N- and P-Channel 60-V (D-S) MOSFET

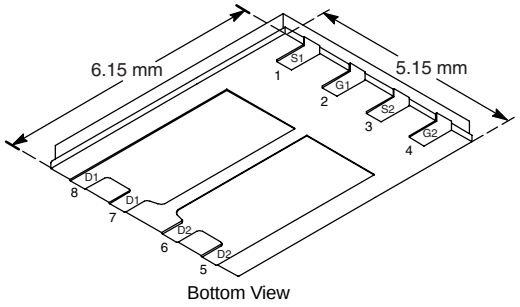
PRODUCT SUMMARY				
	V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
N-Ch	60	0.075 at V_{GS} = 10 V	4.6	12 nC
		0.100 at V_{GS} = 4.5 V	4.0	
P-Ch	- 60	0.064 at V_{GS} = - 10 V	- 5.0	47
		0.080 at V_{GS} = - 4.5 V	- 4.5	

FEATURES

- **Halogen-free According to IEC 61249-2-21 Available**
- TrenchFET® Power MOSFET
- New Low Thermal Resistance PowerPAK® Package with Low 1.07 mm Profile
- 100 % R_g Tested

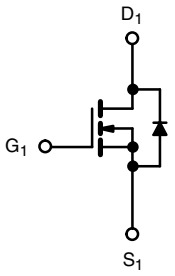
Pb-free
RoHS COMPLIANT
HALOGEN FREE Available

PowerPAK SO-8

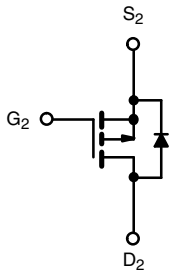


Bottom View

Ordering Information: Si7530DP-T1-E3 (Lead (Pb)-free)
Si7530DP-T1-GE3 (Lead (Pb)-free and Halogen-free)



N-Channel MOSFET



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted

Parameter		Symbol	N-Channel		P-Channel		Unit
			10 s	Steady	10 s	Steady	
Drain-Source Voltage		V_{DS}	60		- 60		V
Gate-Source Voltage		V_{GS}	± 20				
Continuous Drain Current (T_J = 150 °C)[a]	T_A = 25°C	I_D	4.6	3.0	- 5.0	- 3.2	A
	T_A = 70°C		3.6	2.4	- 4.0	- 2.6	
Pulsed Drain Current		I_{DM}	15		- 25		
Continuous Source Current (Diode Conduction)[a]		I_S	2.7	1.2	- 2.9	- 1.2	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	15		- 22		
Single Pulse Repetitive Avalanche Energy[b]		E_{AS}	11		24.2		mJ
Maximum Power Dissipation[a]	T_A = 25°C	P_D	3.3	1.4	3.5	1.5	W
	T_A = 70°C		2.1	0.9	2.2	0.94	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150				°C
Soldering Recommendations (Peak Temperature)[c, d]			260				

THERMAL RESISTANCE RATINGS

Parameter		Symbol	N-Channel		P-Channel		Unit
			Typical	Maximum	Typical	Maximum	
Maximum Junction-to-Ambient[a]	t ≤ 10 s	R_{thJA}	29	38	27	36	°C/W
	Steady State		60	85	60	85	
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	4.0	5.2	3.3	4.3	

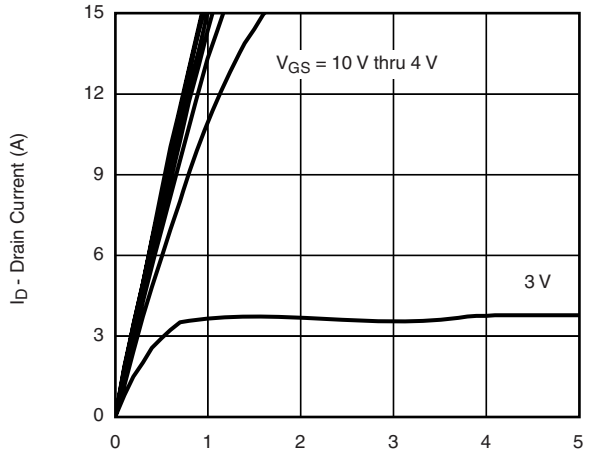
Notes:
a. Surface Mounted on 1" x 1" FR4 board.
b. Duty Cycle ≤ 1 %.
c. See Solder Profile (*www.vishay.com/ppg?73257*). The PowerPAK SO-8 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
d. Rework Conditions: manual soldering with a soldering iron is not recommended for leadless components.

