$	Ch-1	20			A
			Ch-2	20			
Drain-Source On-State Resistance ^b	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 8.0\text{ A}$	Ch-1		0.016	0.019	Ω
			Ch-2		0.029	0.035	
		$V_{GS} = 4.5\text{ V}$, $I_D = 6.9\text{ A}$	Ch-1		0.0215	0.026	
			Ch-2		0.040	0.048	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}$, $I_D = 8.0\text{ A}$	Ch-1		19		S
			Ch-2		13		
Diode Forward Voltage ^b	V_{SD}	$I_S = 1.8\text{ A}$, $V_{GS} = 0\text{ V}$	Ch-1		0.8	1.1	V
			Ch-2		0.8	1.1	
Dynamic^a							
Total Gate Charge	Q_g	Channel-1 $V_{DS} = 15\text{ V}$, $V_{GS} = 4.5\text{ V}$, $I_D = 8.0\text{ A}$	Ch-1		7.0	11	nC
			Ch-2		3.3	5	
Gate-Source Charge	Q_{gs}	Channel-2 $V_{DS} = 15\text{ V}$, $V_{GS} = 4.5\text{ V}$, $I_D = 6.0\text{ A}$	Ch-1		2.6		
			Ch-2		1.2		
Gate-Drain Charge	Q_{gd}	Channel-1 $V_{DS} = 15\text{ V}$, $V_{GS} = 4.5\text{ V}$, $I_D = 6.0\text{ A}$	Ch-1		3.0		
			Ch-2		1.5		
Gate Resistance	R_g	Channel-2 $V_{DD} = 15\text{ V}$, $R_L = 15\text{ }\Omega$ $I_D \equiv 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_G = 6\text{ }\Omega$	Ch-1	0.8	1.5	2.3	Ω
			Ch-2	0.9	1.95	2.9	
Turn-On Delay Time	$t_{d(on)}$	Channel-1 $V_{DD} = 15\text{ V}$, $R_L = 15\text{ }\Omega$ $I_D \equiv 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_G = 6\text{ }\Omega$	Ch-1		8	15	ns
Rise Time	t_r		Ch-2		6	10	
		Channel-2 $V_{DD} = 15\text{ V}$, $R_L = 15\text{ }\Omega$ $I_D \equiv 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_G = 6\text{ }\Omega$	Ch-1		12	20	
Ch-2			11	18			
Turn-Off Delay Time	$t_{d(off)}$	Channel-1 $V_{DD} = 15\text{ V}$, $R_L = 15\text{ }\Omega$ $I_D \equiv 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_G = 6\text{ }\Omega$	Ch-1		22	35	
			Ch-2		15	25	
Fall Time	t_f	Channel-2 $V_{DD} = 15\text{ V}$, $R_L = 15\text{ }\Omega$ $I_D \equiv 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_G = 6\text{ }\Omega$	Ch-1		6	10	
			Ch-2		6	10	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 1.8\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$	Ch-1		20	40	
			Ch-2		15	30	

Notes:

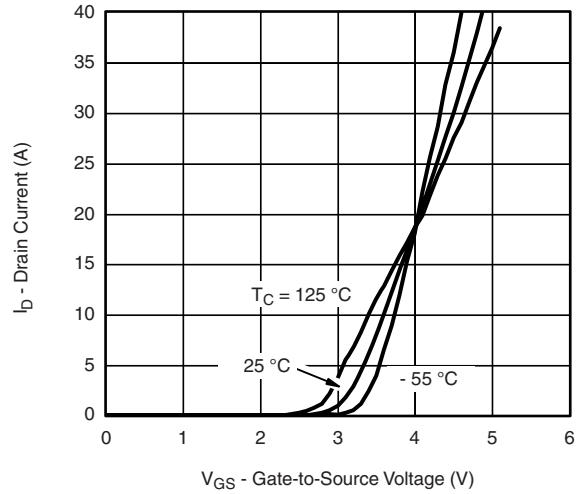
- a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

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.

