Complementary 30-V (D-S) MOSFET

PRODUCT SUMMARY			
	V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
P-Channel	−30	0.051 @ V_{GS} = −10 V	−6.4
		0.075 @ V_{GS} = −6 V	−5.3
N-Channel	30	0.035 @ V_{GS} = 10 V	7.7
		0.050 @ V_{GS} = 4.5 V	6.5

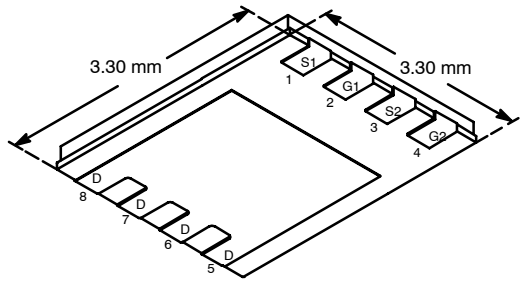
FEATURES

- TrenchFET® Power MOSFET
- New Low Thermal Resistance PowerPAK® Package with Low 1.07-mm Profile

APPLICATIONS

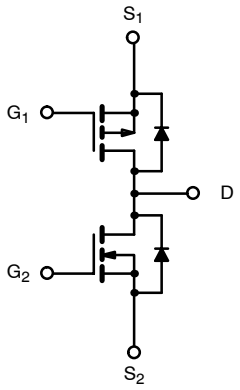
- Backlight Inverter
- DC/DC Converter
  - 4-Cell Battery

PowerPAK 1212-8



Bottom View

Ordering Information: Si7501DN-T1—E3



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)							
Parameter		Symbol	P-Channel		N-Channel		Unit
			10 secs	Steady State	10 secs	Steady State	
Drain-Source Voltage		V_{DS}	−30		30		V
Gate-Source Voltage		V_{GS}	±25		±20		
Continuous Drain Current (T_J = 150°C)[a]	T_A = 25°C	I_D	−6.4	−4.5	7.7	5.4	A
	T_A = 70°C		−5.1	−3.6	4.7	4.3	
Pulsed Drain Current		I_{DM}	−25		25		
Continuous Source Current (Diode Conduction)[a]		I_S	−2.6	−1.3	2.6	1.3	
Maximum Power Dissipation[a]	T_A = 25°C	P_D	3.1	1.6	3.1	1.6	W
	T_A = 70°C		3	1.0	2	1.0	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	−55 to 150				°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[a]	t ≤ 10 sec	R_{thJA}	32	40	°C/W
	Steady State		65	81	
Maximum Junction-to-Foot (Case)	Steady State	R_{thJC}	5	6.3	