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	N-Ch	1		3	V
		V_{DS} = V_{GS}, I_D = - 250 µA	P-Ch	- 1		- 3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	N-Ch			± 100	nA
			P-Ch			± 100	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V	N-Ch			1	µA
		V_{DS} = - 60 V, V_{GS} = 0 V	P-Ch			- 1	
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 55°C	N-Ch			5	
		V_{DS} = - 60 V, V_{GS} = 0 V, T_J = 55°C	P-Ch			- 5	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ 5 V, V_{GS} = 10 V	N-Ch	15			A
		$V_{DS} \leq$ - 5 V, V_{GS} = - 10 V	P-Ch	- 25			
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 4.6 A	N-Ch		0.060	0.075	Ω
		V_{GS} = - 10 V, I_D = - 5.0 A	P-Ch		0.051	0.064	
		V_{GS} = 4.5 V, I_D = 4.0 A	N-Ch		0.080	0.100	
		V_{GS} = - 4.5 V, I_D = - 4.5 A	P-Ch		0.064	0.080	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 4.6 A	N-Ch		6		S
		V_{DS} = - 15 V, I_D = - 5.0 A	P-Ch		16		
Diode Forward Voltage[a]	V_{SD}	I_S = 2.7 A, V_{GS} = 0 V	N-Ch		0.85	1.2	V
		I_S = - 2.9 A, V_{GS} = 0 V	P-Ch		- 0.85	- 1.2	
Dynamic[b]							
Total Gate Charge	Q_g	N-Channel V_{DS} = 30 V, V_{GS} = 10 V, I_D = 15 A P-Channel V_{DS} = - 30 V, V_{GS} = - 10 V, I_D = - 5.0 A	N-Ch		12	20	nC
			P-Ch		26	40	
Gate-Source Charge	Q_{gs}		N-Ch		2		
			P-Ch		4.5		
Gate-Drain Charge	Q_{gd}		N-Ch		3.5		
			P-Ch		7		
Gate Resistance	R_g	f = 1.0 MHz	N-Ch	0.6	1.5	2.5	Ω
			P-Ch	3.5	7	11	
Turn-On Delay Time	$t_{d(on)}$	N-Channel V_{DD} = 30 V, R_L = 30 Ω $I_D \cong$ 1 A, V_{GEN} = 10 V, R_g = 6 Ω P-Channel V_{DD} = - 30 V, R_L = 30 Ω $I_D \cong$ - 1 A, V_{GEN} = - 10 V, R_g = 6 Ω	N-Ch		7	15	ns
			P-Ch		8	15	
Rise Time	t_r		N-Ch		8	15	
			P-Ch		9	15	
Turn-Off Delay Time	$t_{d(off)}$		N-Ch		15	25	
			P-Ch		65	100	
Fall Time	t_f		N-Ch		7	20	
			P-Ch		30	45	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 2.7 A, dI/dt = 100 A/µs	N-Ch		30	60	
		I_F = - 5 A, dI/dt = 100 A/µs	P-Ch		40	80	
Reverse Recovery Energy	Q_{rr}	I_F = 2.7 A, dI/dt = 100 A/µs	N-Ch		33	66	pC
		I_F = - 5 A, dI/dt = 100 A/µs	P-Ch		57	115	

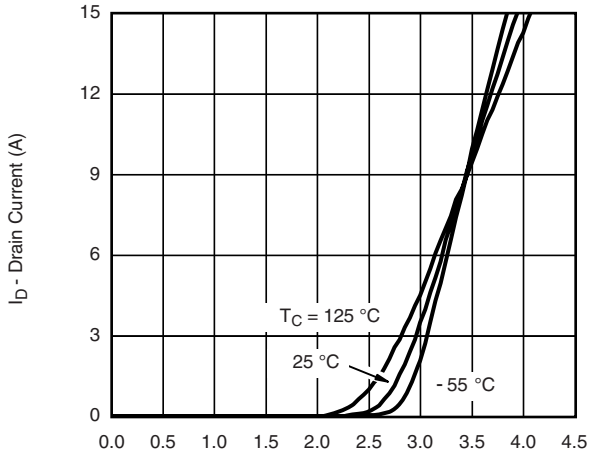
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

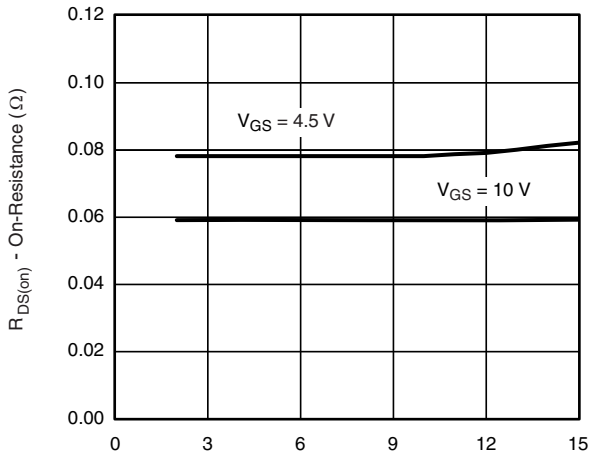
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



