Assymetrical 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 @ V_{GS} = –10 V	–5.0
		0.100 @ V_{GS} = –4.5 V	–3.7
Channel-2	–20	0.027 @ V_{GS} = –4.5 V	–7.0
		0.035 @ V_{GS} = –2.5 V	–6.2
		0.048 @ V_{GS} = –1.8 V	–5.2

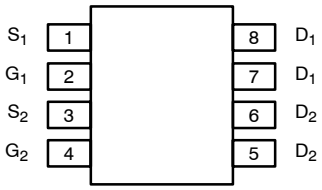
FEATURES

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

APPLICATIONS

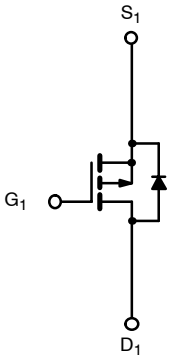
- Game Station
  - Load Switch

SO-8

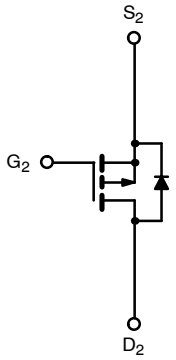


Top View

Ordering Information: Si4955DY—E3
Si4955DY-T1—E3 (with Tape and Reel)



P-Channel MOSFET



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter		Symbol	Channel-1		Channel-2		Unit
			10 secs	Steady State	10 secs	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.

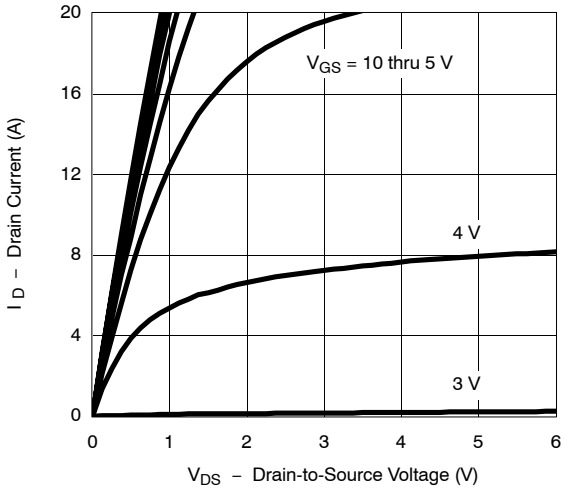
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition		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} = −24 V, V_{GS} = 0 V	Ch 1			−1	μA
		V_{DS} = −16 V, V_{GS} = 0 V	Ch 2			−1	
		V_{DS} = −24 V, V_{GS} = 0 V, T_J = 85°C	Ch 1			−5	
		V_{DS} = −16 V, V_{GS} = 0 V, T_J = 85°C	Ch 2			−5	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ −5 V, V_{GS} = −10 V	Ch 1	−20			A
		V_{DS} ≤ −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 ≅ −1 A, V_{GEN} = −10 V, R_G = 6 Ω Channel-2 V_{DD} = −10 V, R_L = 10 Ω I_D ≅ −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	

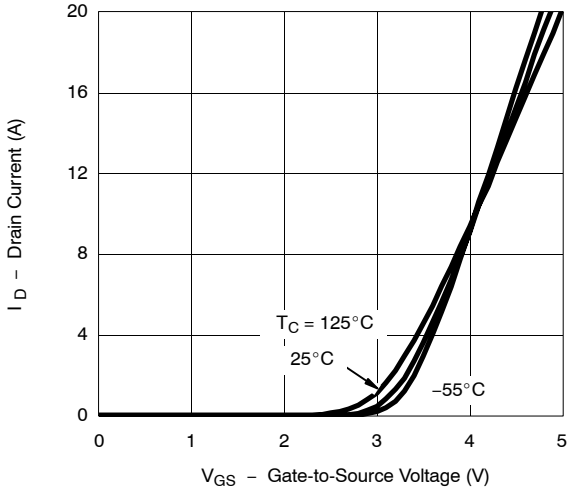
Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) CHANNEL 1

