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

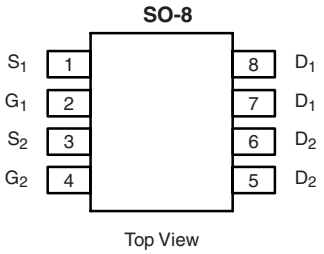
FEATURES

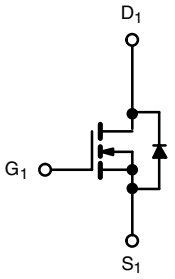
- **Halogen-free According to IEC 61249-2-21 Available**
- TrenchFET® Power MOSFETs
- 100 % R_g Tested

RoHS COMPLIANT
HALOGEN FREE Available

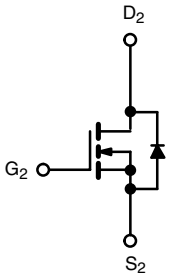
APPLICATIONS

- Logic DC/DC
  - Notebook PC





N-Channel 1 MOSFET



N-Channel 2 MOSFET

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]	T_A = 25 °C	I_D	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	0.7	
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	

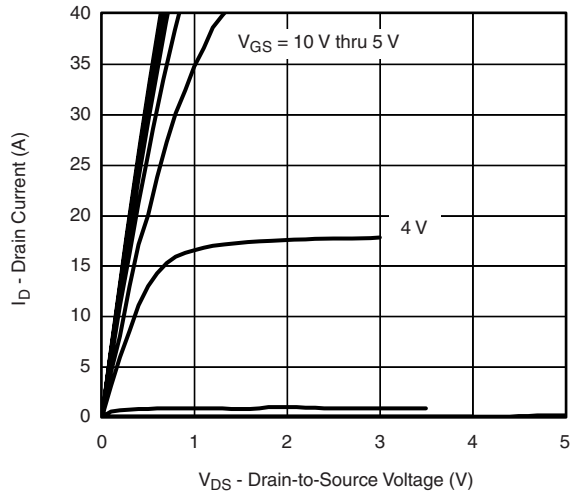
Notes:
a. Surface Mounted on 1" x 1" FR4 board.

MOSFET SPECIFICATIONS T_J = 25 °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	Ch-1	1.0		3.0	V
			Ch-2	1.0		3.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	Ch-1			± 100	nA
			Ch-2			± 100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V	Ch-1			1	µA
			Ch-2			1	
		V_{DS} = 30 V, V_{GS} = 0 V, T_J = 85 °C	Ch-1			15	
			Ch-2			15	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	Ch-1	20			A
			Ch-2	20			
Drain-Source On-State Resistance[b]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 8.0 A	Ch-1		0.016	0.019	Ω
		V_{GS} = 10 V, I_D = 6.0 A	Ch-2		0.029	0.035	
		V_{GS} = 4.5 V, I_D = 6.9 A	Ch-1		0.0215	0.026	
		V_{GS} = 4.5 V, I_D = 5.0 A	Ch-2		0.040	0.048	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 8.0 A	Ch-1		19		S
		V_{DS} = 15 V, I_D = 6.0 A	Ch-2		13		
Diode Forward Voltage[b]	V_{SD}	I_S = 1.8 A, V_{GS} = 0 V	Ch-1		0.8	1.1	V
		I_S = 1.8 A, V_{GS} = 0 V	Ch-2		0.8	1.1	
Dynamic[a]							
Total Gate Charge	Q_g	Channel-1 V_{DS} = 15 V, V_{GS} = 4.5 V, I_D = 8.0 A Channel-2 V_{DS} = 15 V, V_{GS} = 4.5 V, I_D = 6.0 A	Ch-1		7.0	11	nC
			Ch-2		3.3	5	
Gate-Source Charge	Q_{gs}		Ch-1		2.6		
			Ch-2		1.2		
Gate-Drain Charge	Q_{gd}		Ch-1		3.0		
			Ch-2		1.5		
Gate Resistance	R_g		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 V, R_L = 15 Ω I_D ≅ 1 A, V_{GEN} = 10 V, R_G = 6 Ω Channel-2 V_{DD} = 15 V, R_L = 15 Ω I_D ≅ 1 A, V_{GEN} = 10 V, R_G = 6 Ω	Ch-1		8	15	ns
			Ch-2		6	10	
Rise Time	t_r		Ch-1		12	20	
			Ch-2		11	18	
Turn-Off Delay Time	$t_{d(off)}$		Ch-1		22	35	
			Ch-2		15	25	
Fall Time	t_f		Ch-1		6	10	
			Ch-2		6	10	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 1.8 A, dI/dt = 100 A/µs	Ch-1		20	40	
			Ch-2		15	30	