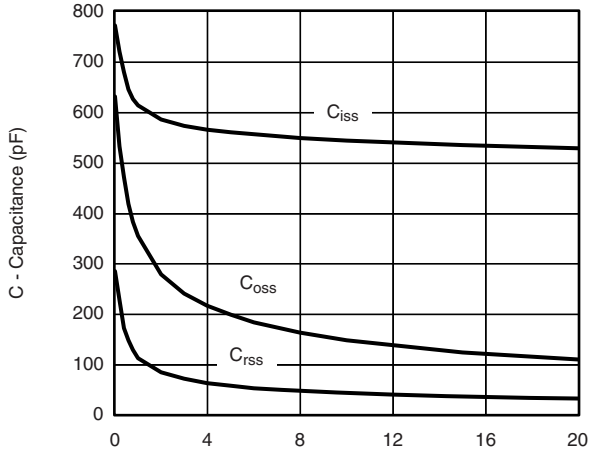
Output Characteristics



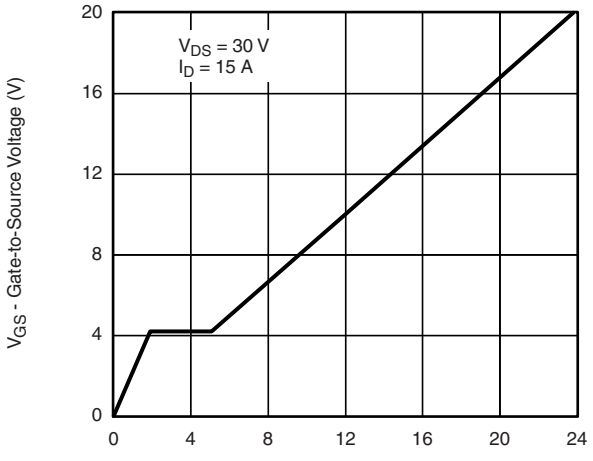
Transfer Characteristics



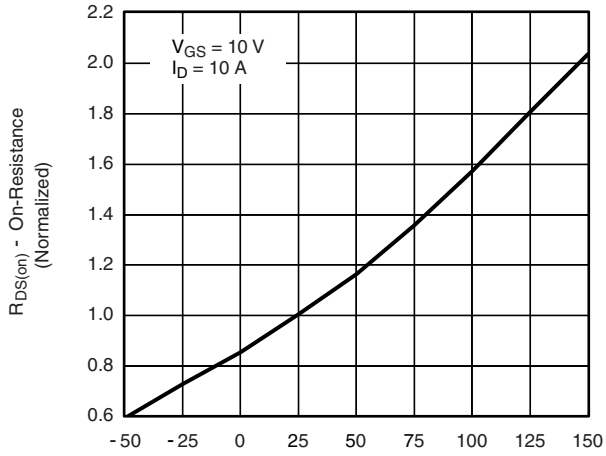
On-Resistance vs. Drain Current



Capacitance

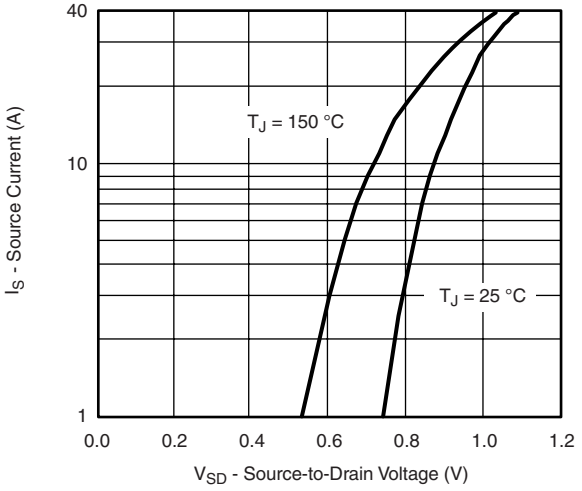


Gate Charge

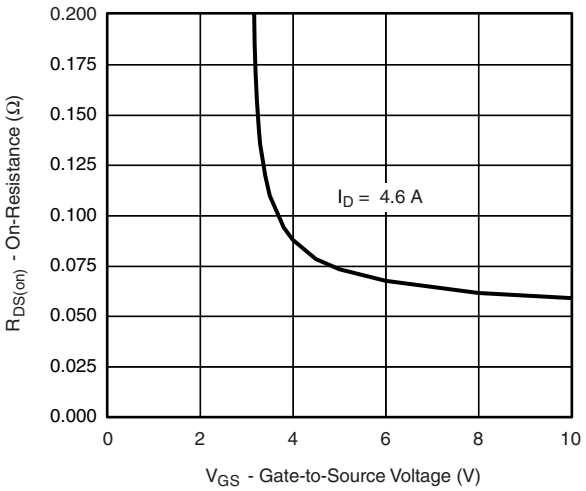


On-Resistance vs. Junction Temperature

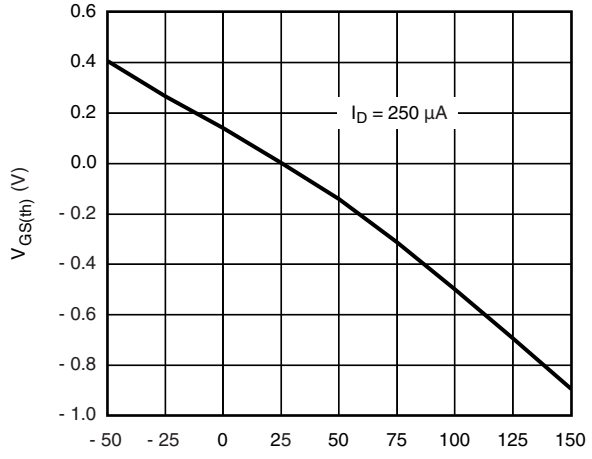
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



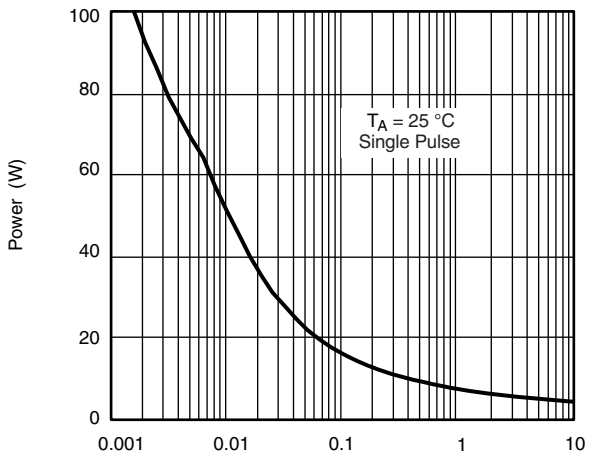
Source-Drain Diode Forward Voltage



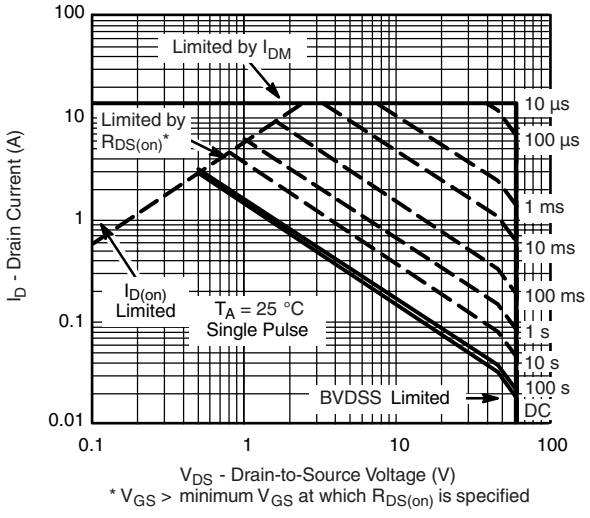
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