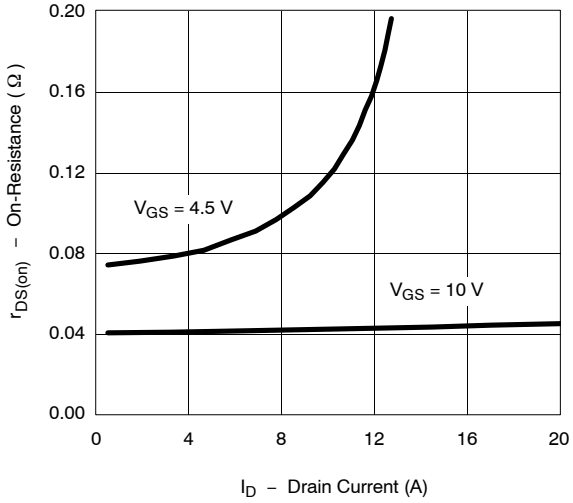
Output Characteristics



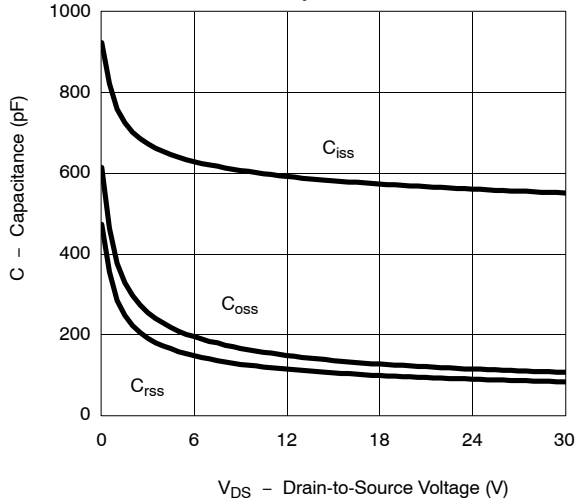
Transfer Characteristics



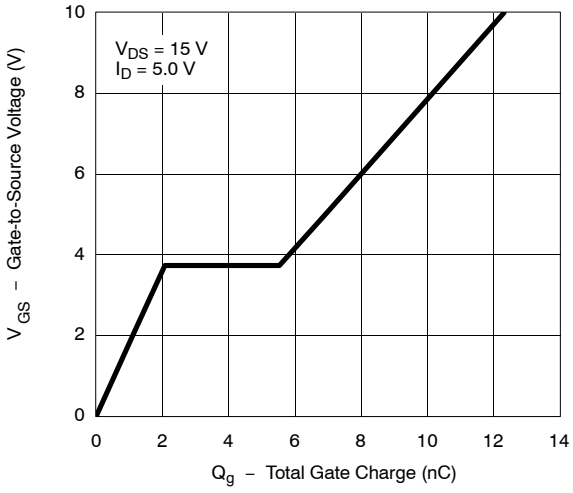
On-Resistance vs. Drain Current



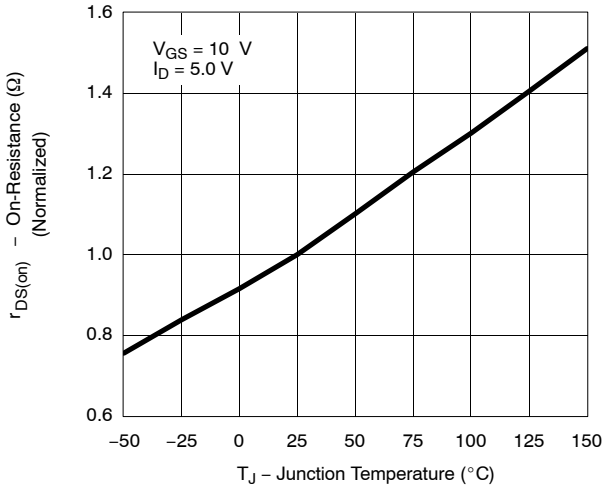
Capacitance



Gate Charge

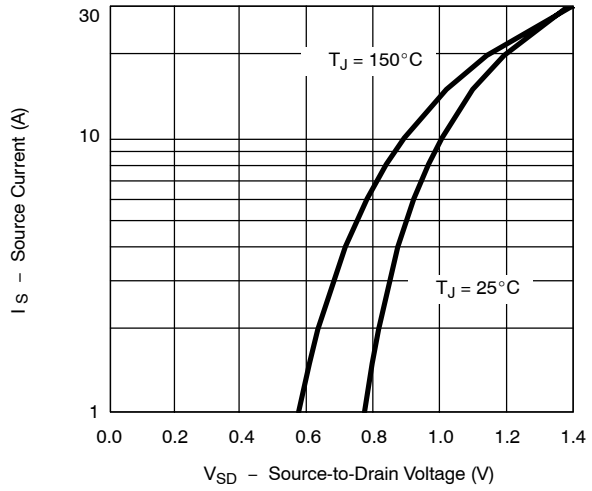