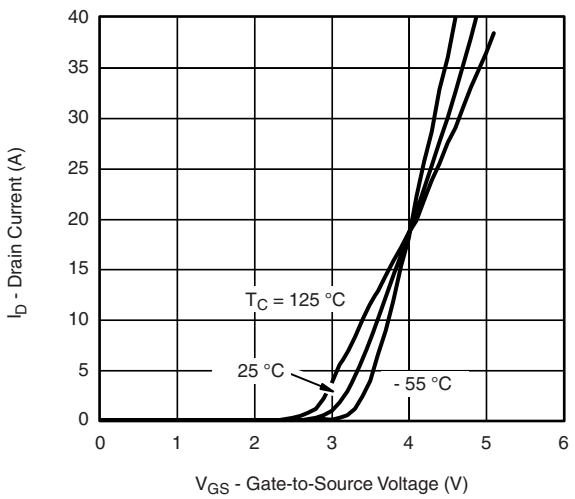
Notes:
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

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.

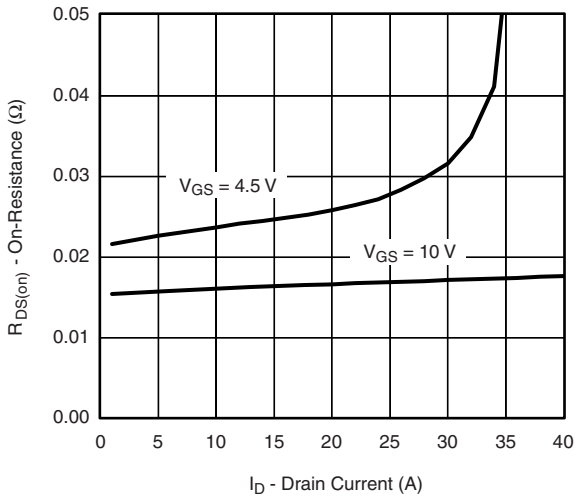
CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