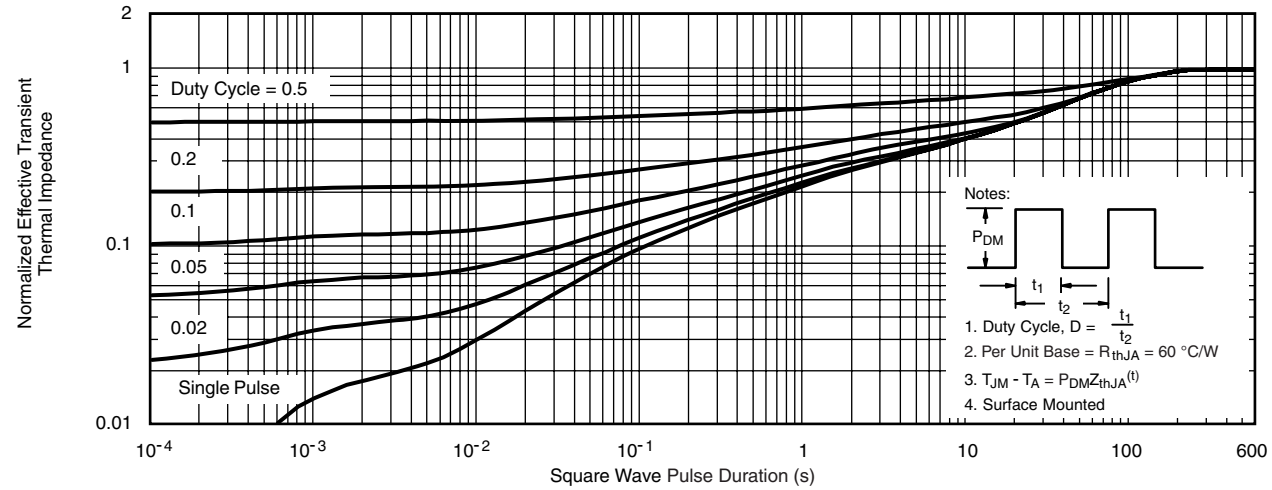
Single Pulse Power



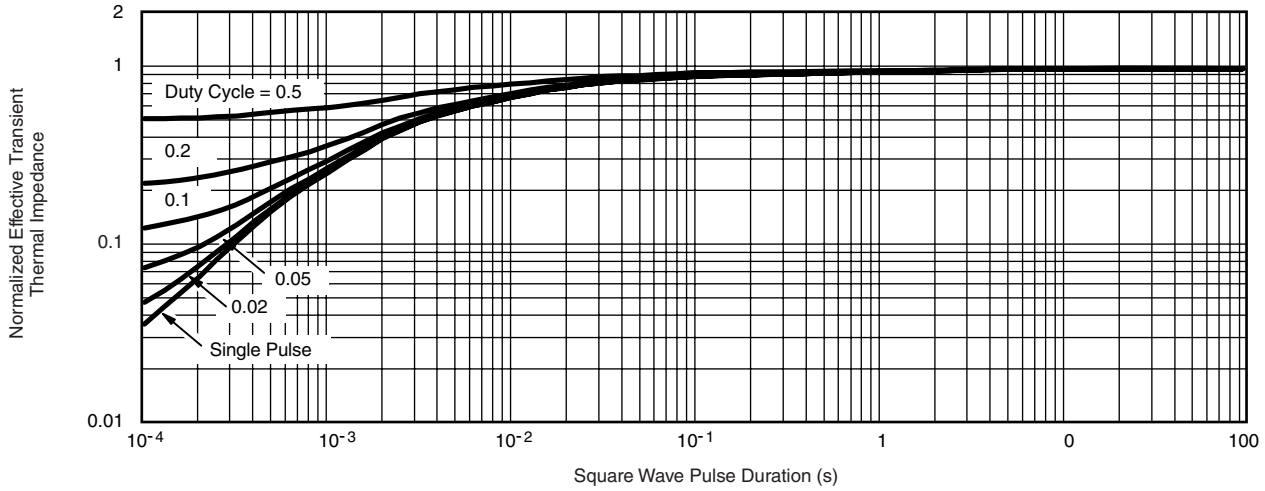
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Case