On-Resistance vs. Junction Temperature

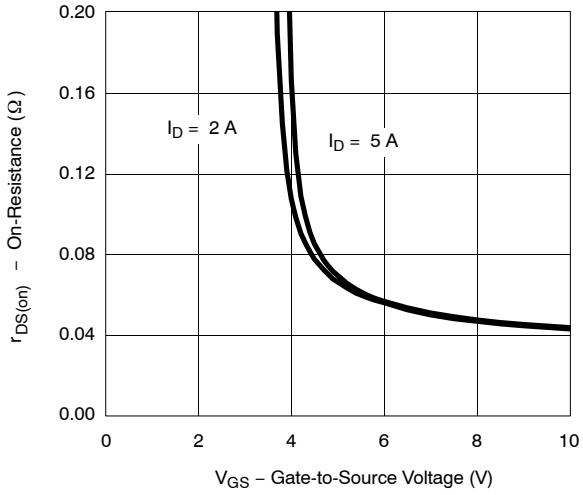


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) CHANNEL 1

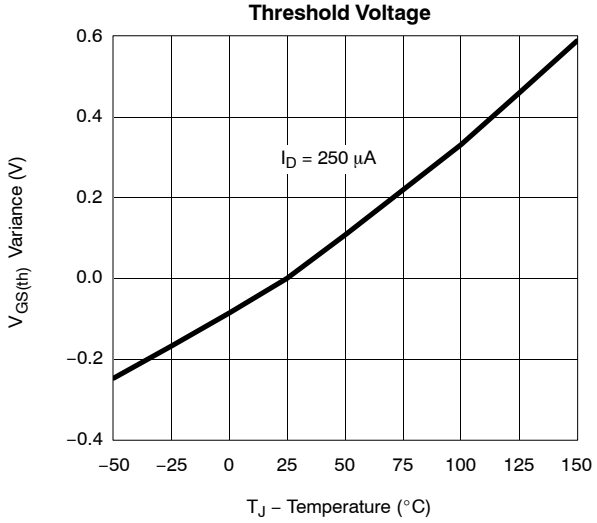
Source-Drain Diode Forward Voltage



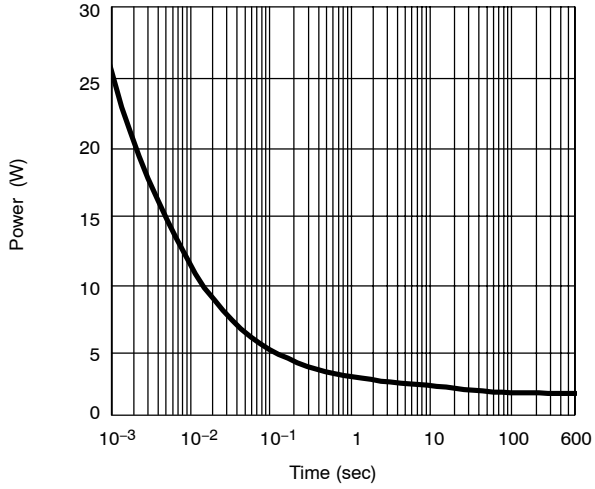
On-Resistance vs. Gate-to-Source Voltage



