Asymmetrical Dual P-Channel 30-V/20-V (D-S) MOSFETs

PRODUCT SUMMARY			
	V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
Channel-1	- 30	0.054 at V_{GS} = - 10 V	- 5.0
		0.100 at V_{GS} = - 4.5 V	- 3.7
Channel-2	- 20	0.027 at V_{GS} = - 4.5 V	- 7.0
		0.035 at V_{GS} = - 2.5 V	- 6.2
		0.048 at V_{GS} = - 1.8 V	- 5.2

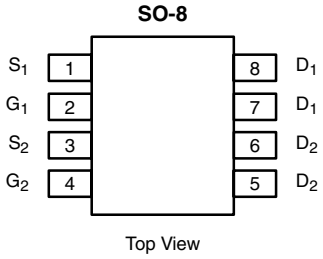
FEATURES

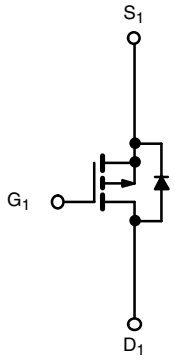
- TrenchFET® Power MOSFETs
- Low Gate Drive (2.5 V) Capability For Channel 2

Pb-free
RoHS COMPLIANT

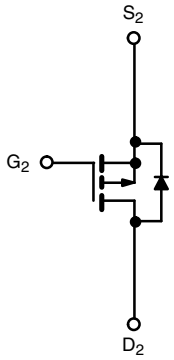
APPLICATIONS

- Game Station
  - Load Switch





P-Channel MOSFET



P-Channel MOSFET

Ordering Information: Si4955DY-T1-E3 (Lead (Pb)-free)

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted							
Parameter		Symbol	Channel-1		Channel-2		Unit
			10 sec	Steady State	10 sec	Steady State	
Drain-Source Voltage		V_{DS}	- 30		- 20		V
Gate-Source Voltage		V_{GS}	± 20		± 8		
Continuous Drain Current (T_J = 150 °C)[a]	T_A = 25 °C	I_D	- 5.0	- 3.8	- 7.0	- 5.3	A
	T_A = 70 °C		- 4.0	- 3.0	- 5.6	- 4.2	
Pulsed Drain Current		I_{DM}	- 20				
Continuous Source Current (Diode Conduction)[a]		I_S	- 1.7	- 0.9	- 1.7	- 0.9	
Maximum Power Dissipation[a]	T_A = 25 °C	P_D	2.0	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 sec	R_{thJA}	55	62.5	58	62.5	°C/W
	Steady State		90	110	91	110	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	33	40	34	40	

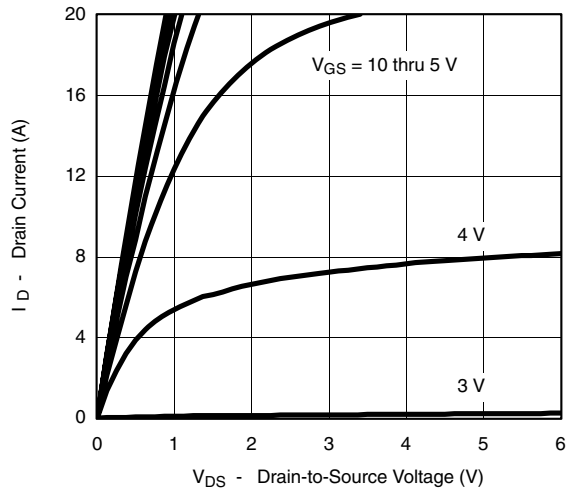
Notes:
a. Surface Mounted on 1" x 1" FR4 Board.