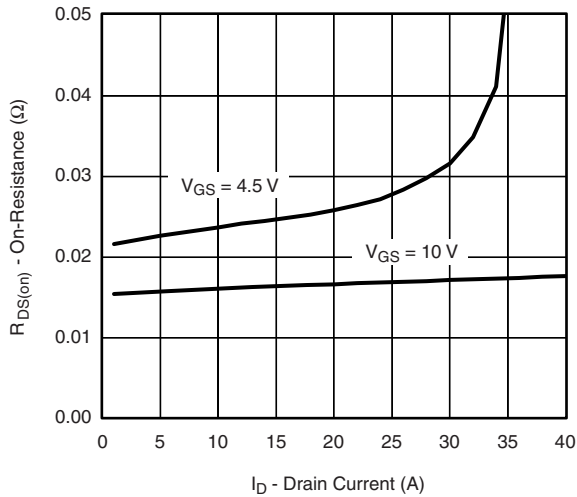
CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



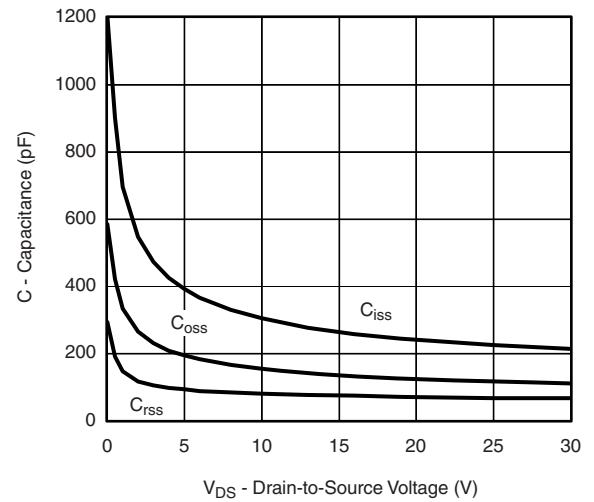
Output Characteristics



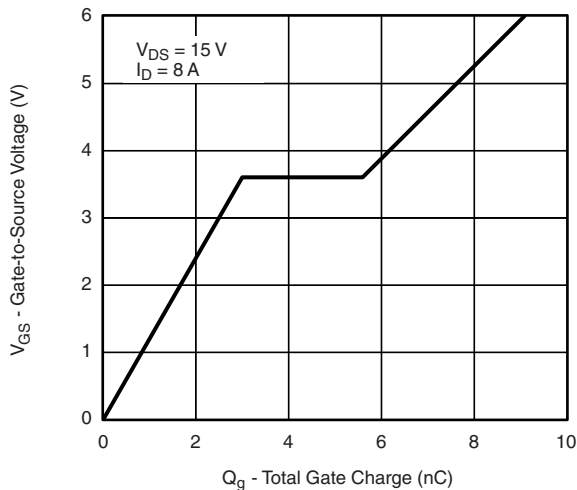
Transfer Characteristics



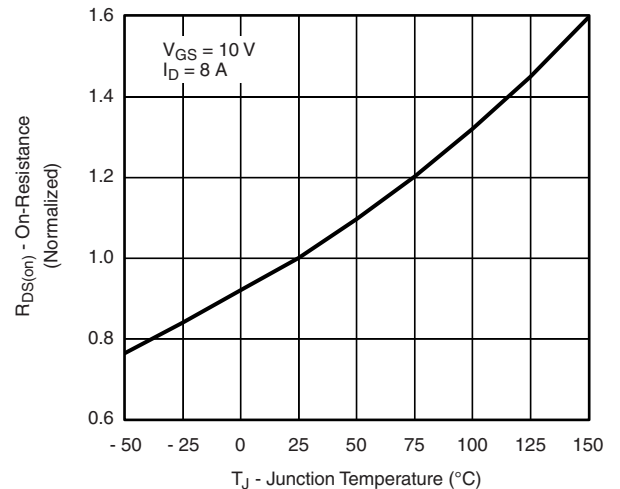