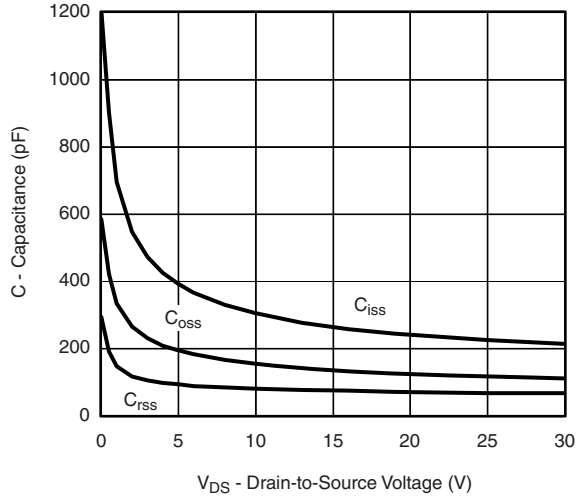
Output Characteristics



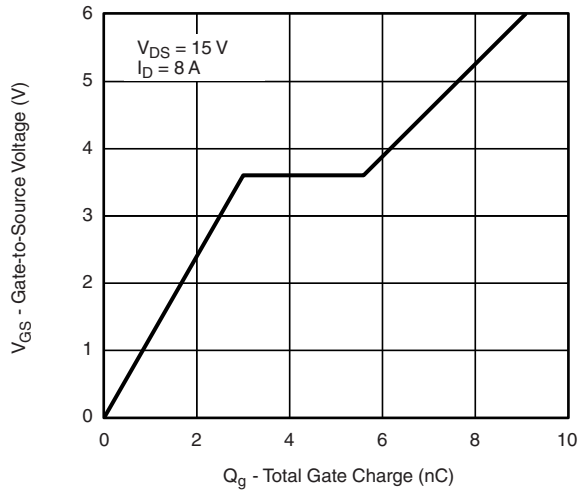
Transfer Characteristics



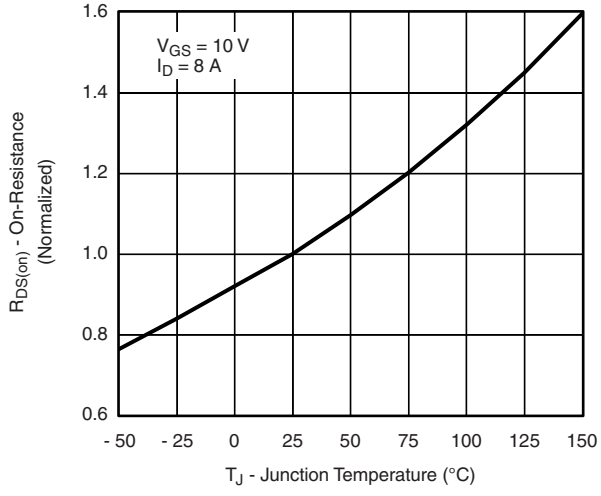
On-Resistance vs. Drain Current



Capacitance

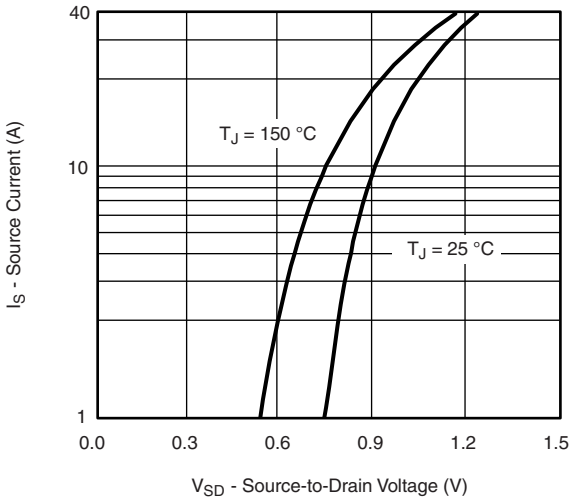


Gate Charge

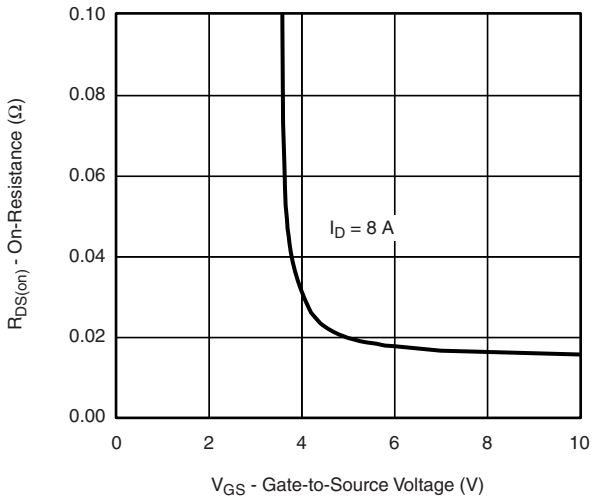


On-Resistance vs. Junction Temperature

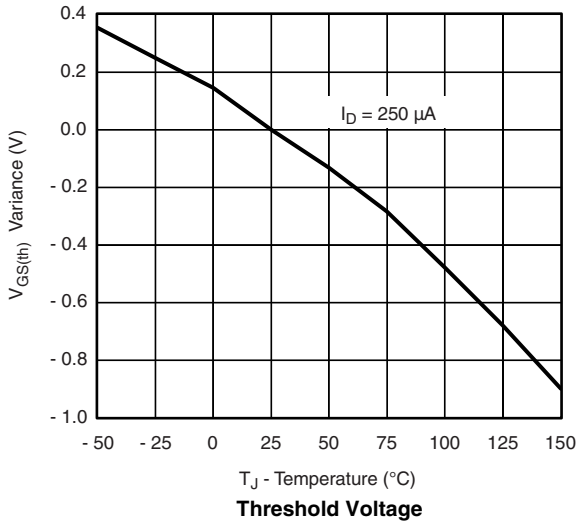
CHANNEL-1 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