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	Ch-1	- 1.0		- 3	V
		$V_{DS} = V_{GS}$, I_D = - 250 µA	Ch-2	- 0.4		- 1	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	Ch-1			± 100	nA
		V_{DS} = 0 V, V_{GS} = ± 8 V	Ch-2			± 100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 30 V, V_{GS} = 0 V	Ch-1			- 1	µA
		V_{DS} = - 20 V, V_{GS} = 0 V	Ch-2			- 1	
		V_{DS} = - 30 V, V_{GS} = 0 V, T_J = 85 °C	Ch-1			- 5	
		V_{DS} = - 20 V, V_{GS} = 0 V, T_J = 85 °C	Ch-2			- 5	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ - 5 V, V_{GS} = - 10 V	Ch-1	- 20			A
		$V_{DS} \leq$ - 5 V, V_{GS} = - 10 V	Ch-2	- 20			
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = - 10 V, I_D = - 5.0 A	Ch-1		0.044	0.054	Ω
		V_{GS} = - 4.5 V, I_D = - 7.0 A	Ch-2		0.022	0.027	
		V_{GS} = - 4.5 V, I_D = - 3.7 A	Ch-1		0.082	0.100	
		V_{GS} = - 2.5 V, I_D = - 6.2 A	Ch-2		0.029	0.035	
		V_{GS} = - 1.8 V, I_D = - 3 A	Ch-2		0.039	0.048	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 15 V, I_D = - 5.0 A	Ch-1		10		S
		V_{DS} = - 15 V, I_D = - 3 A	Ch-2		25		
Diode Forward Voltage[a]	V_{SD}	I_S = - 1.7 A, V_{GS} = 0 V	Ch-1		- 0.80	- 1.2	V
		I_S = - 1.7 A, V_{GS} = 0 V	Ch-2		- 0.80	- 1.2	
Dynamic[b]							
Total Gate Charge	Q_g	Channel-1 V_{DS} = - 15 V, V_{GS} = - 10 V, I_D = - 5.0 A Channel-2 V_{DS} = - 10 V, V_{GS} = - 4.5 V, I_D = - 7 A	Ch-1		12.5	19	nC
			Ch-2		21	25	
Gate-Source Charge	Q_{gs}		Ch-1		2.1		
			Ch-2		2.6		
Gate-Drain Charge	Q_{gd}		Ch-1		3.5		
			Ch-2		6.0		
Turn-On Delay Time	$t_{d(on)}$	Channel-1 V_{DD} = - 15 V, R_L = - 15 Ω $I_D \cong$ - 1 A, V_{GEN} = - 10 V, R_G = 6 Ω Channel-2 V_{DD} = - 10 V, R_L = 10 Ω $I_D \cong$ - 1 A, V_{GEN} = - 4.5 V, R_G = 6 Ω	Ch-1		7	15	ns
			Ch-2		20	30	
Rise Time	t_r		Ch-1		10	15	
			Ch-2		40	60	
Turn-Off Delay Time	$t_{d(off)}$		Ch-1		30	45	
			Ch-2		125	190	
Fall Time	t_f		Ch-1		22	35	
			Ch-2		85	130	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = - 1.7 A, di/dt = 100 A/µs	Ch-1		25	60	
		I_F = - 1.7 A, di/dt = 100 A/µs	Ch-2		64	90	

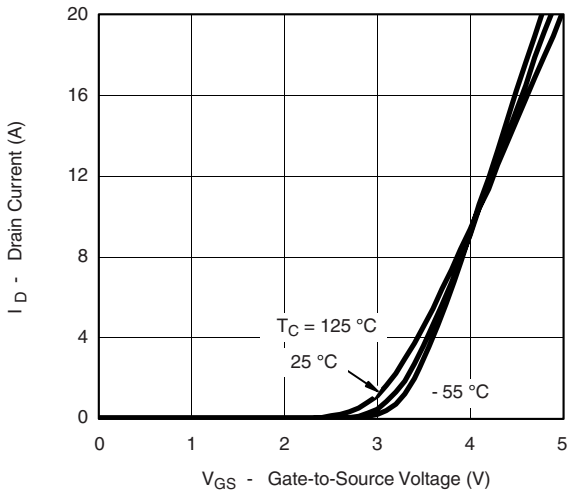
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

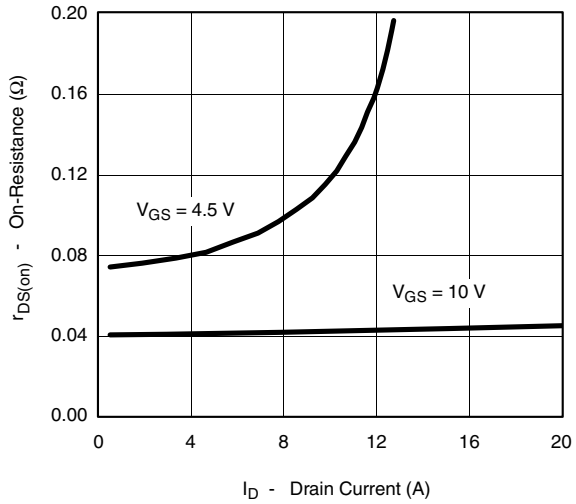
CHANNEL 1 TYPICAL CHARACTERISTICS 25 °C unless noted



