Complementary MOSFET Half-Bridge (N- and P-Channel)

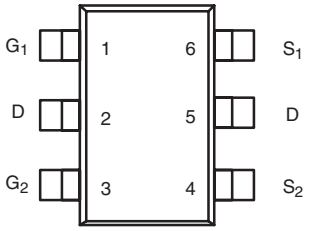
PRODUCT SUMMARY			
	V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
N-Channel	20	0.300 at V_{GS} = 4.5 V	1.4
		0.410 at V_{GS} = 3.0 V	1.2
P-Channel	- 20	0.640 at V_{GS} = - 4.5 V	- 0.96
		0.980 at V_{GS} = - 3.0 V	- 0.78

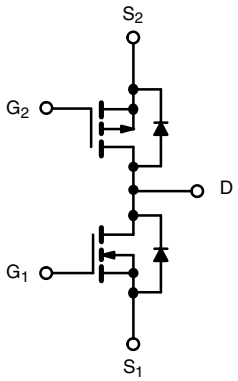
FEATURES

- **Halogen-free According to IEC 61249-2-21 Definition**
- TrenchFET® Power MOSFET
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC

Pb-free
RoHS COMPLIANT
HALOGEN FREE Available

TSOP-6
Top View





Ordering Information: Si3850ADV-T1-E3 (Lead (Pb)-free)
Si3850ADV-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted					
Parameter		**Symbol**	**N-Channel**	**P-Channel**	**Unit**
Drain-Source Voltage		V_{DS}	20	- 20	V
Gate-Source Voltage		V_{GS}	± 12		
Continuous Drain Current (T_J = 150 °C)	T_A = 25 °C	I_D	1.4	- 0.96	A
	T_A = 70 °C		1.1	- 0.77	
Pulsed Drain Current		I_{DM}	3.5	- 2.0	
Continuous Source Current (Diode Conduction)[a]		I_S	0.9	- 0.9	
Maximum Power Dissipation (Surface Mounted on FR4 Board)	T_A = 25 °C	P_D	1.08		W
	T_A = 70 °C		0.70		
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150		°C

THERMAL RESISTANCE RATINGS			
Parameter	**Symbol**	**N- or P-Channel**	**Unit**
Maximum Junction-to-Ambient (Surface Mounted on FR4 Board, ± ≤ 10 s)	R_{thJA}	115	°C/W

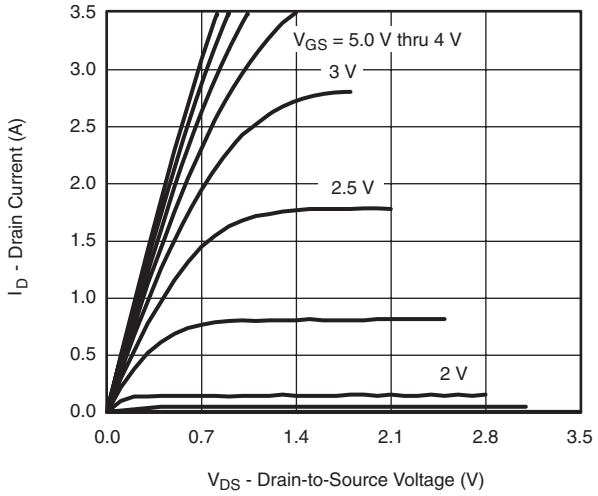
Note:
Maximum under Steady State condition is 150 °C/W.