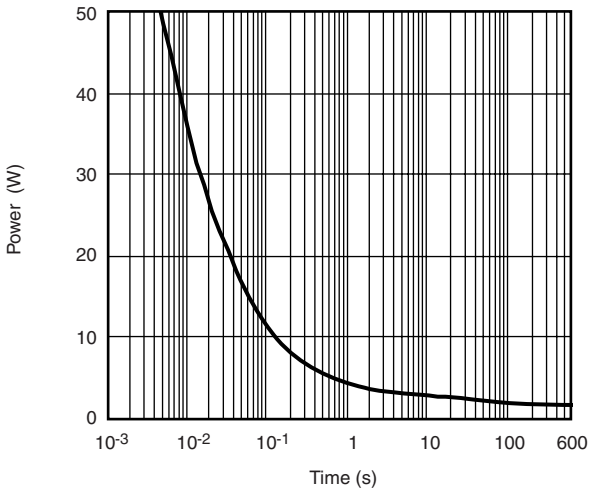
Source-Drain Diode Forward Voltage



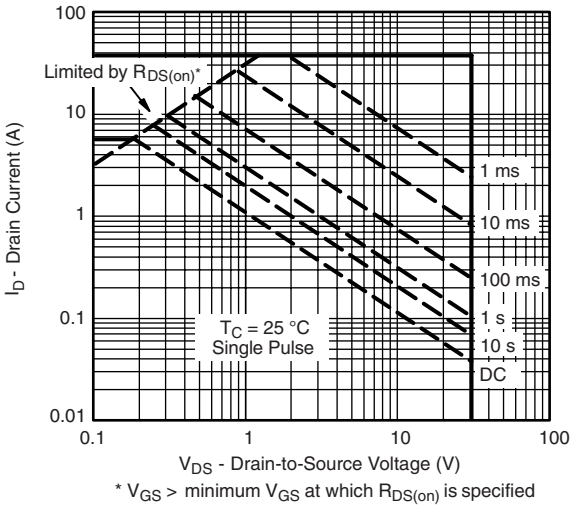
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