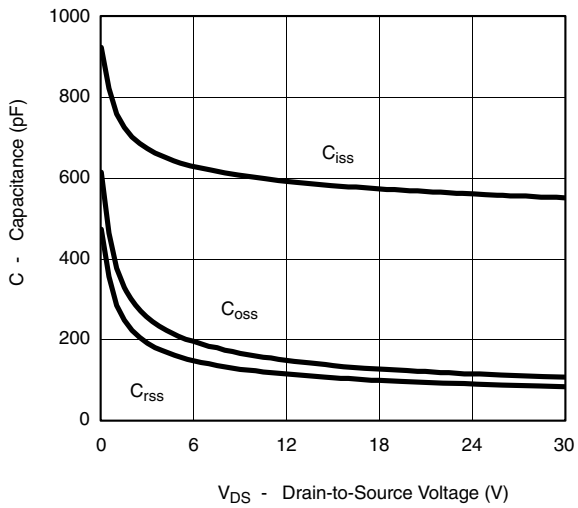
Output Characteristics



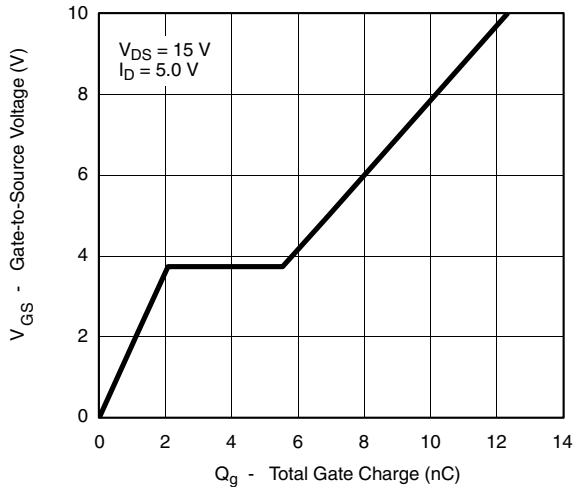
Transfer Characteristics



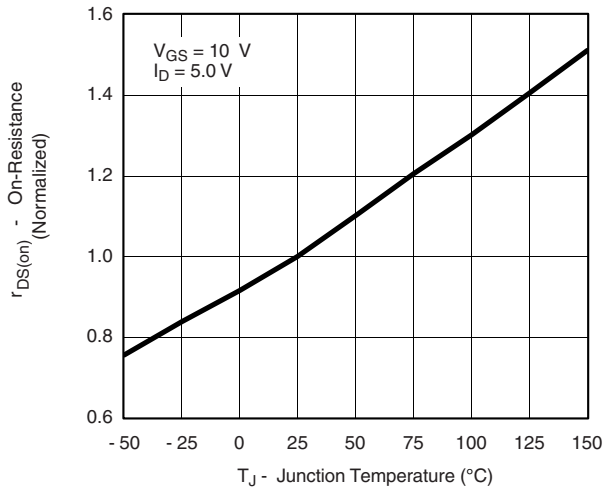
On-Resistance vs. Drain Current



Capacitance

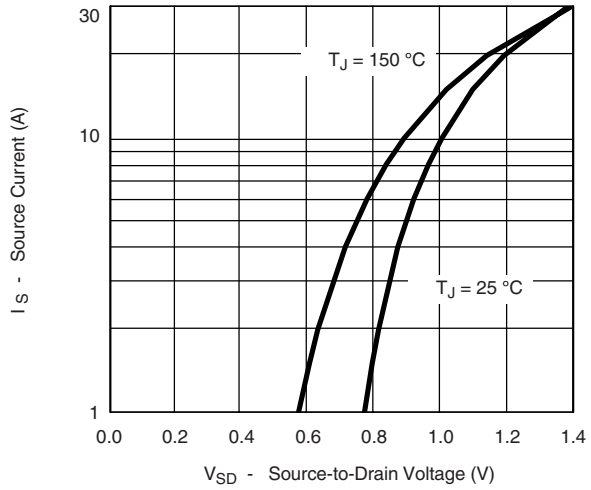


Gate Charge

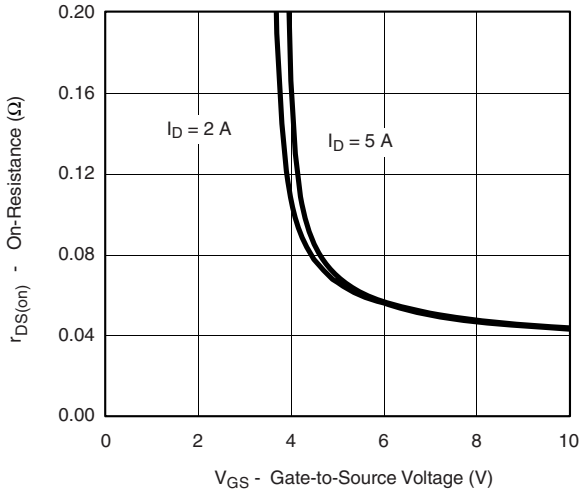