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

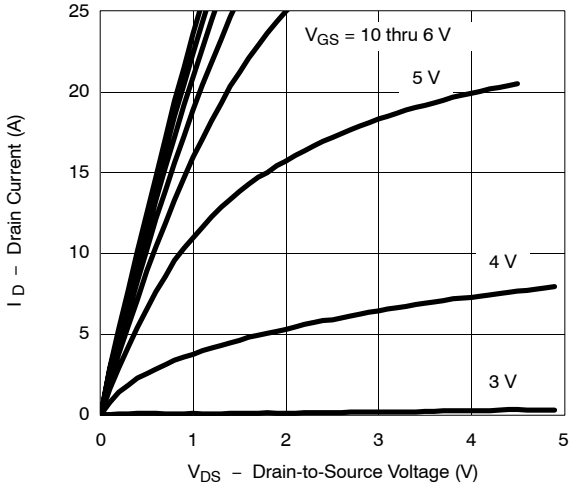
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
Static							
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = –250 μA	P-Ch	–1.0		–3	V
		V_{DS} = V_{GS}, I_D = 250 μA	N-Ch	1.0		3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±25 V	P-Ch			±200	nA
		V_{DS} = 0 V, V_{GS} = ±20 V	N-Ch			±100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = –30 V, V_{GS} = 0 V	P-Ch			–1	μA
		V_{DS} = 30 V, V_{GS} = 0 V	N-Ch			1	
		V_{DS} = –30 V, V_{GS} = 0 V, T_J = 55°C	P-Ch			–5	
		V_{DS} = 30 V, V_{GS} = 0 V, T_J = 55°C	N-Ch			5	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ –5 V, V_{GS} = –10 V	P-Ch	–25			A
		V_{DS} ≤ 5 V, V_{GS} = 10 V	N-Ch	25			
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = –10 V, I_D = –6.4 A	P-Ch		0.041	0.051	Ω
		V_{GS} = 10 V, I_D = 7.7 A	N-Ch		0.028	0.035	
		V_{GS} = –6 V, I_D = –5.3 A	P-Ch		0.055	0.075	
		V_{GS} = 4.5 V, I_D = 6.5 A	N-Ch		0.040	0.050	
Forward Transconductance[a]	g_{fs}	V_{DS} = –15 V, I_D = –6.4 A	P-Ch		13		S
		V_{DS} = 15 V, I_D = 7.7 A	N-Ch		15		
Diode Forward Voltage[a]	V_{SD}	I_S = –1.7 A, V_{GS} = 0 V	P-Ch		–0.80	–1.2	V
		I_S = 1.7 A, V_{GS} = 0 V	N-Ch		0.80	1.2	
Dynamic[b]							
Total Gate Charge	Q_g	P-Channel V_{DS} = –15 V, V_{GS} = –10 V, I_D = –6.4 A N-Channel V_{DS} = 15 V, V_{GS} = 10 V, I_D = 7.7 A	P-Ch		12.5	19	nC
			N-Ch		9	14	
Gate-Source Charge	Q_{gs}		P-Ch		2.5		
			N-Ch		2		
Gate-Drain Charge	Q_{gd}		P-Ch		3.6		
			N-Ch		1.3		
Gate Resistance	R_g		P-Ch		9		Ω
			N-Ch		3		
Turn-On Delay Time	$t_{d(on)}$	P-Channel V_{DD} = –15 V, R_L = 5 Ω I_D ≅ –3 A, V_{GEN} = –10 V, R_G = 1 Ω N-Channel V_{DD} = 15 V, R_L = 5 Ω I_D ≅ 3 A, V_{GEN} = 10 V, R_G = 1 Ω	P-Ch		10	15	ns
			N-Ch		10	15	
Rise Time	t_r		P-Ch		20	30	
			N-Ch		15	25	
Turn-Off Delay Time	$t_{d(off)}$		P-Ch		25	40	
			N-Ch		20	30	
Fall Time	t_f		P-Ch		30	45	
			N-Ch		10	15	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = –1.7 A, di/dt = 100 A/μs	P-Ch		25	50	
		I_F = 1.7 A, di/dt = 100 A/μs	N-Ch		20	40	

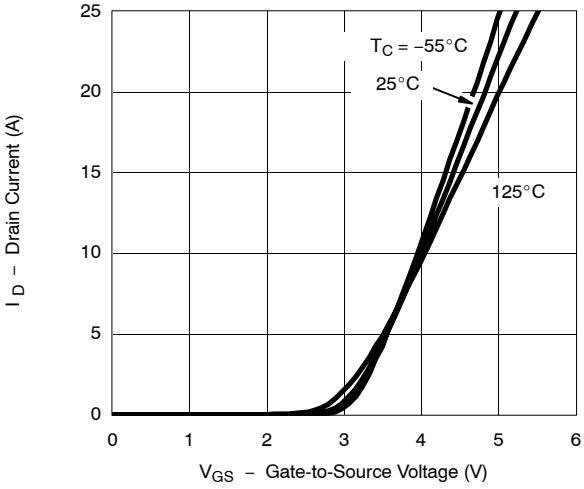
Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) P-CHANNEL