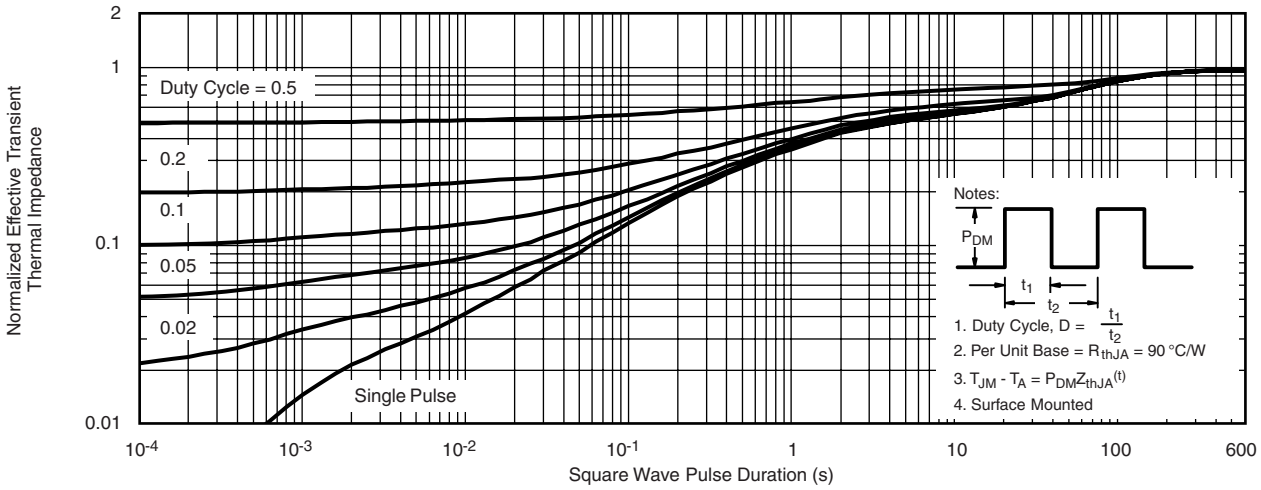
Single Pulse Power



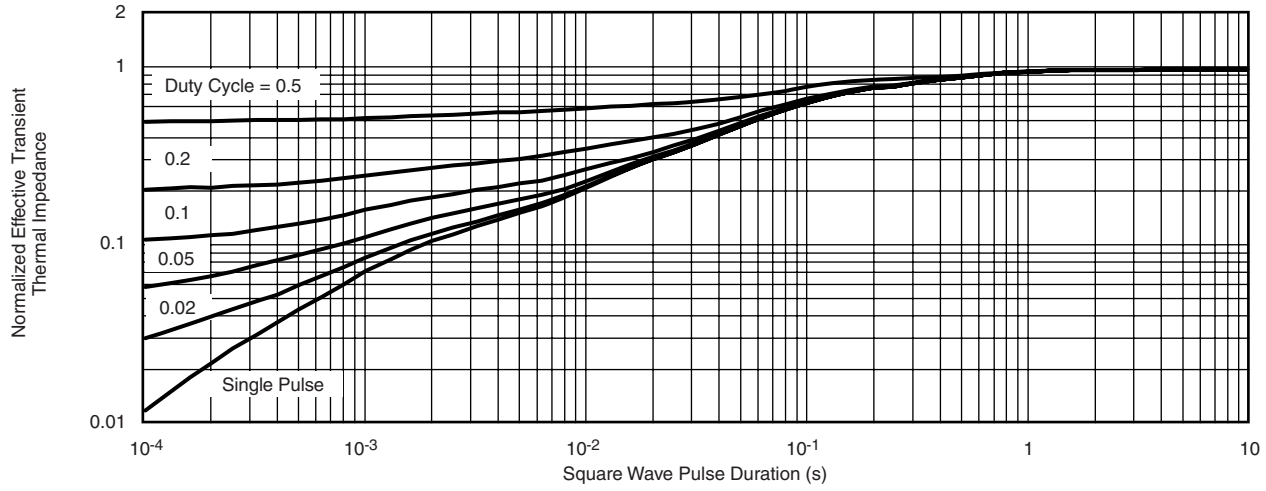
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Case

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

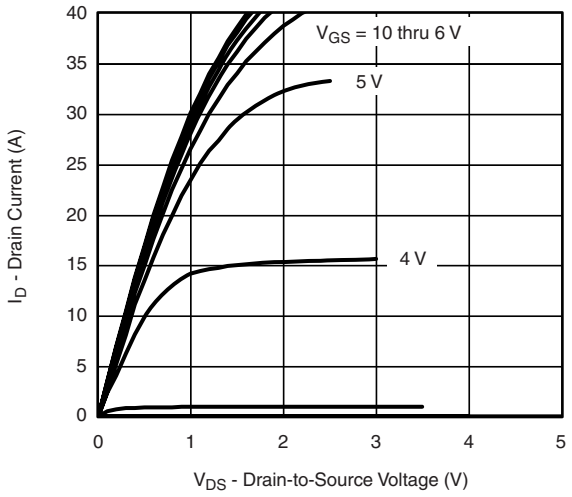


Normalized Thermal Transient Impedance, Junction-to-Ambient

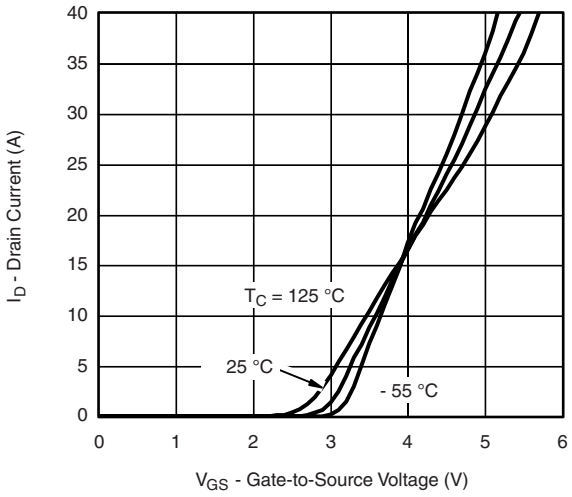


Normalized Thermal Transient Impedance, Junction-to-Foot

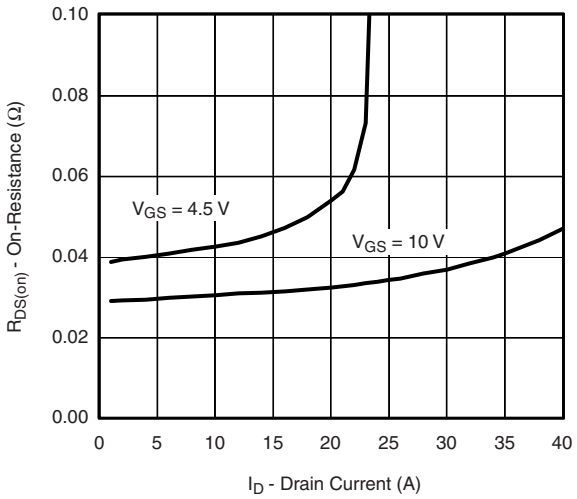
CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