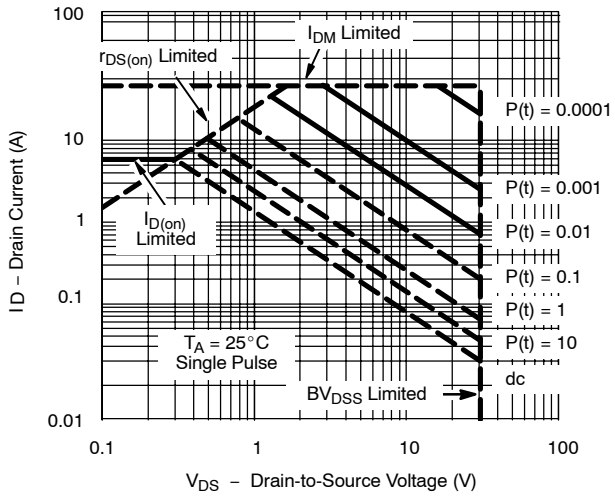
Threshold Voltage



Single Pulse Power

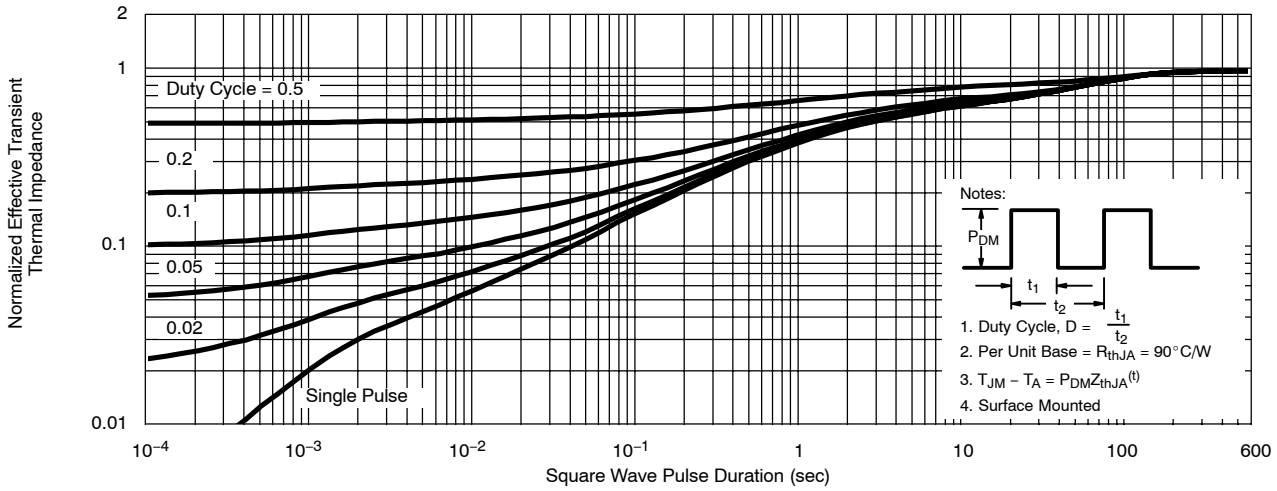


Safe Operating Area

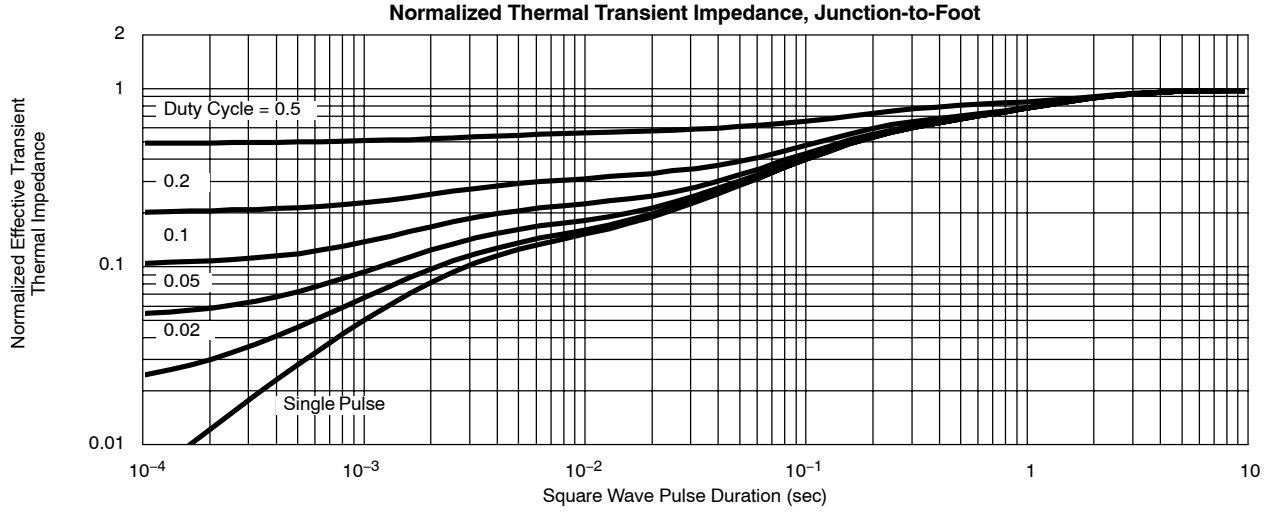


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) CHANNEL 1