On-Resistance vs. Drain Current



Capacitance

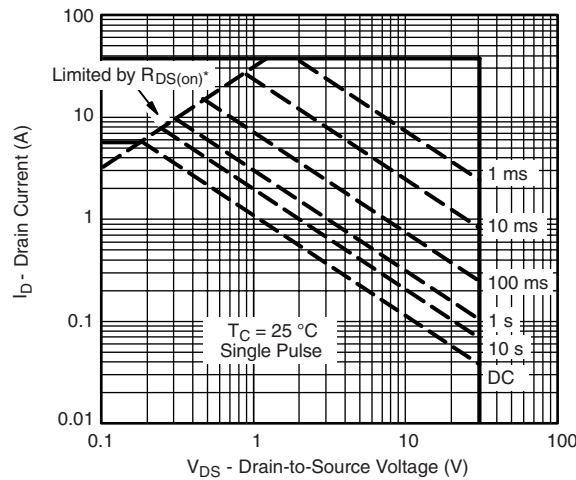
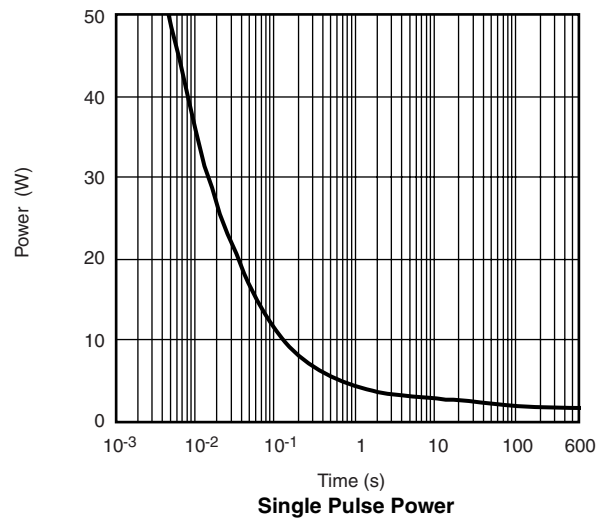
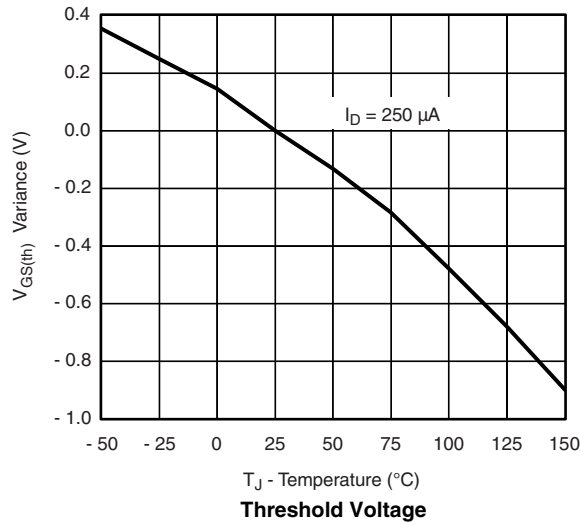
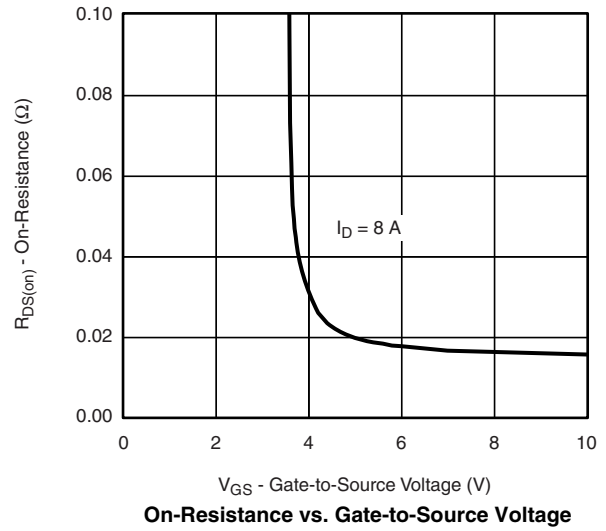
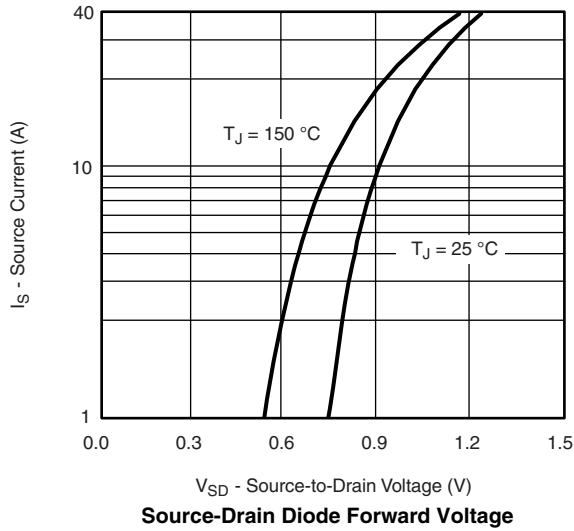