On-Resistance vs. Junction Temperature

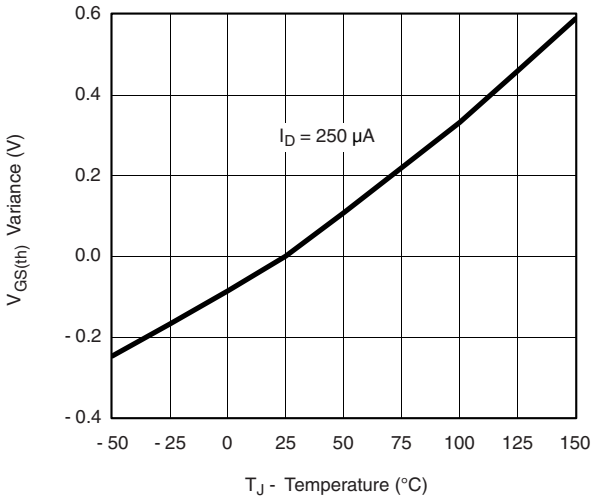
CHANNEL 1 TYPICAL CHARACTERISTICS 25 °C unless noted



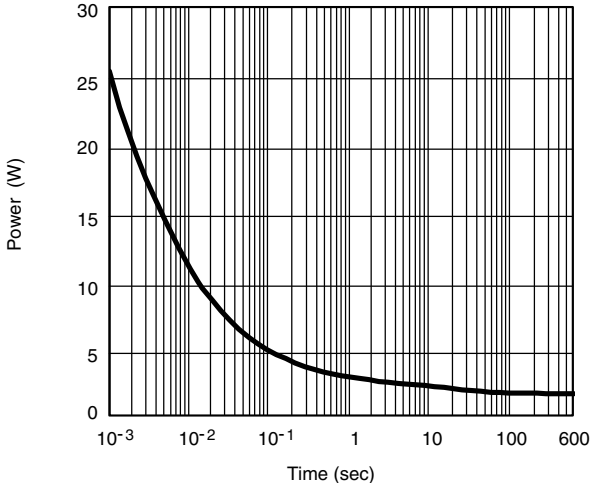
Source-Drain Diode Forward Voltage



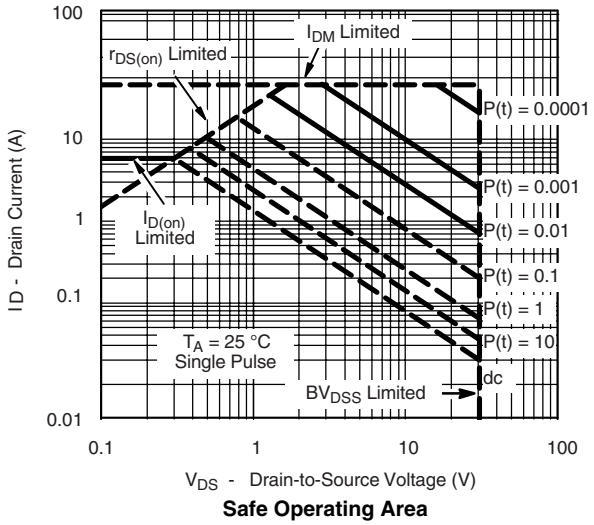
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