Normalized Thermal Transient Impedance, Junction-to-Ambient

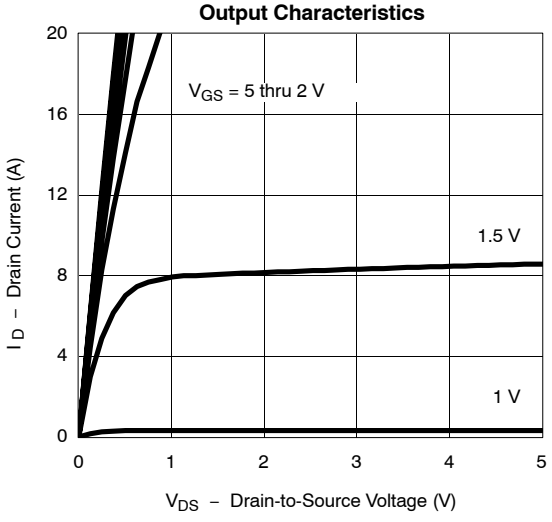


Normalized Thermal Transient Impedance, Junction-to-Foot

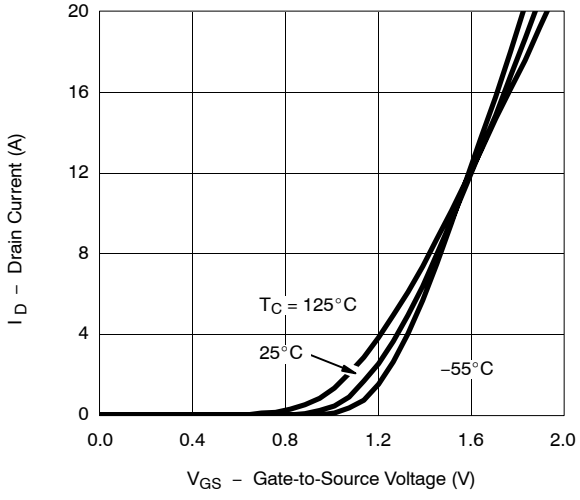


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) CHANNEL 2