Gate Charge



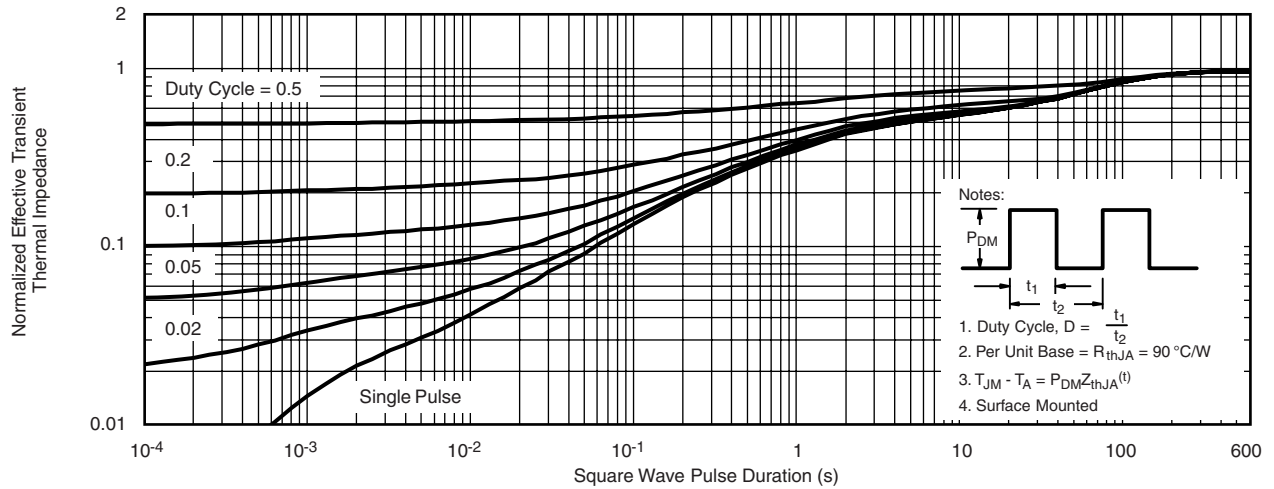
On-Resistance vs. Junction Temperature

CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

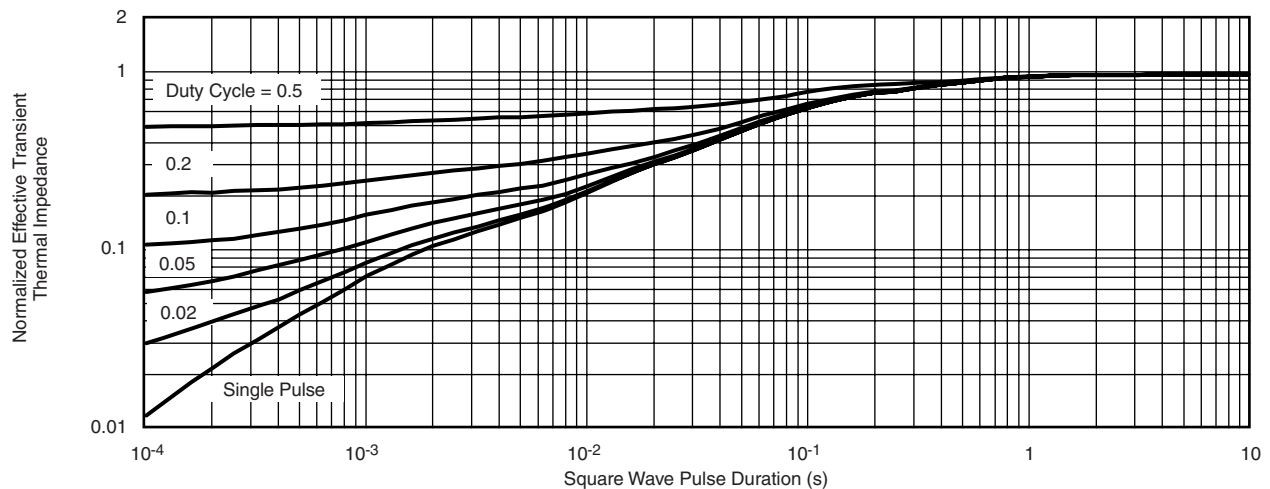


* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified
Safe Operating Area, Junction-to-Case

CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

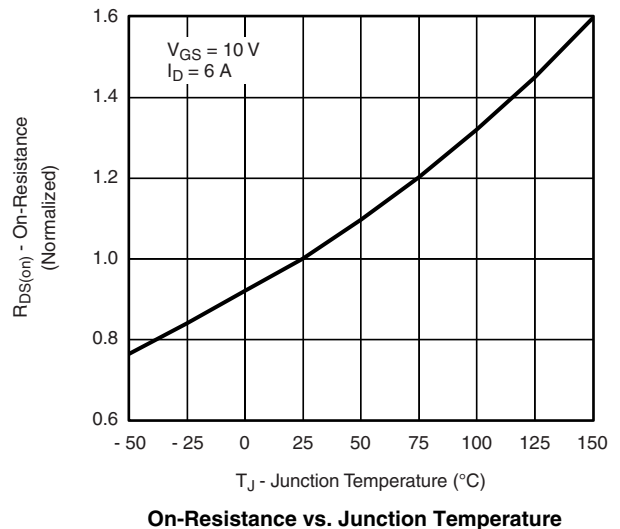
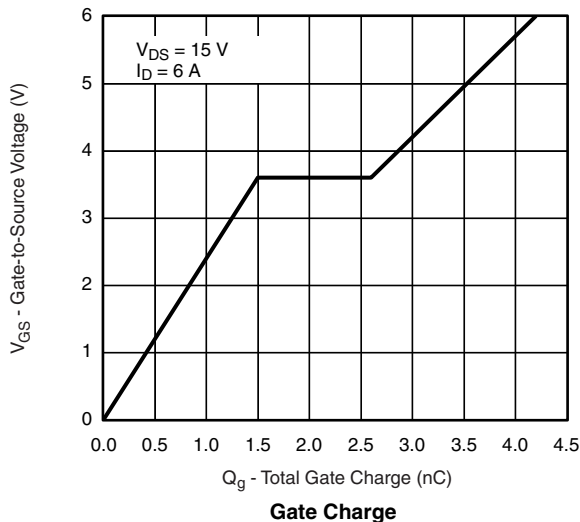
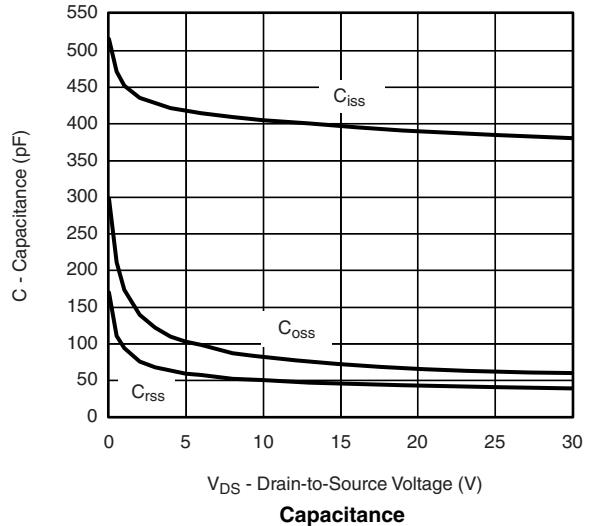
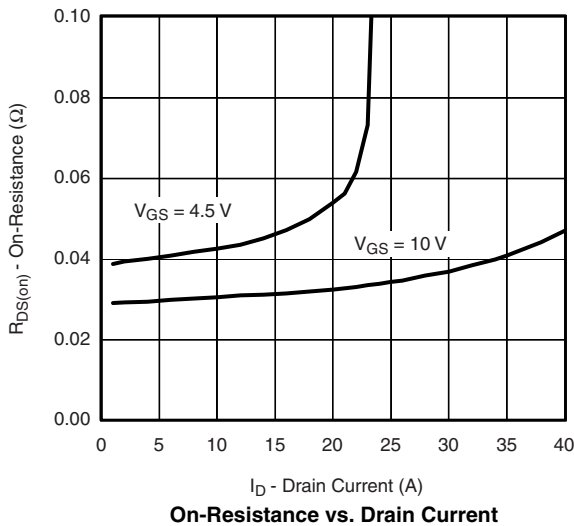
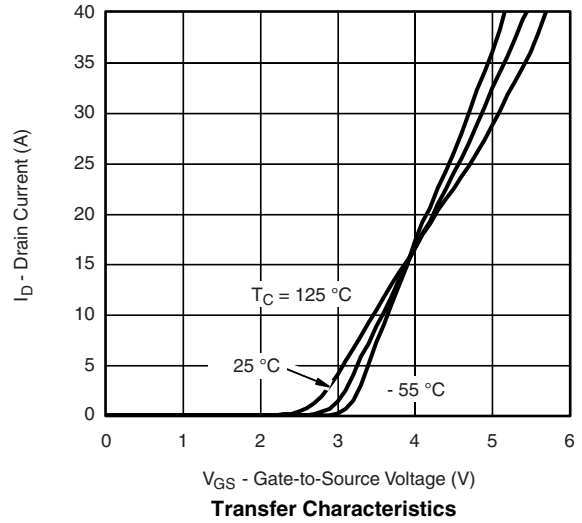
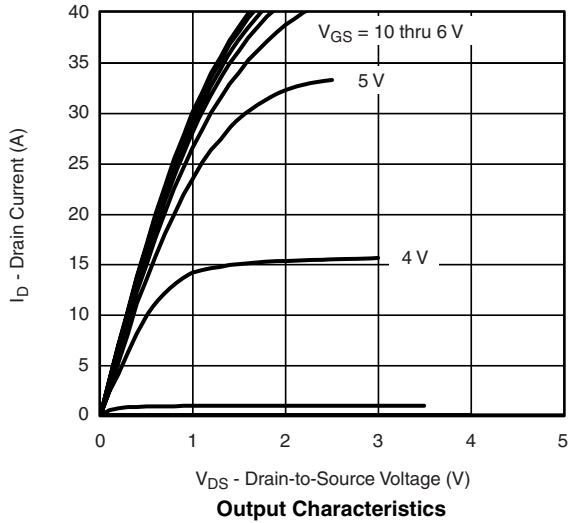