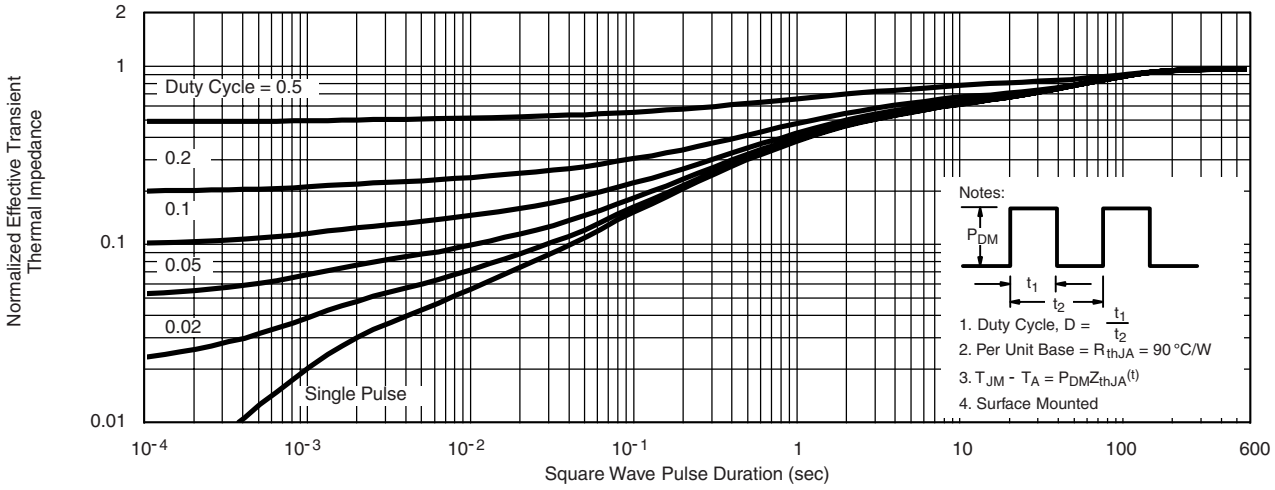


Single Pulse Power

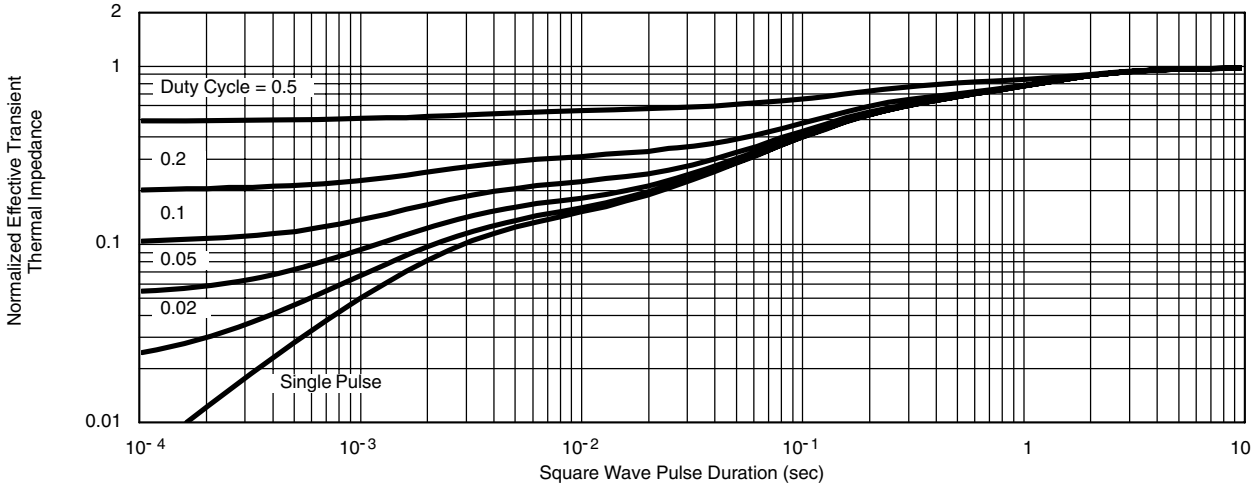


Safe Operating Area

CHANNEL 1 TYPICAL CHARACTERISTICS 25 °C unless noted

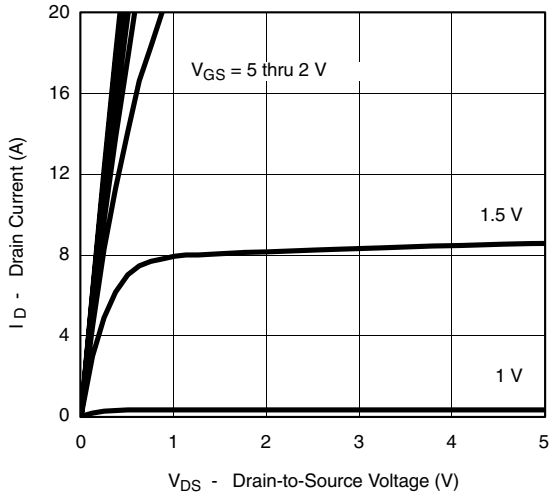


Normalized Thermal Transient Impedance, Junction-to-Ambient

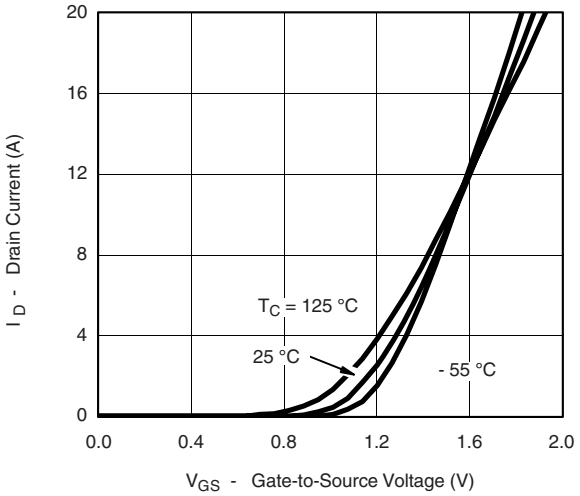


Normalized Thermal Transient Impedance, Junction-to-Foot

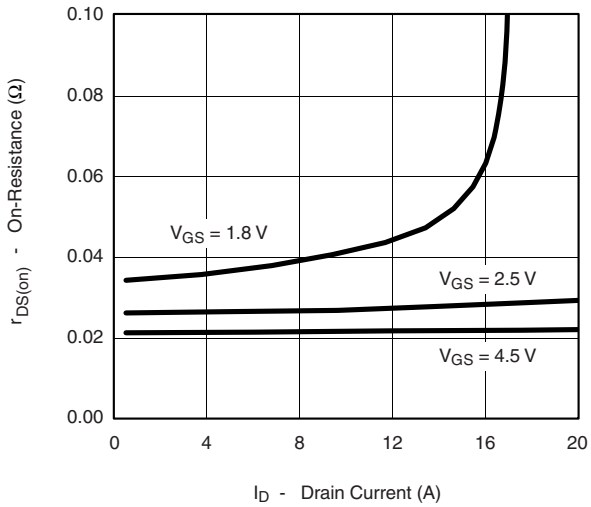
CHANNEL 2 TYPICAL CHARACTERISTICS 25 °C unless noted