Output Characteristics

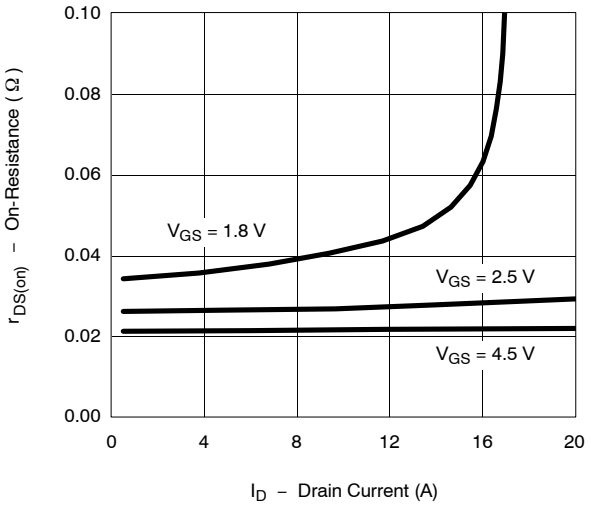


Transfer Characteristics

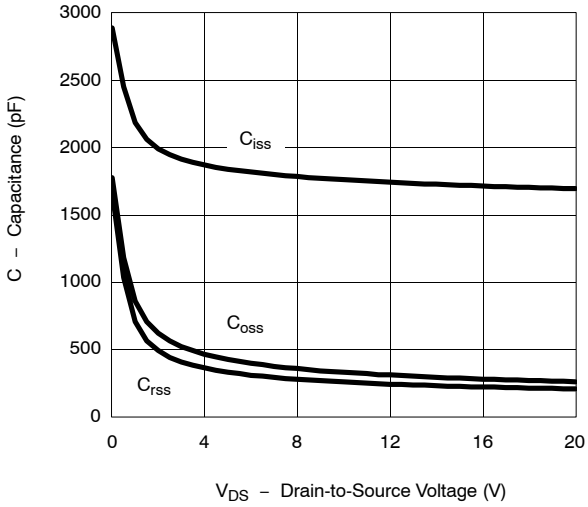


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) CHANNEL 2

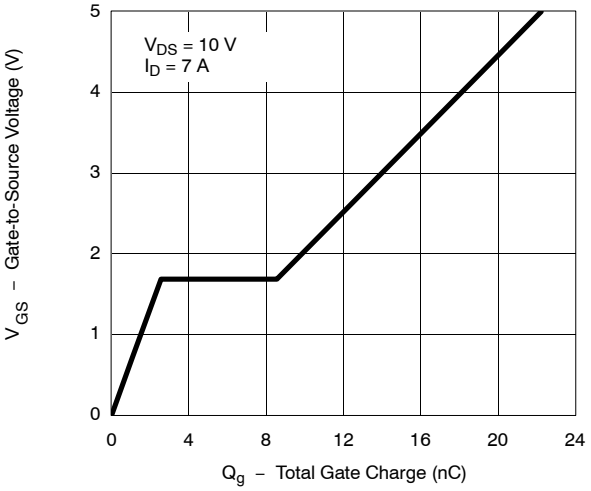