Normalized Thermal Transient Impedance, Junction-to-Ambient

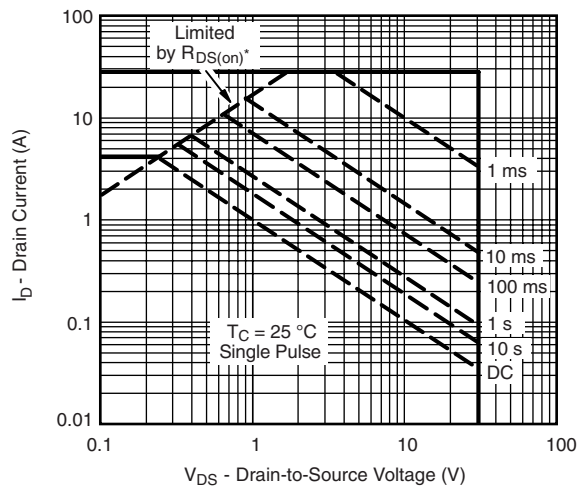
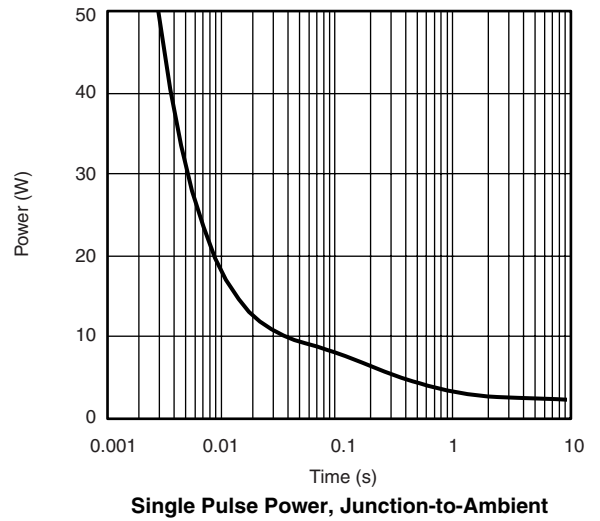
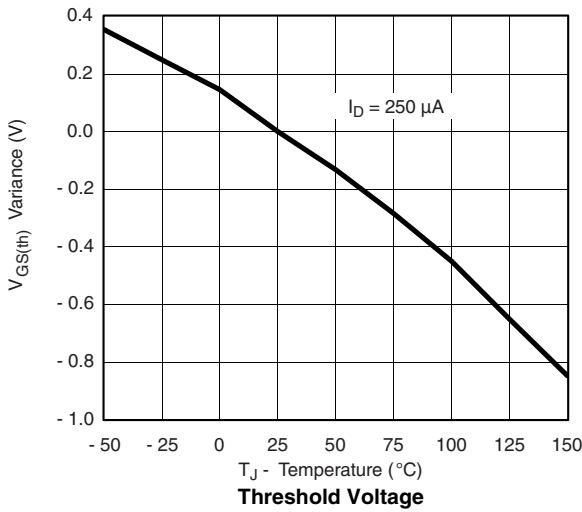
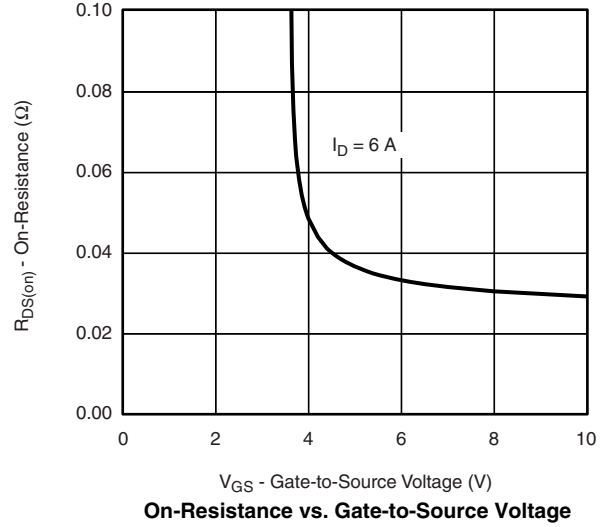
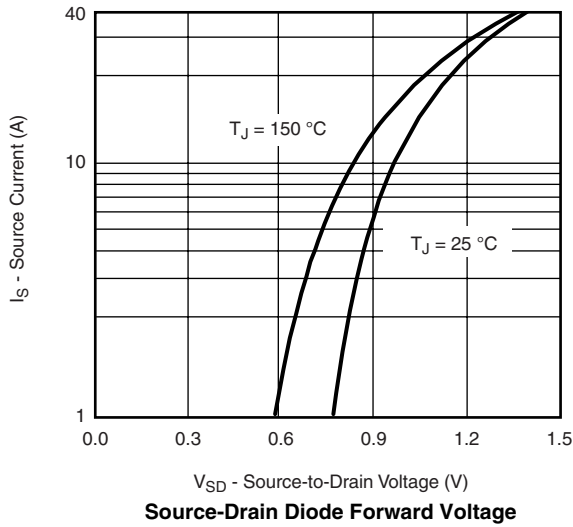