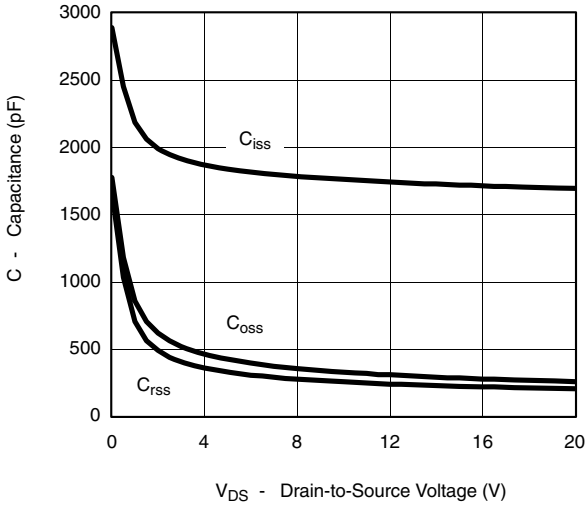
Output Characteristics



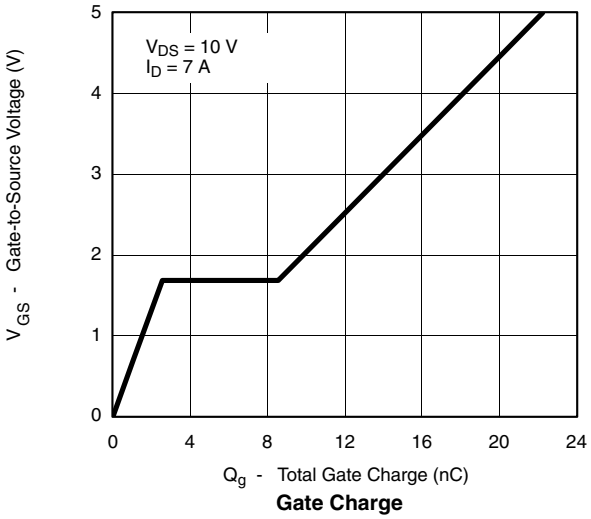
Transfer Characteristics



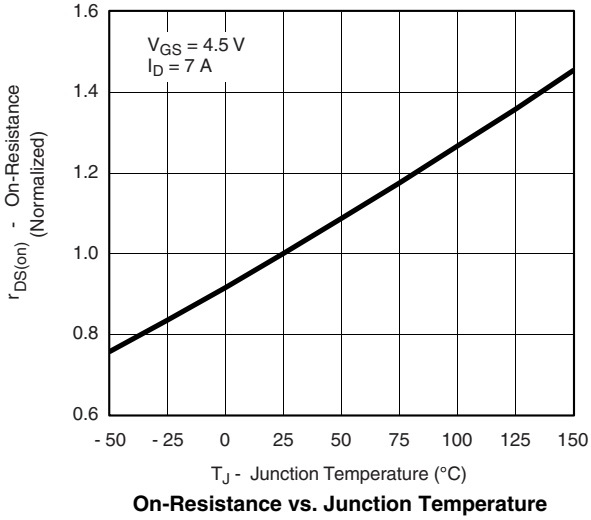
On-Resistance vs. Drain Current



Capacitance

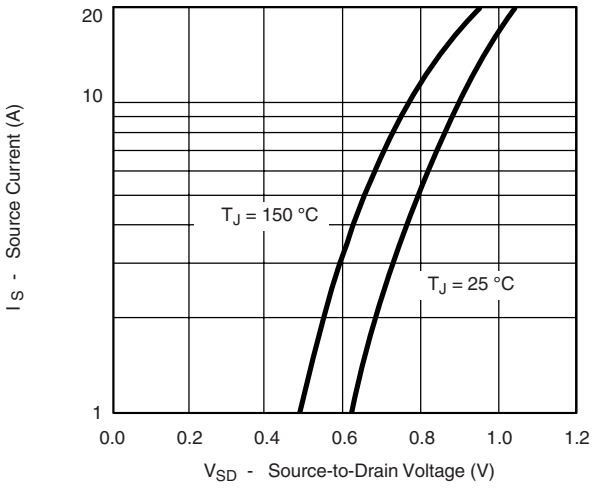


Gate Charge

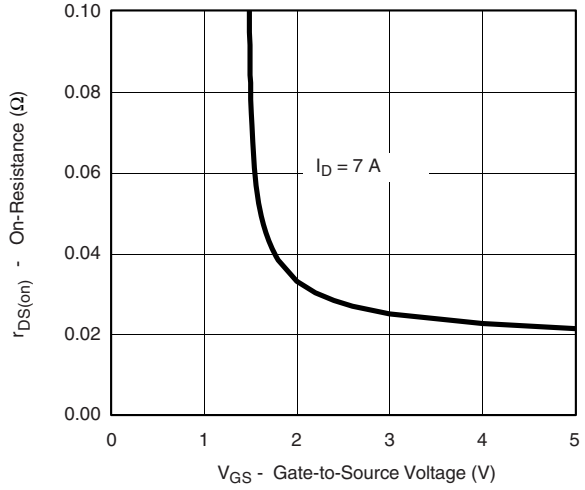