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	0.6		1.5	V
		V_{DS} = V_{GS}, I_D = - 250 µA	P-Ch	- 0.6		- 1.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 12 V				± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20 V, V_{GS} = 0 V	N-Ch			1	µA
		V_{DS} = - 20 V, V_{GS} = 0 V	P-Ch			- 1	
		V_{DS} = 20 V, V_{GS} = 0 V, T_J = 70 °C	N-Ch			10	
		V_{DS} = - 20 V, V_{GS} = 0 V, T_J = 70 °C	P-Ch			- 10	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 4.5 V	N-Ch	3.0			A
		V_{DS} = - 5 V, V_{GS} = - 4.5 V	P-Ch	- 1.5			
Drain-Source On-State Resistance[b]	$R_{DS(on)}$	V_{GS} = 4.5 V, I_D = 0.5 A	N-Ch		0.240	0.300	Ω
		V_{GS} = - 4.5 V, I_D = - 0.5 A	P-Ch		0.510	0.640	
		V_{GS} = 3.0 V, I_D = 0.5 A	N-Ch		0.325	0.410	
		V_{GS} = - 3.0 V, I_D = - 0.5 A	P-Ch		0.780	0.980	
Forward Transconductance[b]	g_{fs}	V_{DS} = 10 V, I_D = 1 A	N-Ch		1.8		S
		V_{DS} = - 10 V, I_D = - 1 A	P-Ch		1.1		
Diode Forward Voltage[b]	V_{SD}	I_S = 0.9 A, V_{GS} = 0 V	N-Ch		0.87	1.2	V
		I_S = - 0.8 A, V_{GS} = 0 V	P-Ch		- 1.0	- 1.3	
Dynamic[b]							
Total Gate Charge	Q_g	N-Channel V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 1 A P-Channel V_{DS} = - 10 V, V_{GS} = - 4.5 V, I_D = - 1 A	N-Ch		0.95	1.4	nC
			P-Ch		1.10	1.7	
Gate-Source Charge	Q_{gs}		N-Ch		0.22		
			P-Ch		0.28		
Gate-Drain Charge	Q_{gd}		N-Ch		0.24		
			P-Ch		0.26		
Gate Resistance	R_g		N-Ch		3.5	5.3	Ω
			P-Ch		10.5	16	
Turn-On Delay Time	$t_{d(on)}$	N-Channel V_{DD} = 10 V, R_L = 10 Ω $I_D \cong$ 0.9 A, V_{GEN} = 4.5 V, R_g = 1 Ω P-Channel V_{DD} = - 10 V, R_L = 10 Ω $I_D \cong$ - 0.9 A, V_{GEN} = - 4.5 V, R_g = 1 Ω	N-Ch		8	14	ns
			P-Ch		13	20	
Rise Time	t_r		N-Ch		16	25	
			P-Ch		34	50	
Turn-Off Delay Time	$t_{d(off)}$		N-Ch		20	30	
			P-Ch		18	30	
Fall Time	t_f		N-Ch		9	15	
			P-Ch		18	30	
Body Diode Reverse Recovery Tme	t_{rr}	I_F = 0.9 A, dI/dt = 100 A/µs	N-Ch		20	30	
		I_F = - 0.9 A, dI/dt = 100 A/µs	P-Ch		25	40	
Body Diode Reverse Recovery Charge	Q_{rr}	I_F = 0.9 A, dI/dt = 100 A/µs	N-Ch		9	15	nC
		I_F = - 0.9 A, dI/dt = 100 A/µs	P-Ch		9	15	

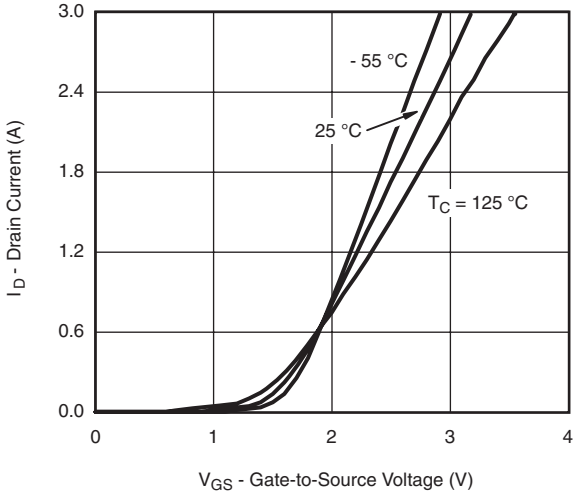
Notes:
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

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.