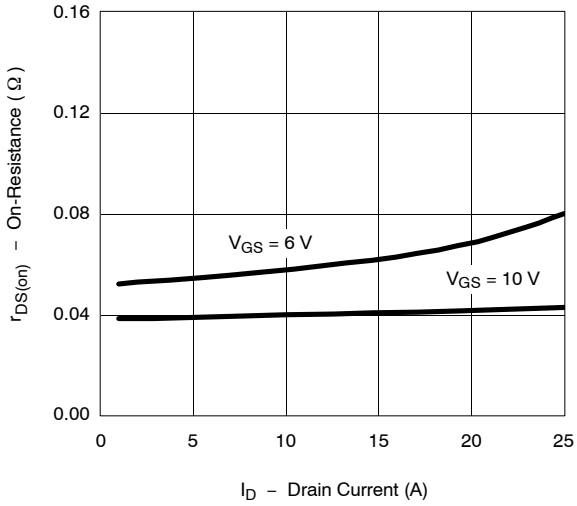
Output Characteristics



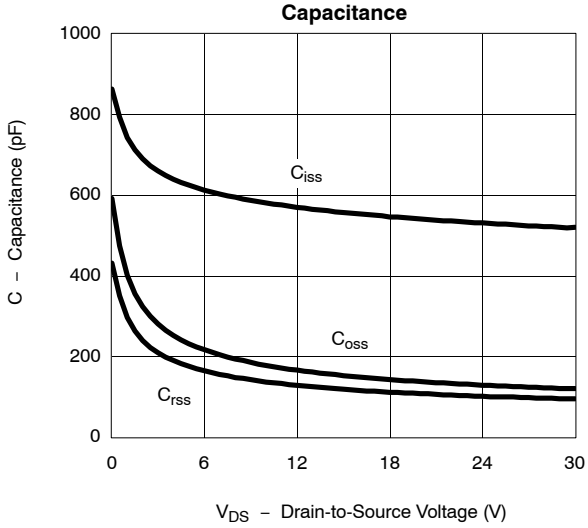
Transfer Characteristics



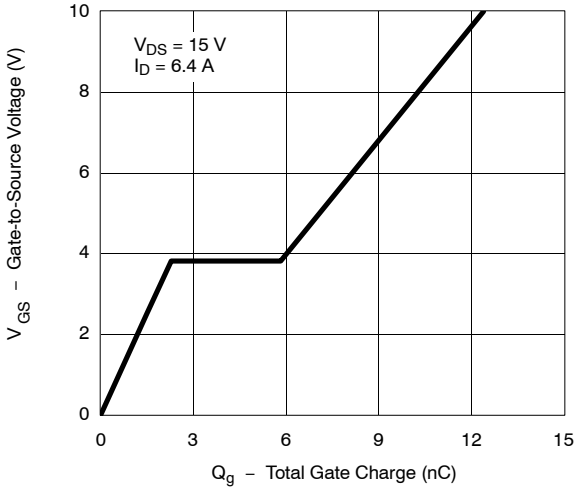
On-Resistance vs. Drain Current



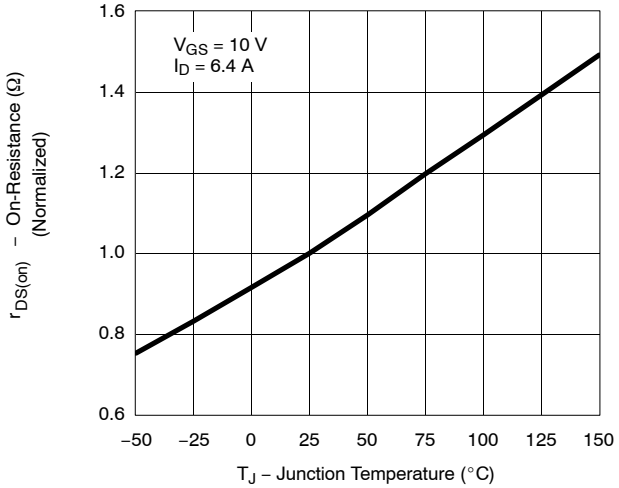
Capacitance



Gate Charge

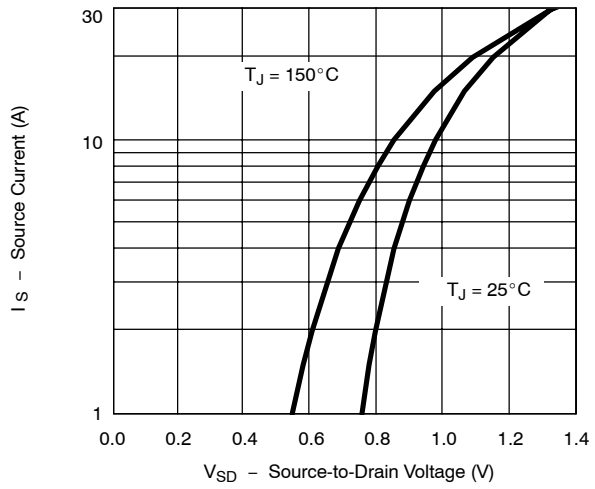