On-Resistance vs. Junction Temperature

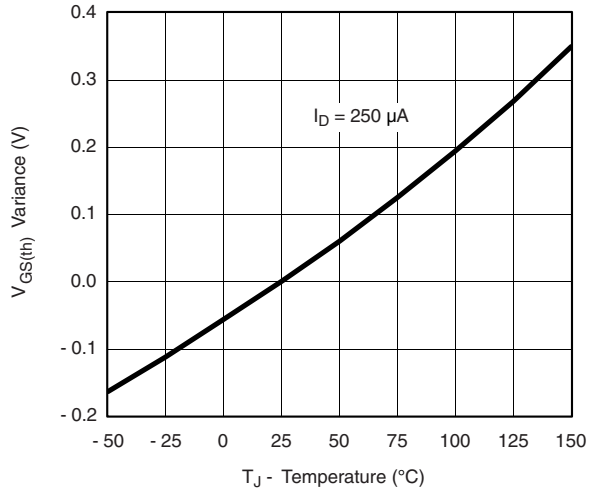
CHANNEL 2 TYPICAL CHARACTERISTICS 25 °C unless noted



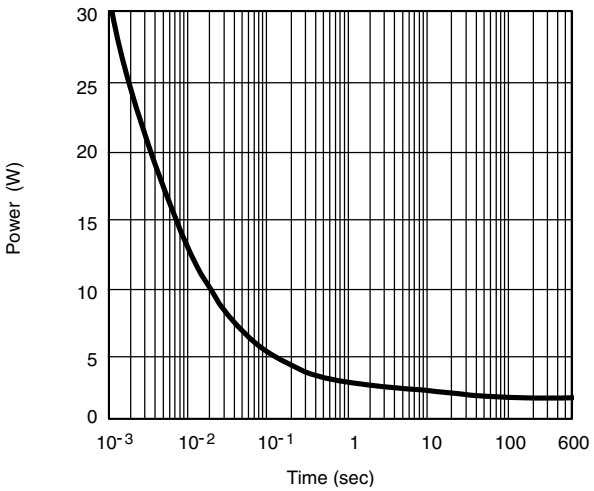
Source-Drain Diode Forward Voltage



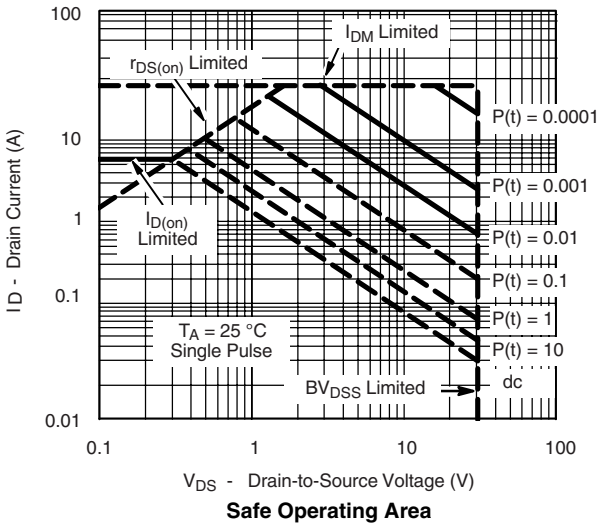
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