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

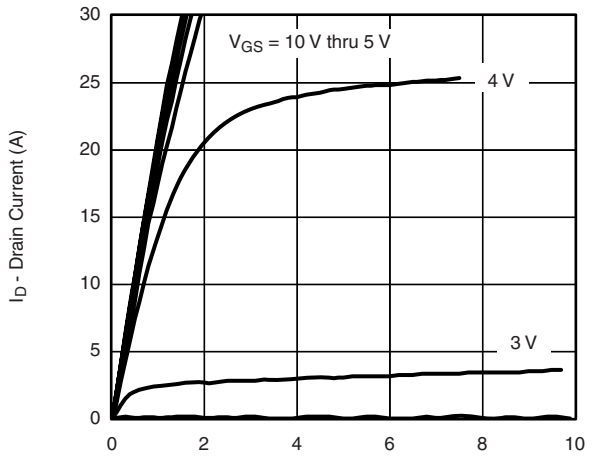


Normalized Thermal Transient Impedance, Junction-to-Ambient

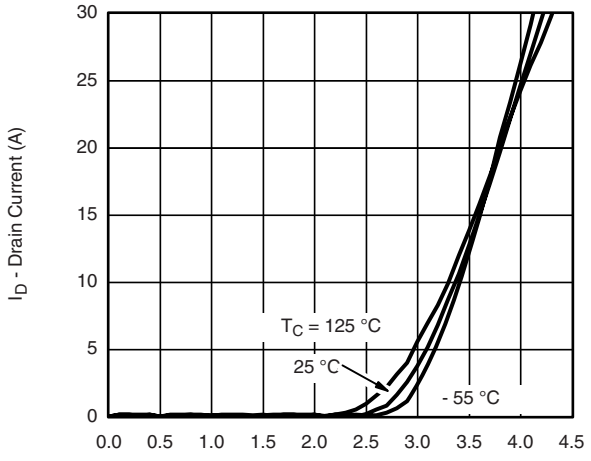


Normalized Thermal Transient Impedance, Junction-to-Case

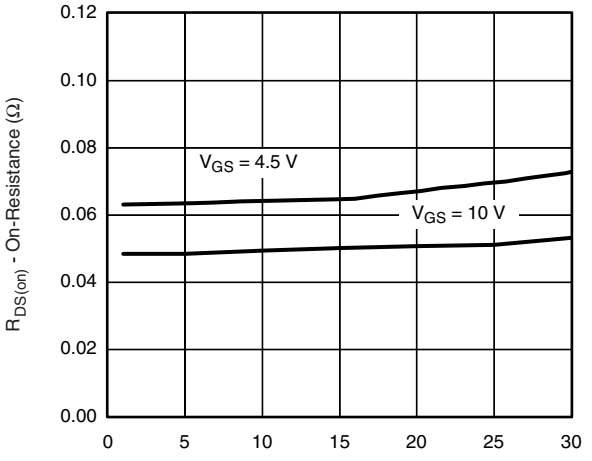
P-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