Normalized Thermal Transient Impedance, Junction-to-Foot

CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



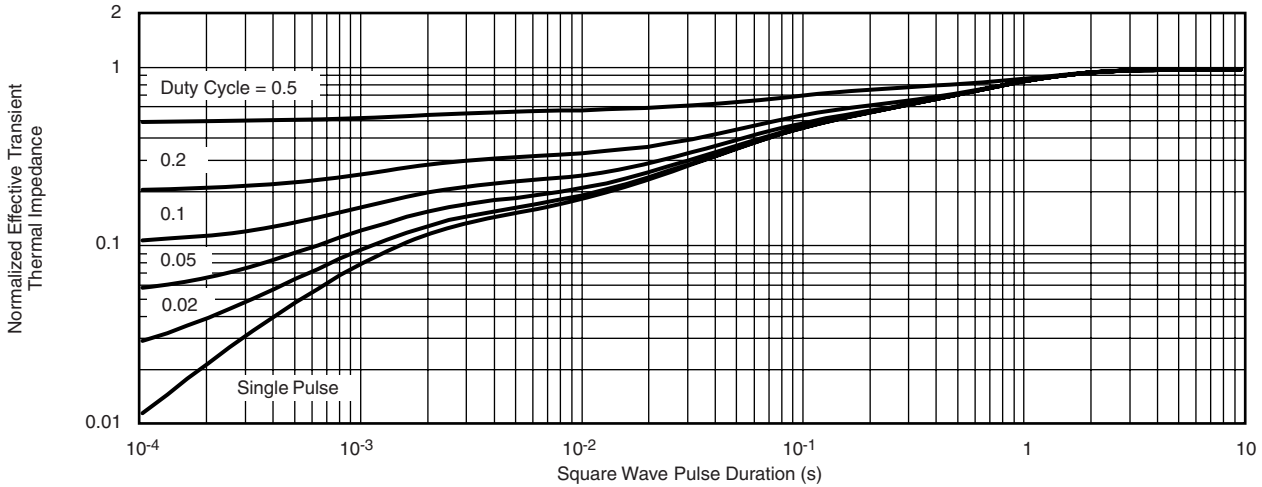
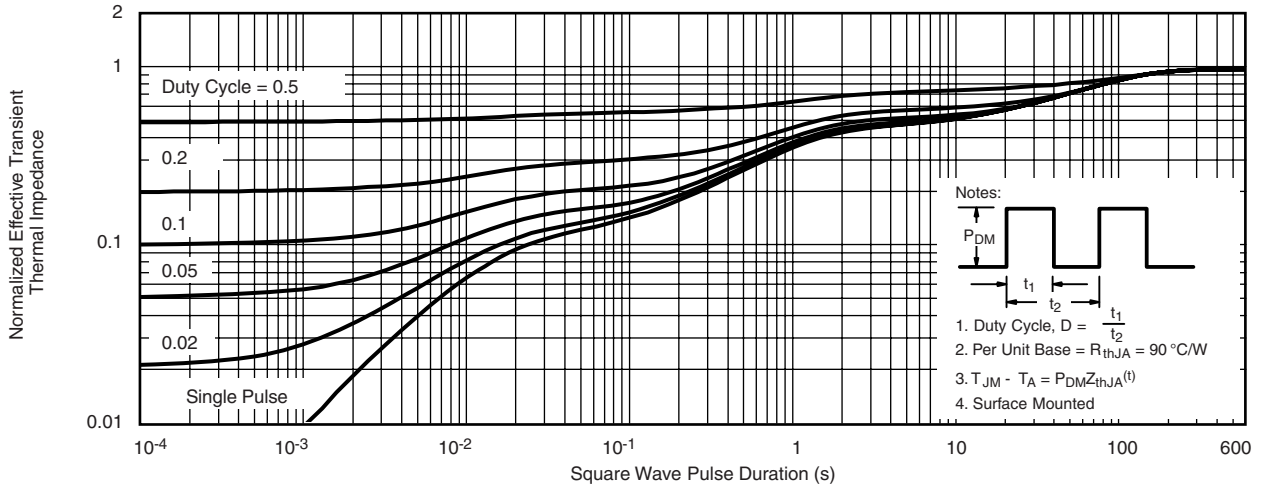
CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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

Safe Operating Area, Junction-to-Case

CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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