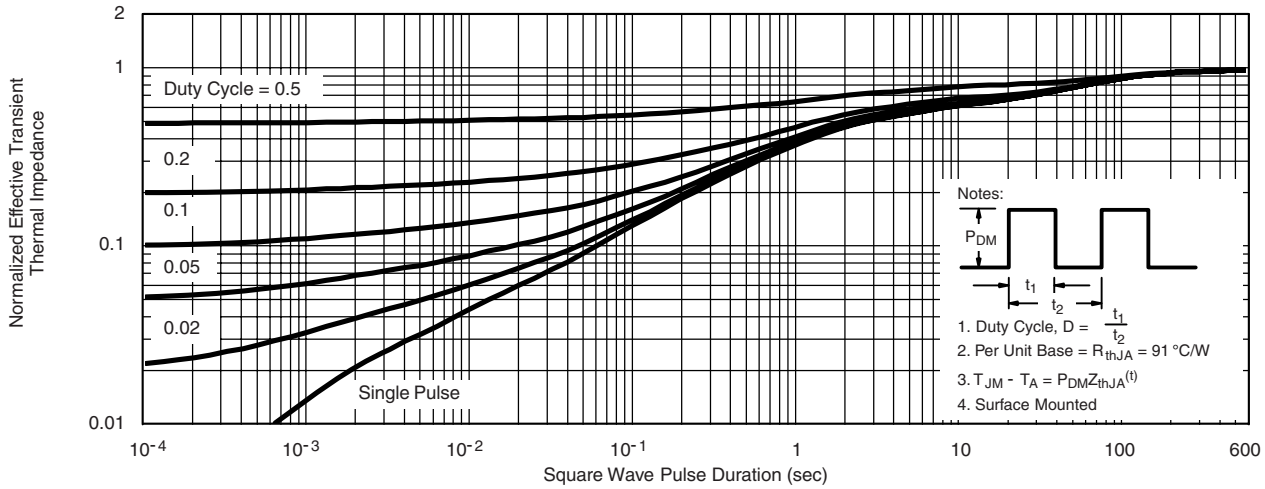


Single Pulse Power

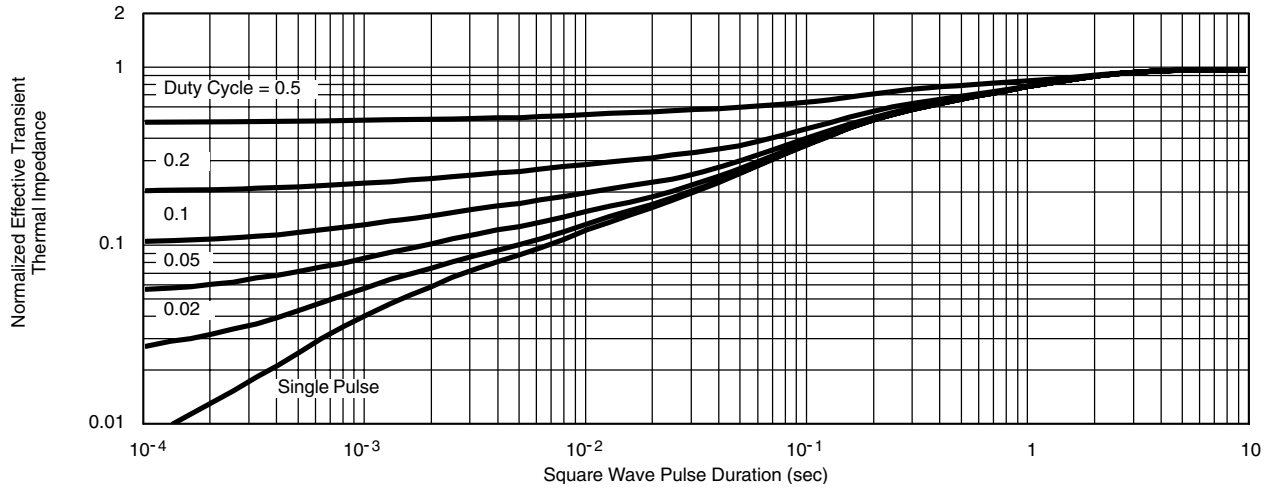


Safe Operating Area

CHANNEL 2 TYPICAL CHARACTERISTICS 25 °C unless noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

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