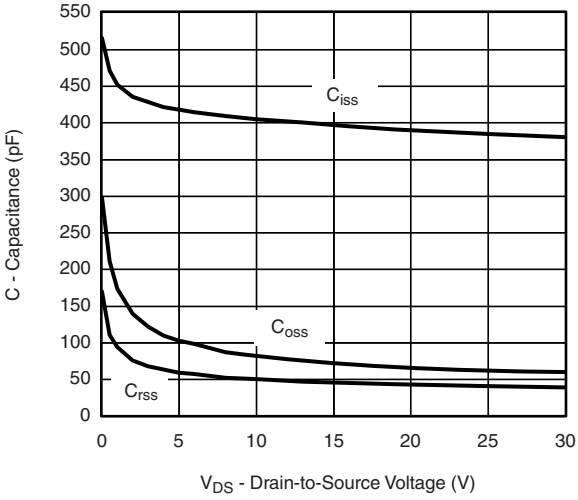
Output Characteristics



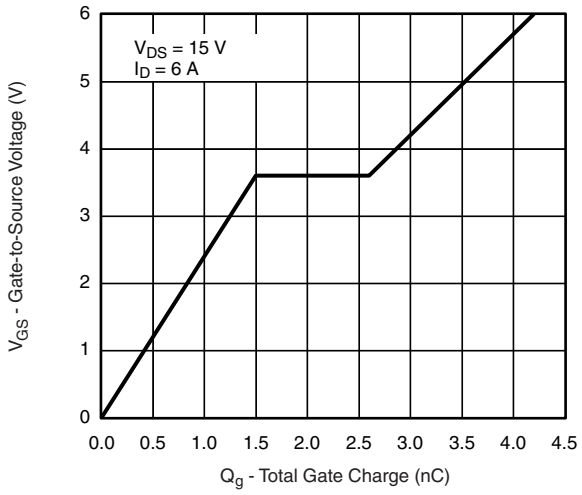
Transfer Characteristics



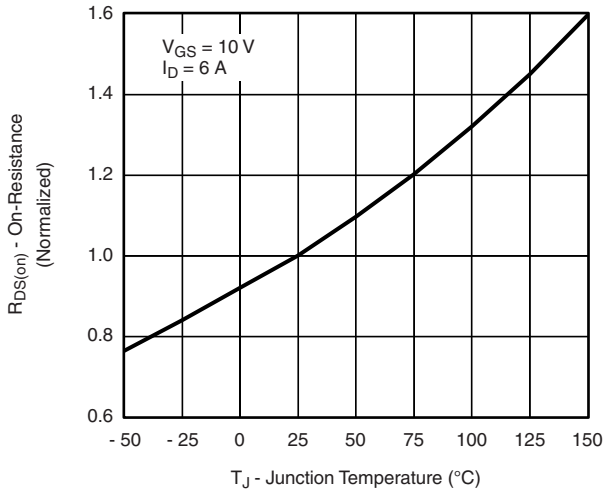
On-Resistance vs. Drain Current



Capacitance

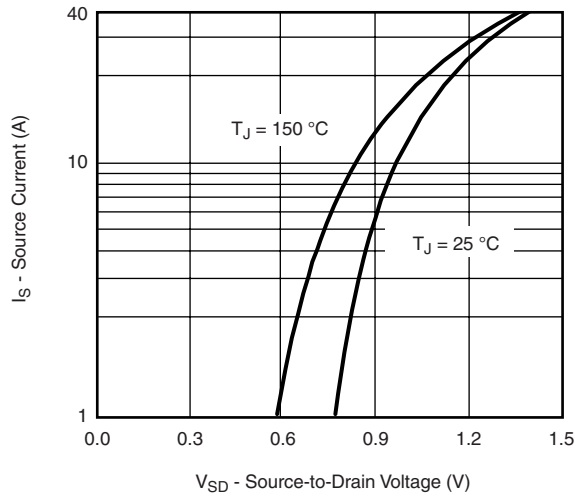


Gate Charge

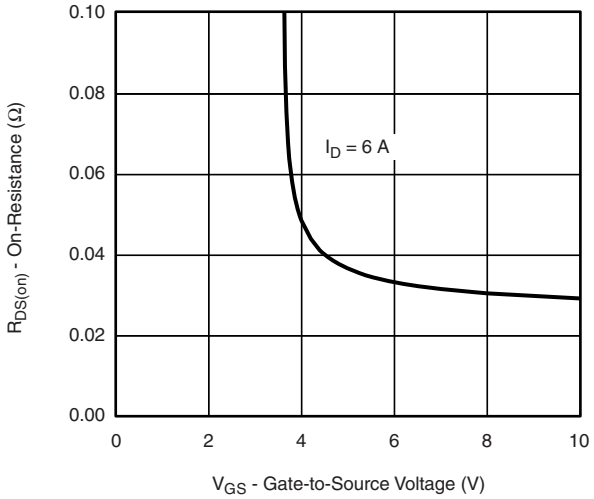