On-Resistance vs. Drain Current



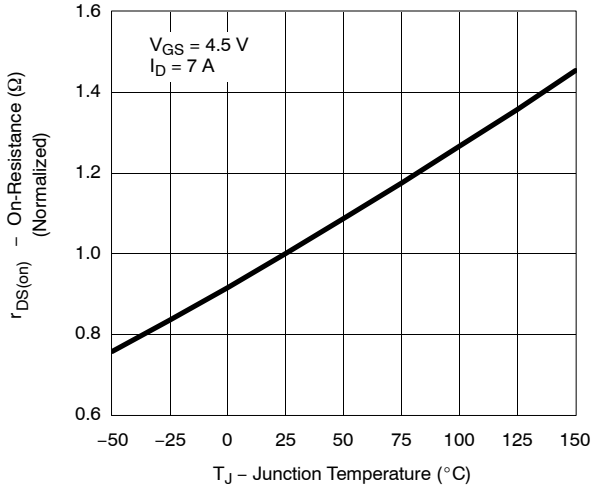
Capacitance



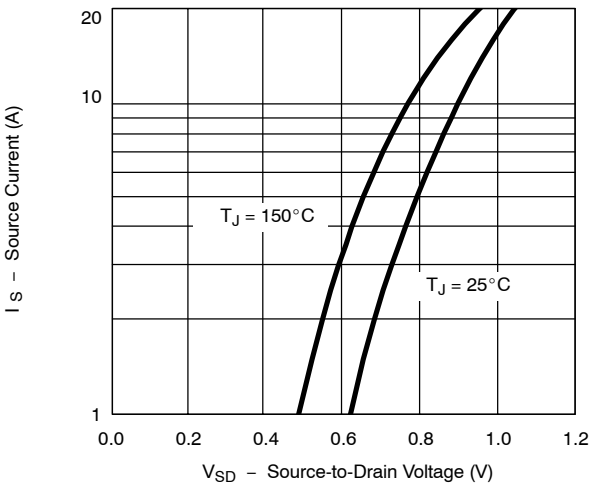
Gate Charge



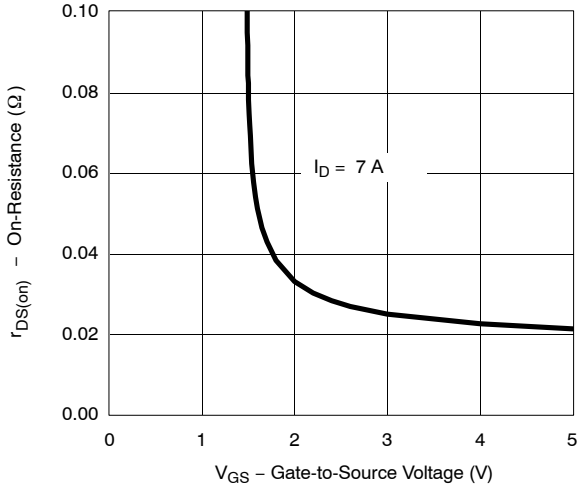
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