On-Resistance vs. Junction Temperature

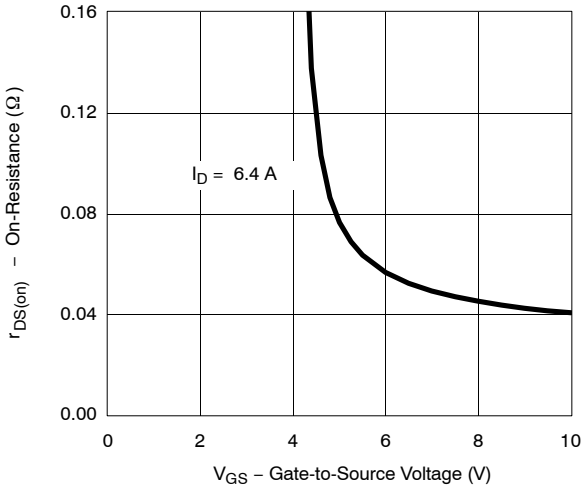


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) P-CHANNEL

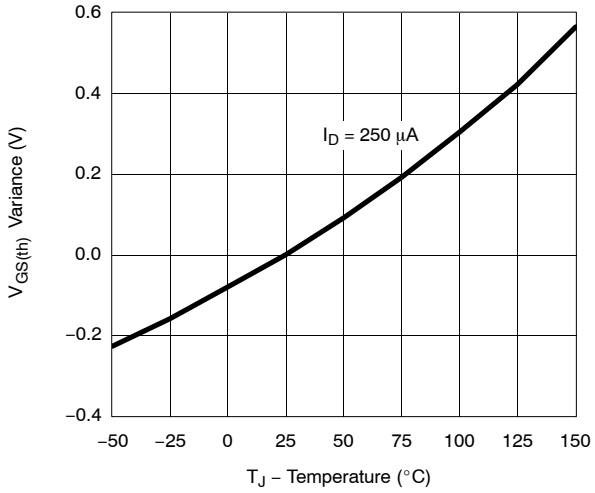
Source-Drain Diode Forward Voltage



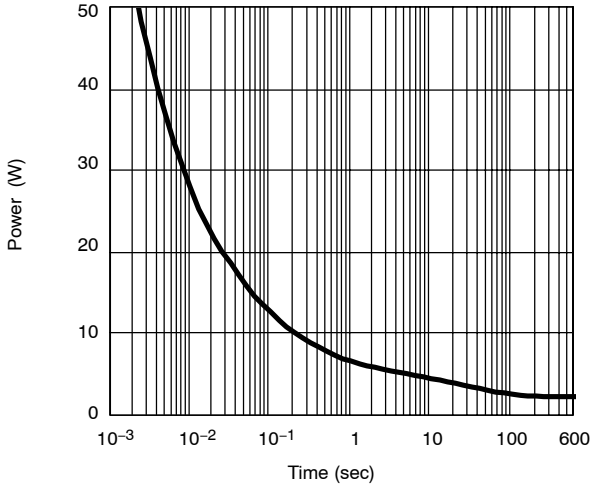
On-Resistance vs. Gate-to-Source Voltage