On-Resistance vs. Junction Temperature

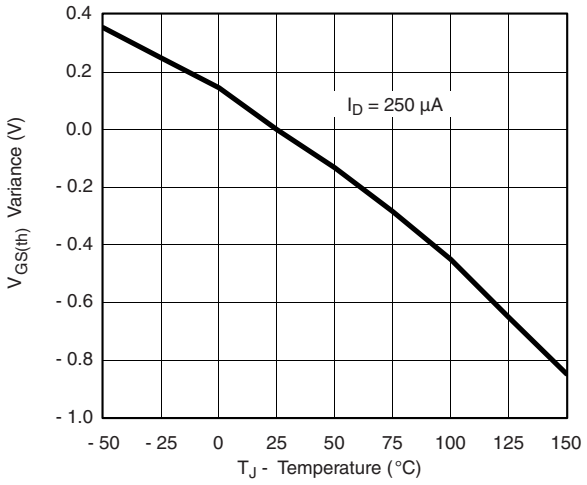
CHANNEL-2 TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



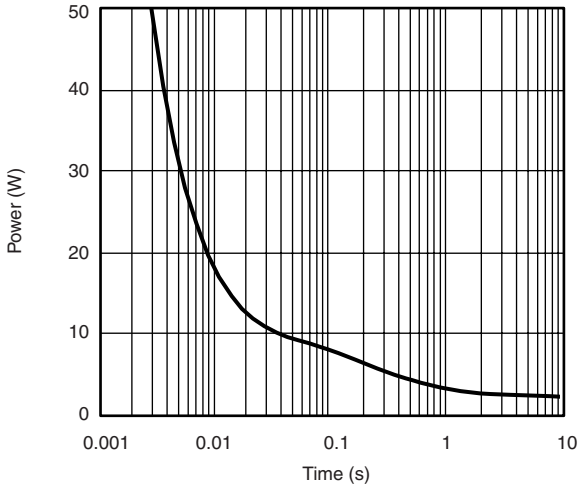
Source-Drain Diode Forward Voltage



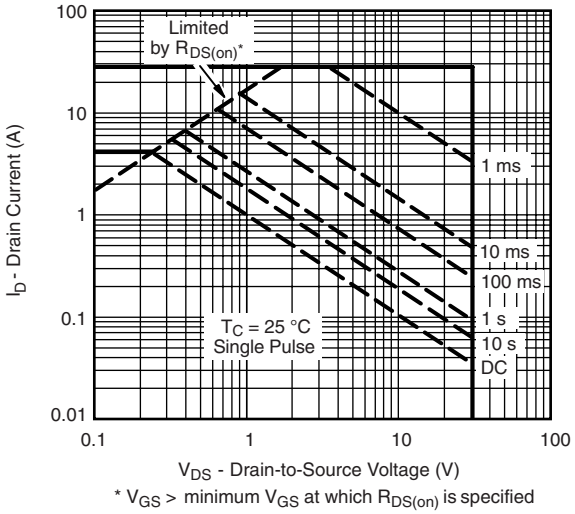
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