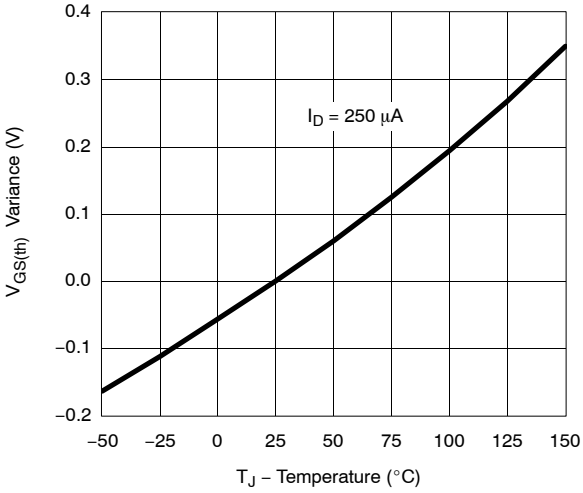


On-Resistance vs. Gate-to-Source Voltage

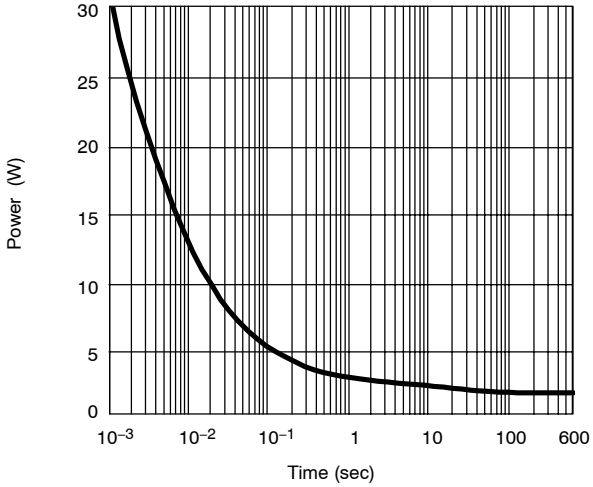


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) CHANNEL 2

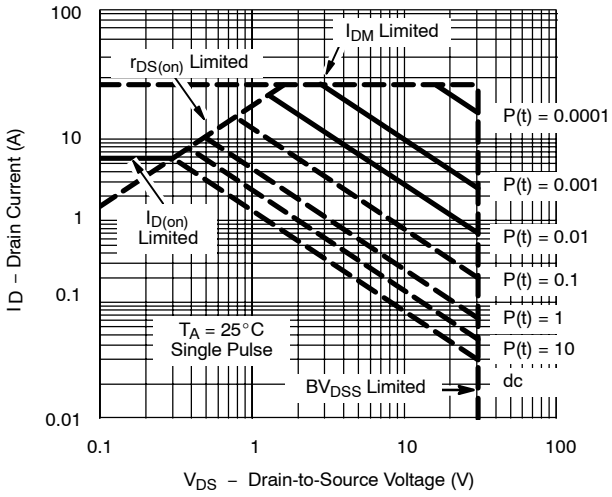
Threshold Voltage



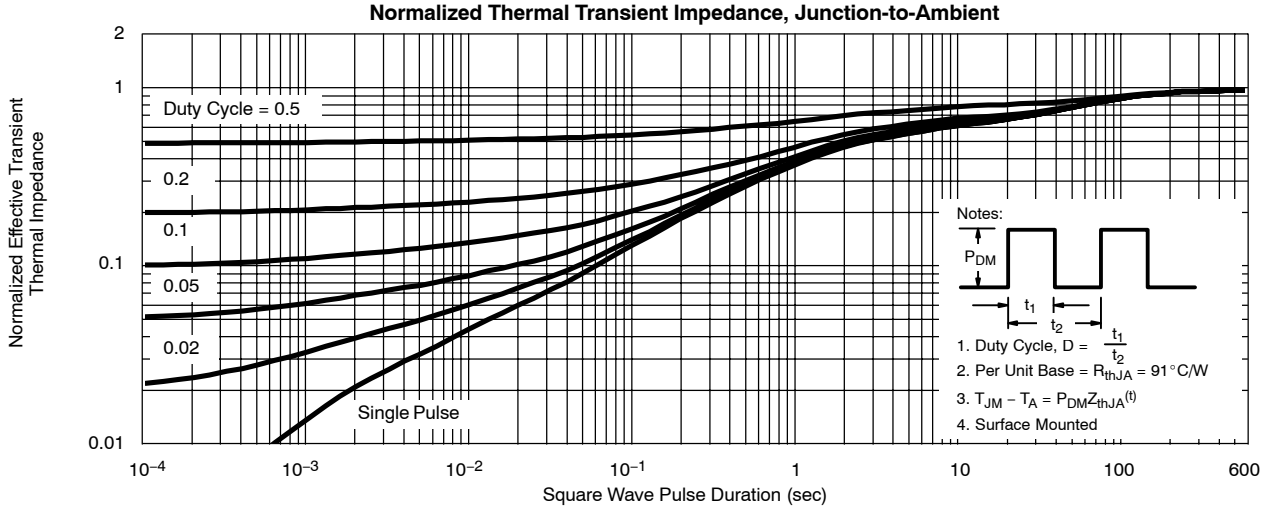
Single Pulse Power



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) CHANNEL 2

Normalized Thermal Transient Impedance, Junction-to-Foot