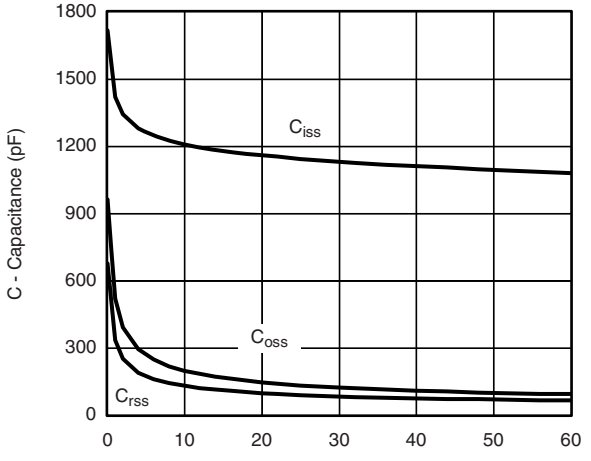
Output Characteristics



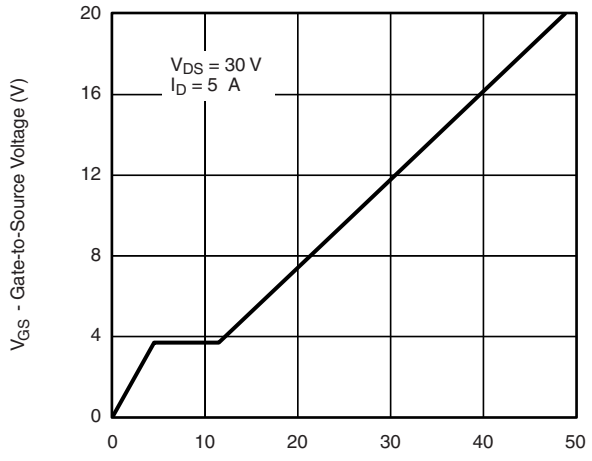
Transfer Characteristics



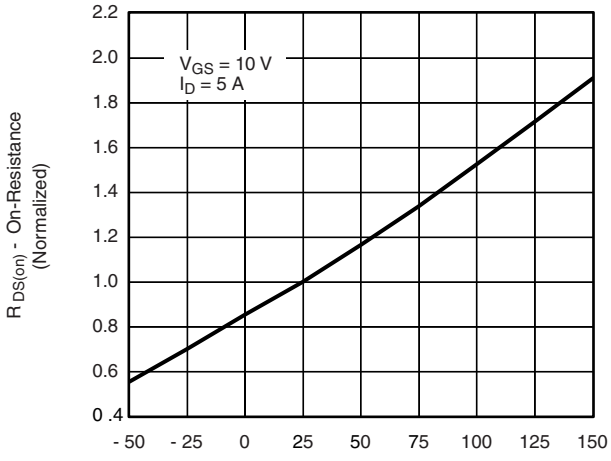
On-Resistance vs. Drain Current



Capacitance

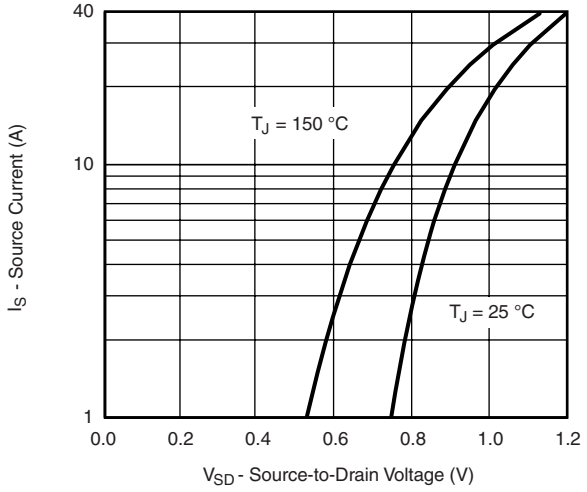


Gate Charge

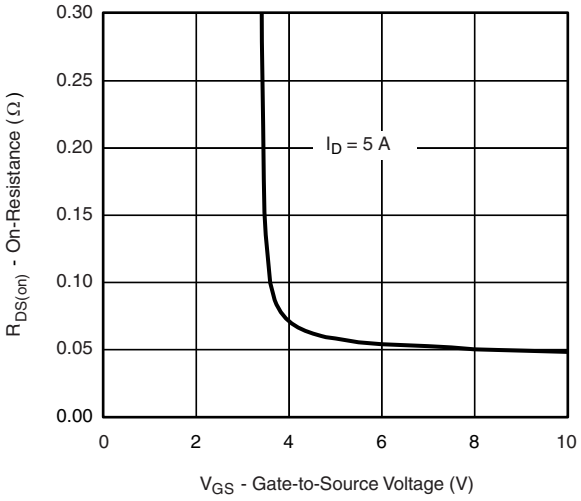