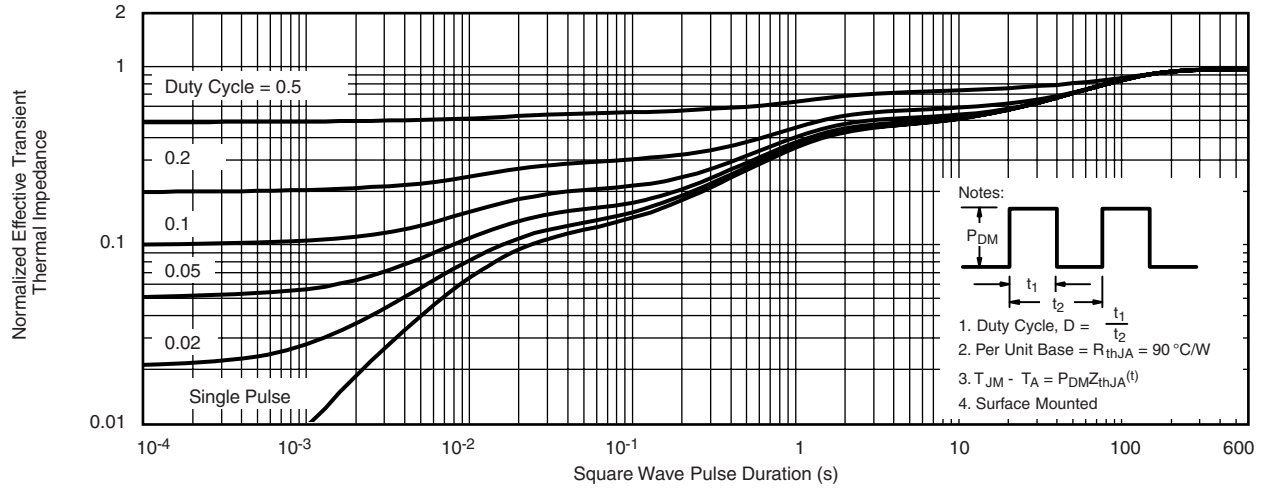
Single Pulse Power, Junction-to-Ambient



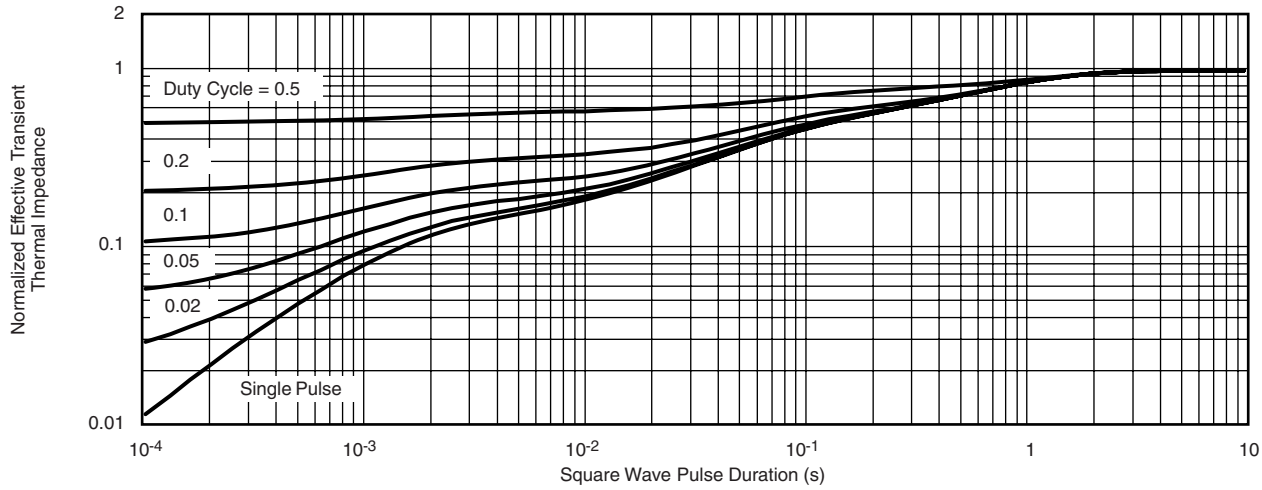
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Case

CHANNEL-2 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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