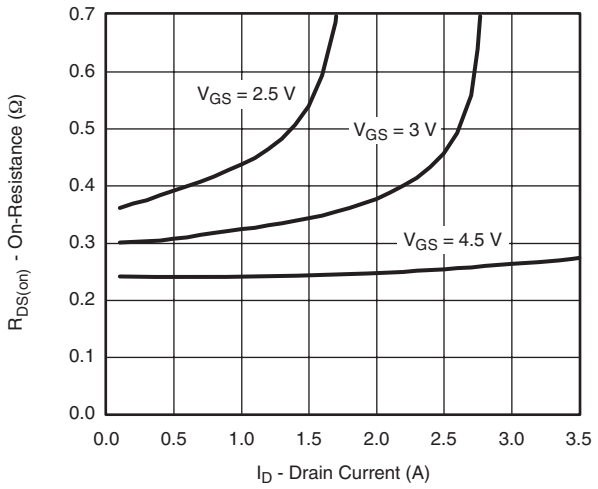
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



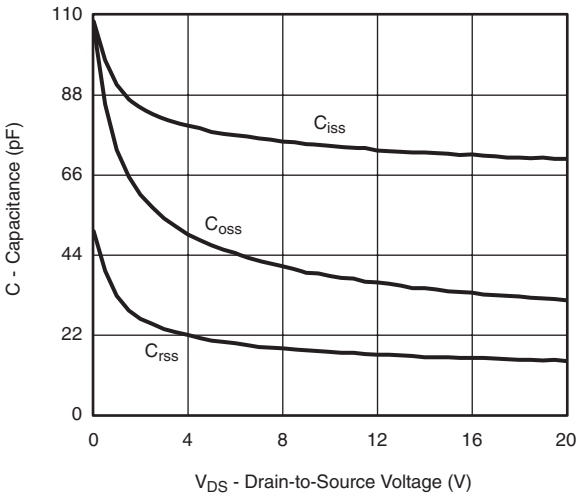
Output Characteristics



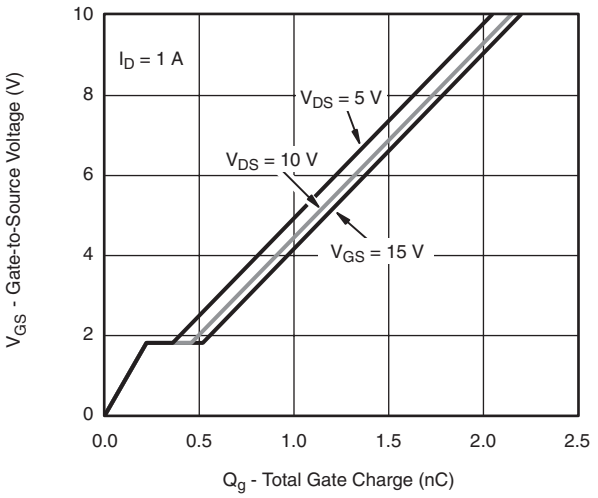
Transfer Characteristics



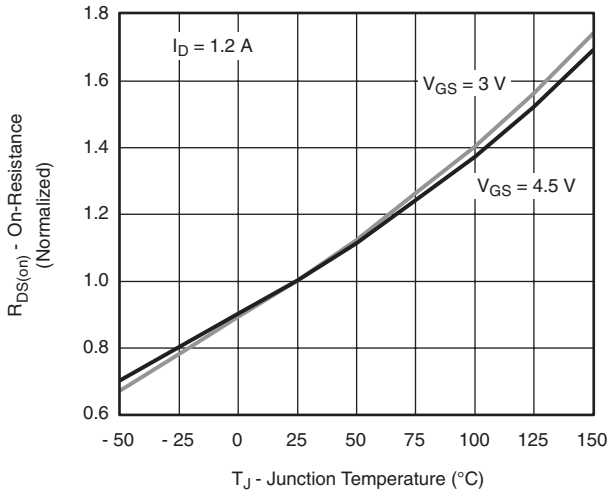