On-Resistance vs. Junction Temperature

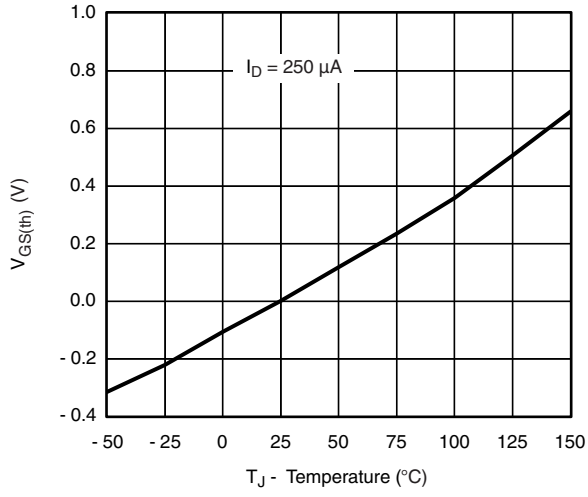
P-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



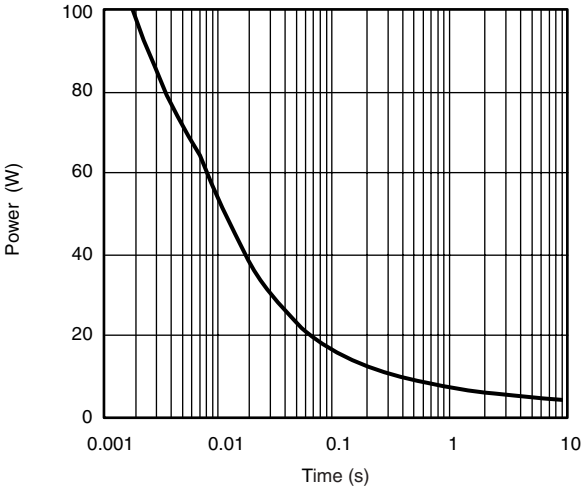
Source-Drain Diode Forward Voltage



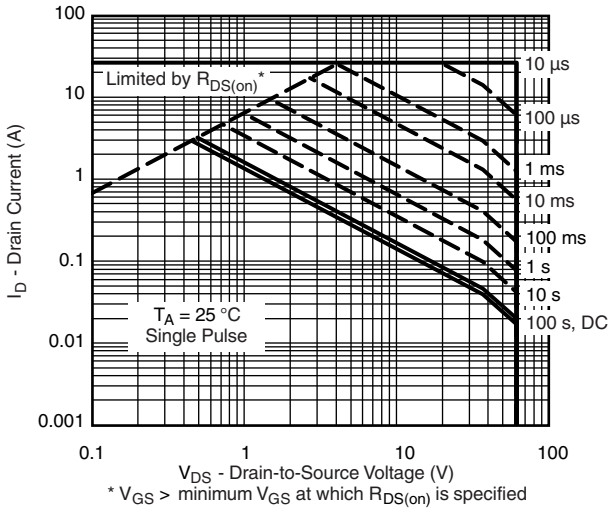
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