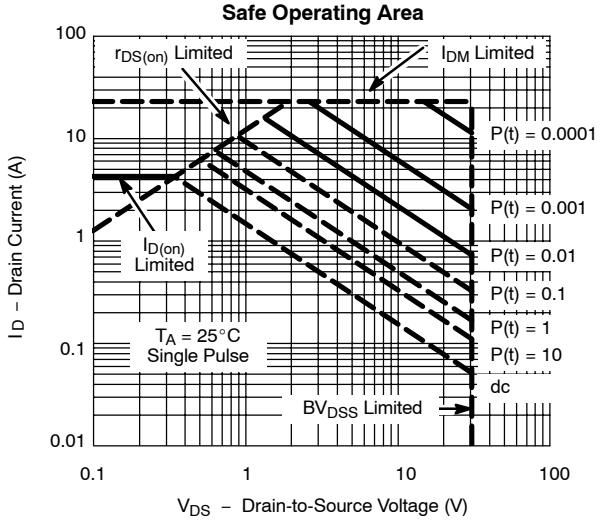
Threshold Voltage



Single Pulse Power

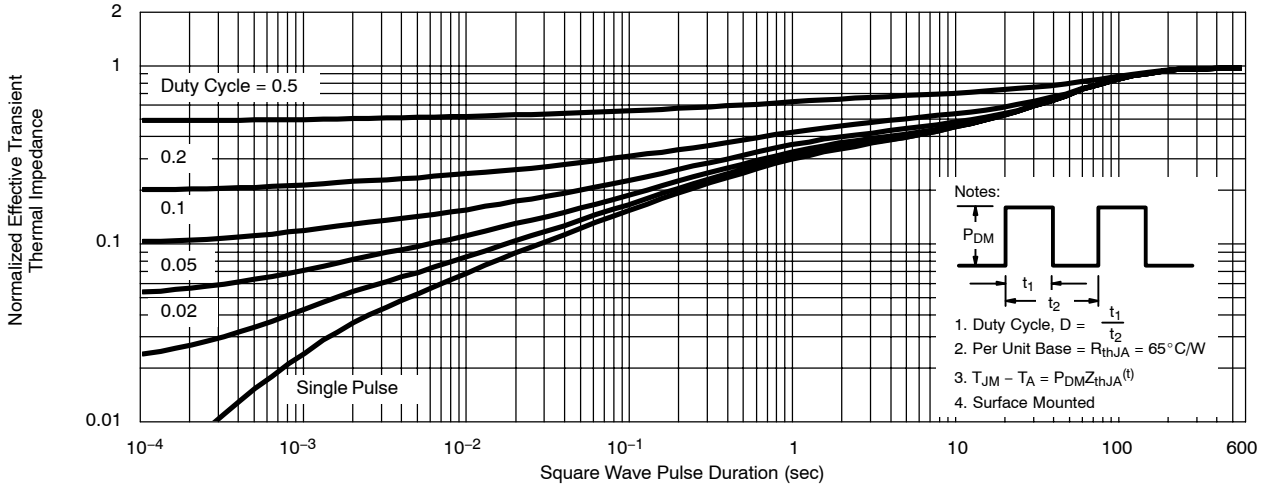


Safe Operating Area

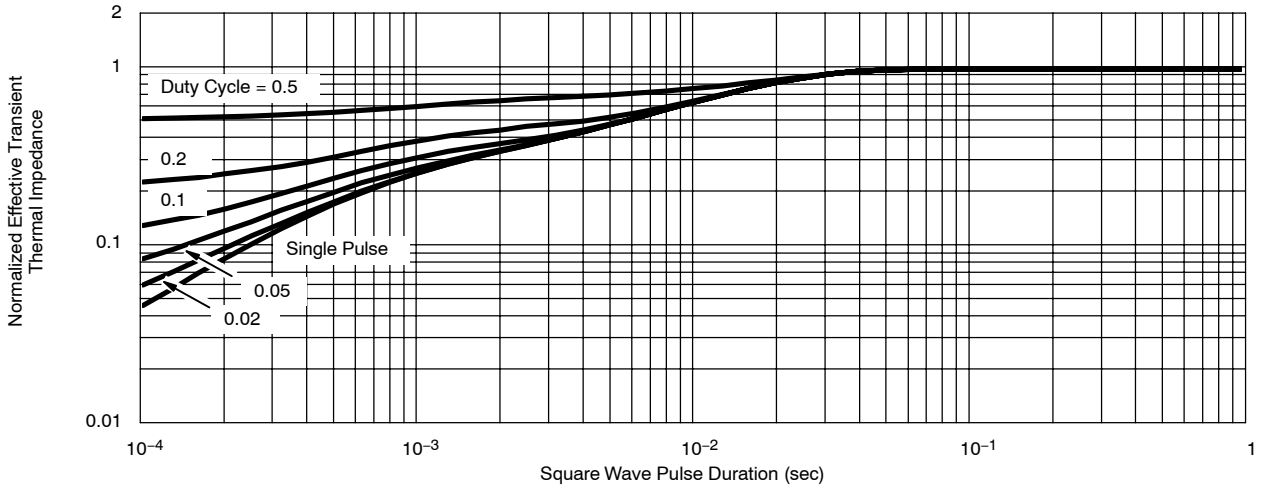


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) P-CHANNEL

Normalized Thermal Transient Impedance, Junction-to-Ambient

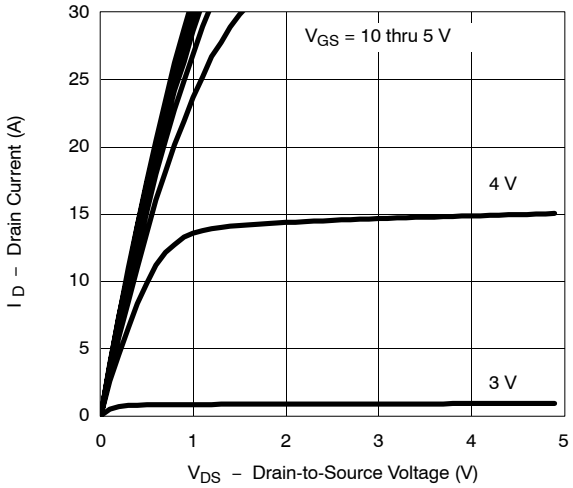