On-Resistance vs. Drain Current



Capacitance

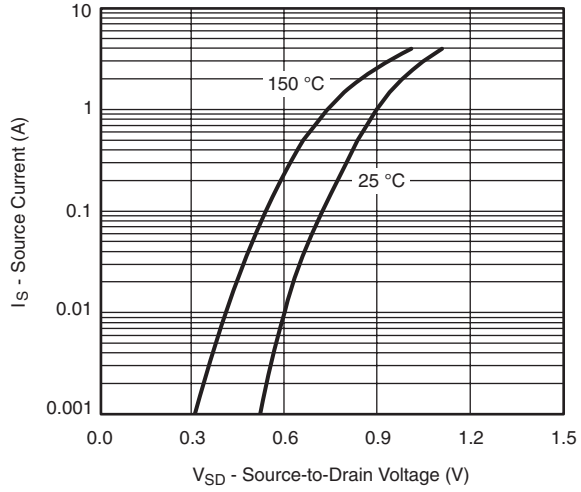


Gate Charge

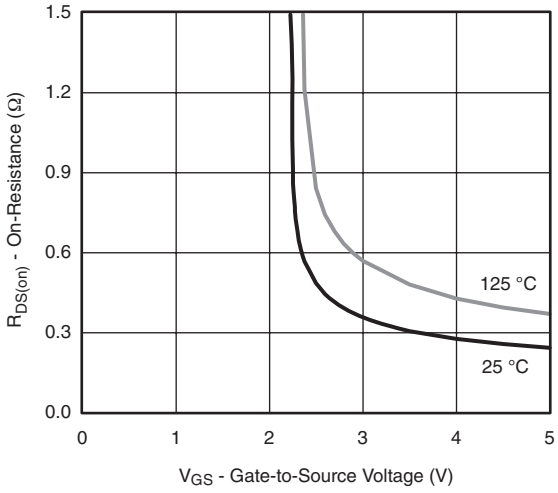


On-Resistance vs. Junction Temperature

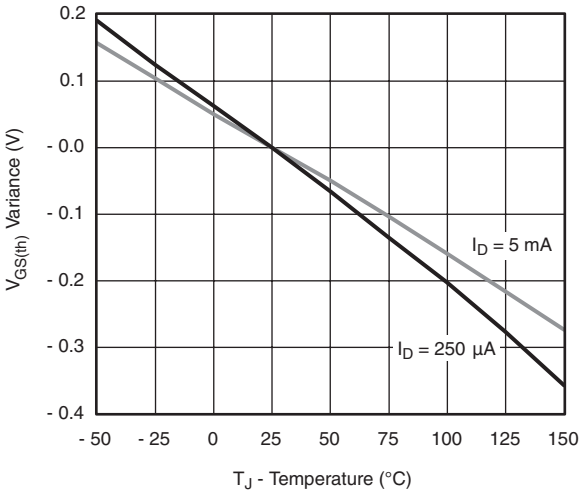
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