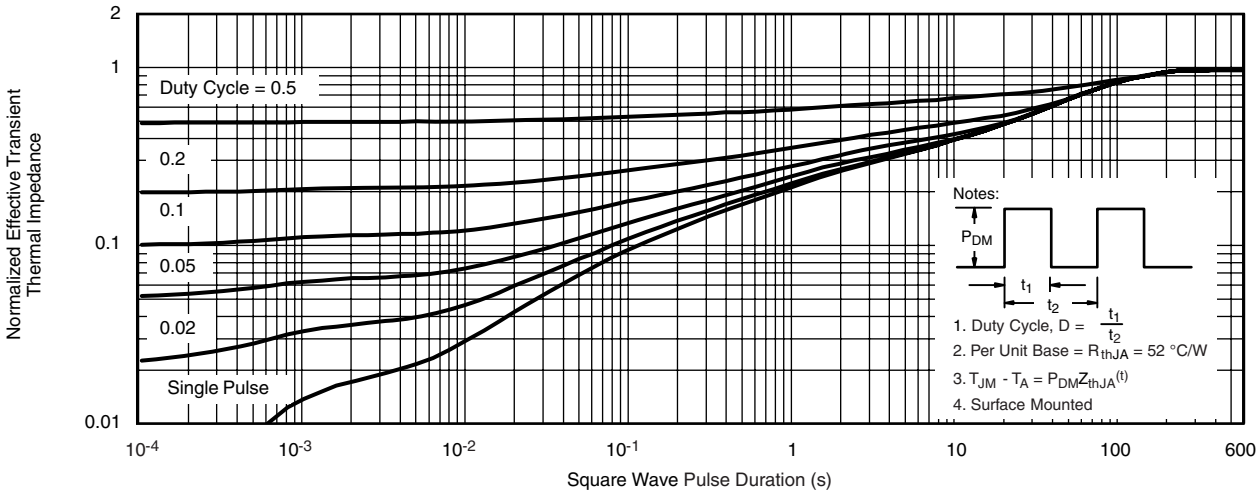


Single Pulse Power, Junction-to-Ambient

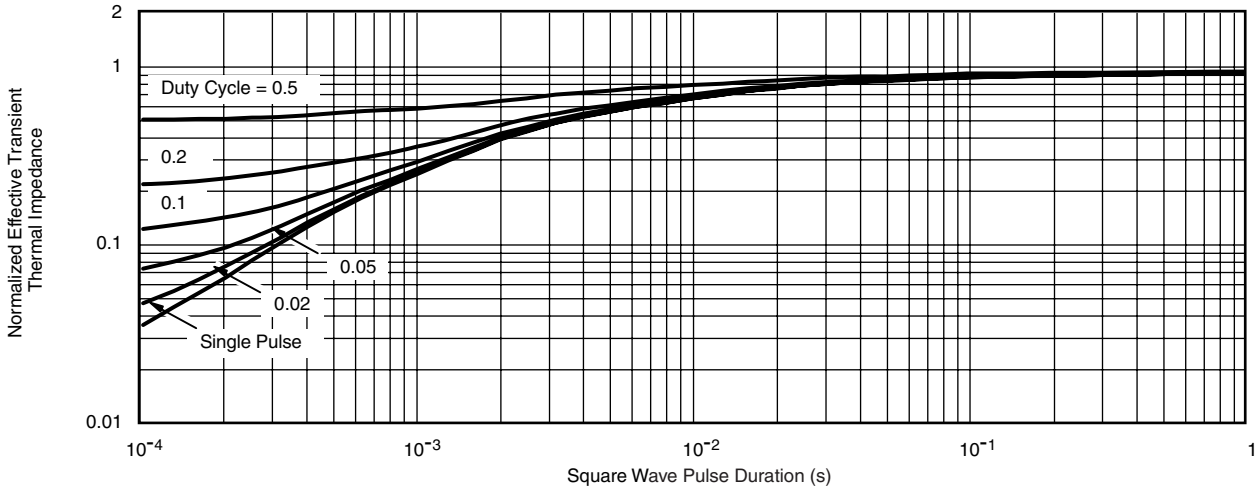


Safe Operating Area

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



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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