Normalized Thermal Transient Impedance, Junction-to-Case

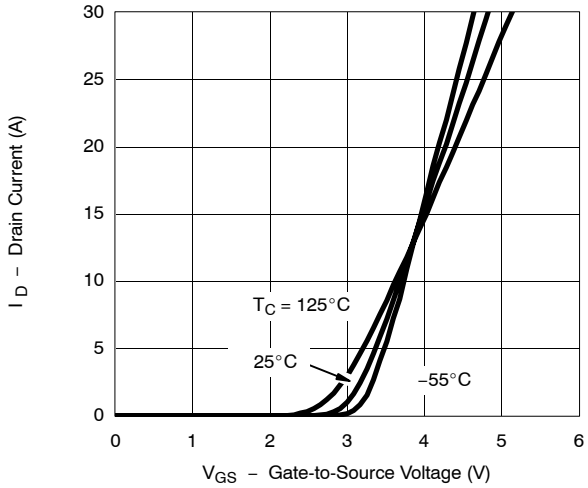


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL

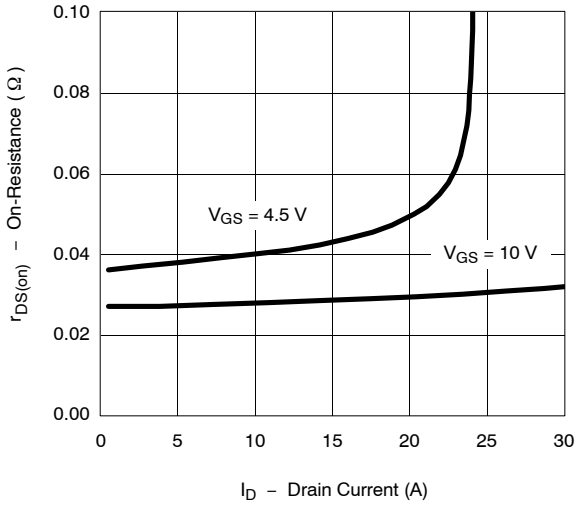
Output Characteristics



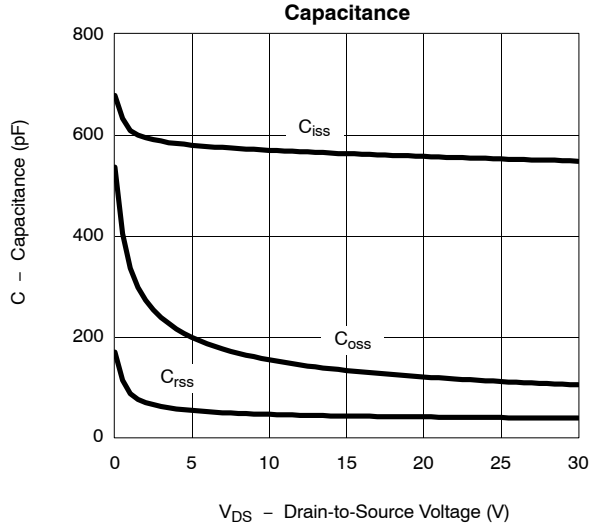
Transfer Characteristics



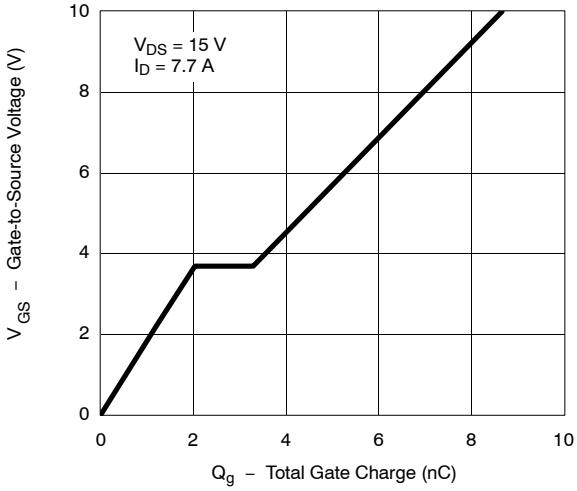
On-Resistance vs. Drain Current



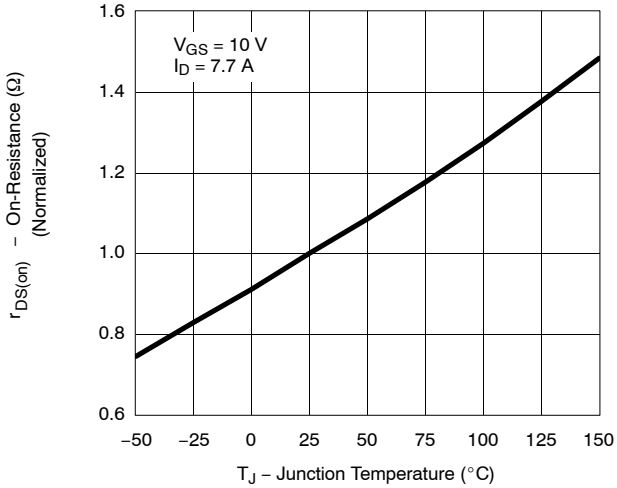
Capacitance



Gate Charge

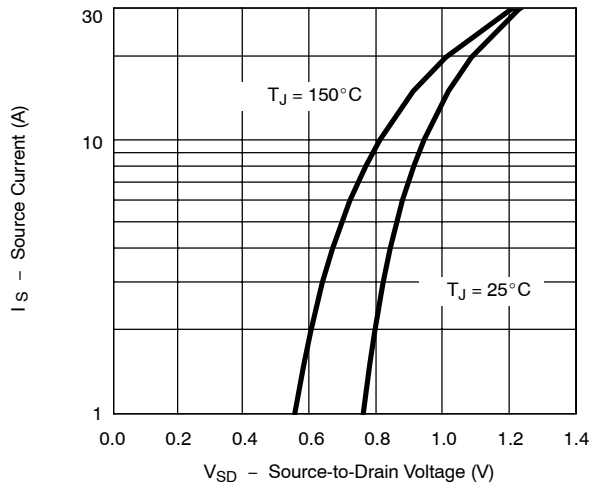


On-Resistance vs. Junction Temperature

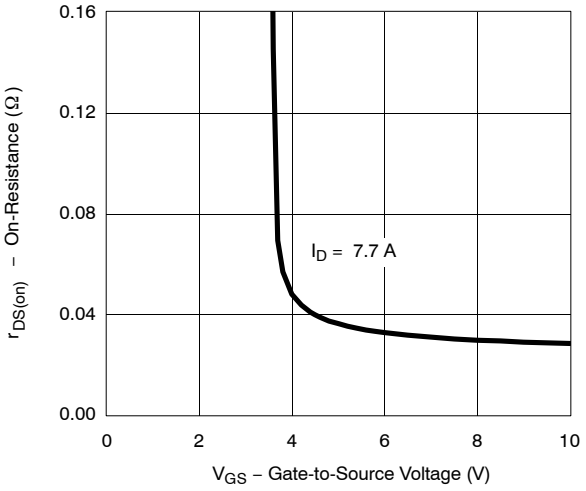


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL

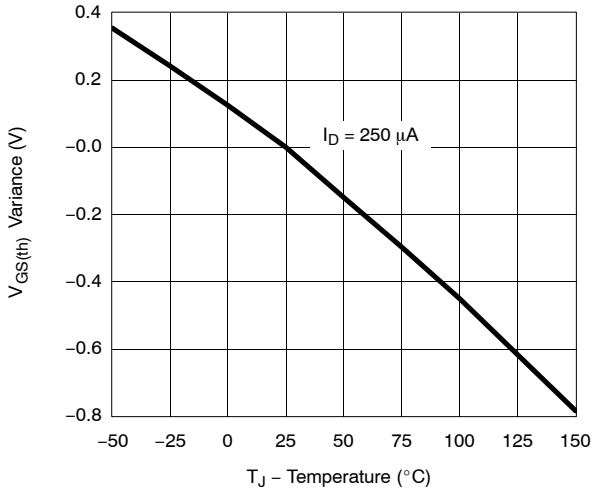
Source-Drain Diode Forward Voltage



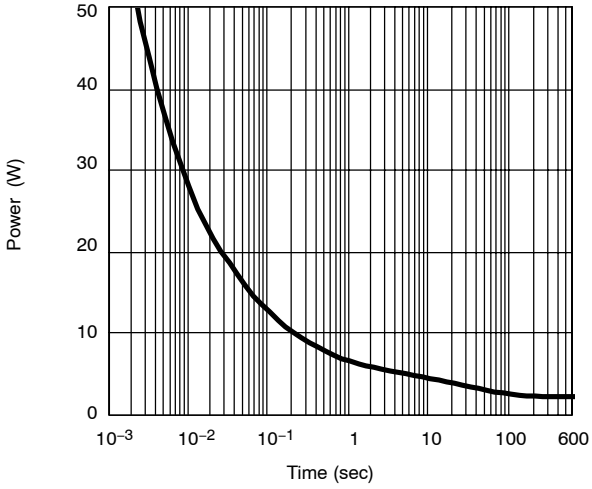
On-Resistance vs. Gate-to-Source Voltage



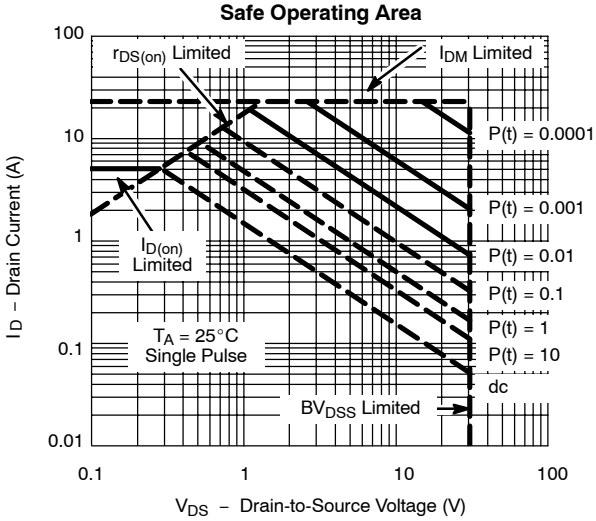
Threshold Voltage



Single Pulse Power

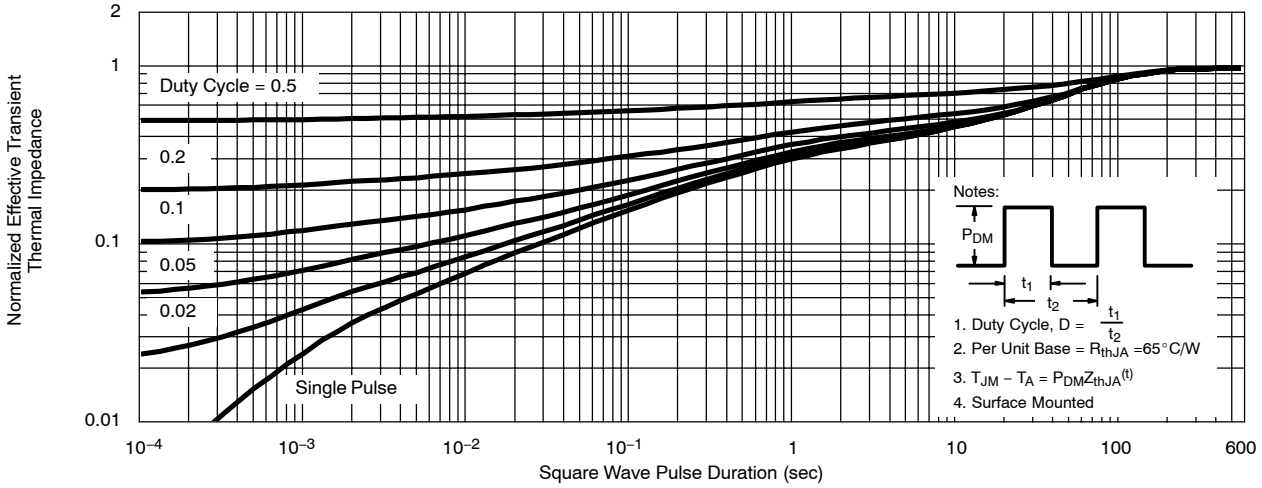


Safe Operating Area



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED) N-CHANNEL

Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case