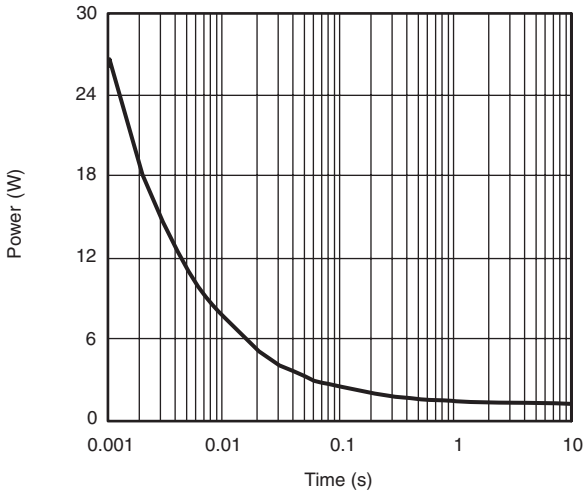
Source-Drain Diode Forward Voltage



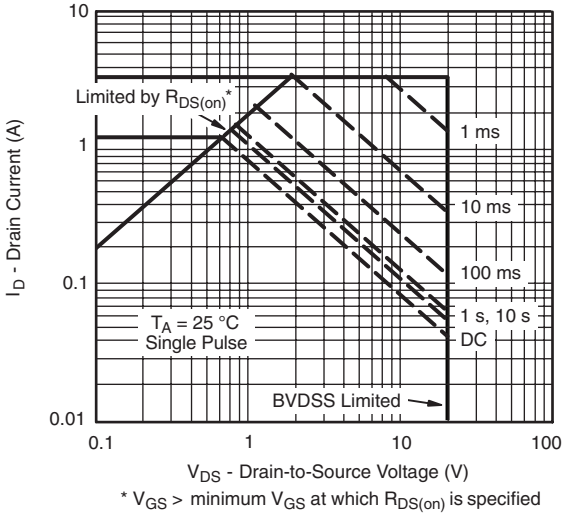
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



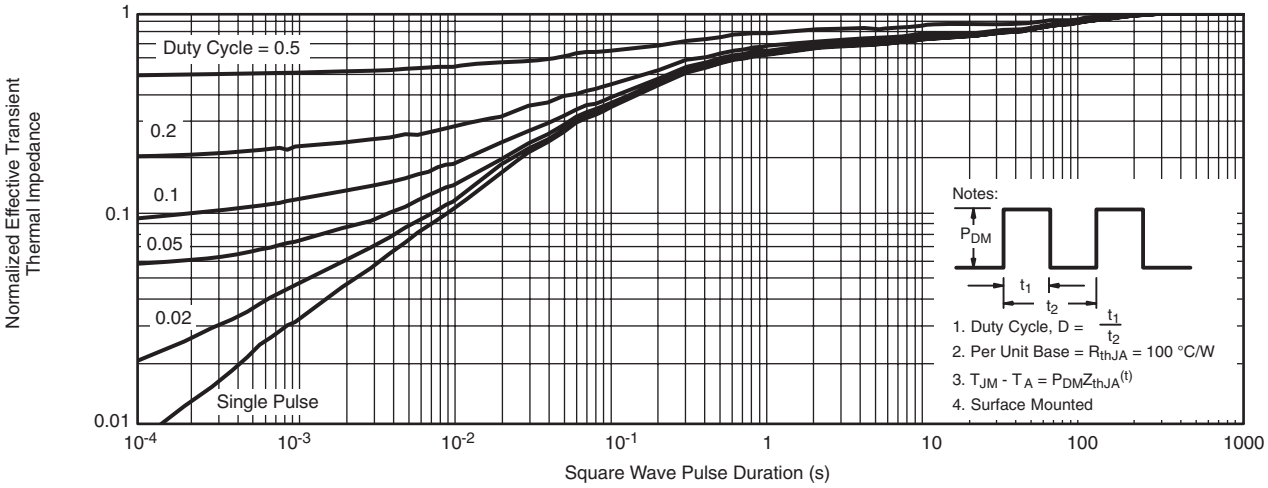
Single Pulse Power



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

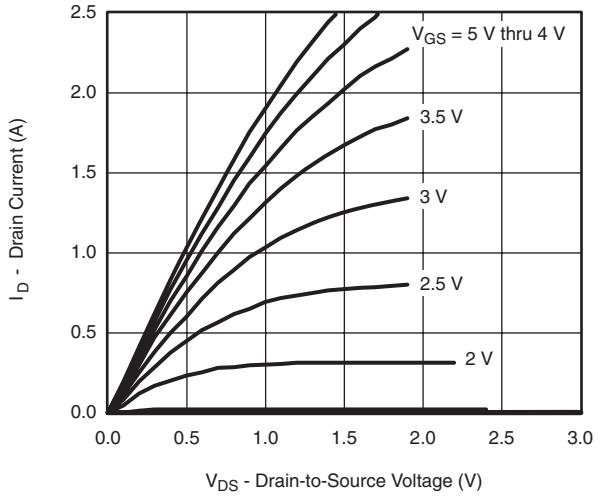
Safe Operating Area

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

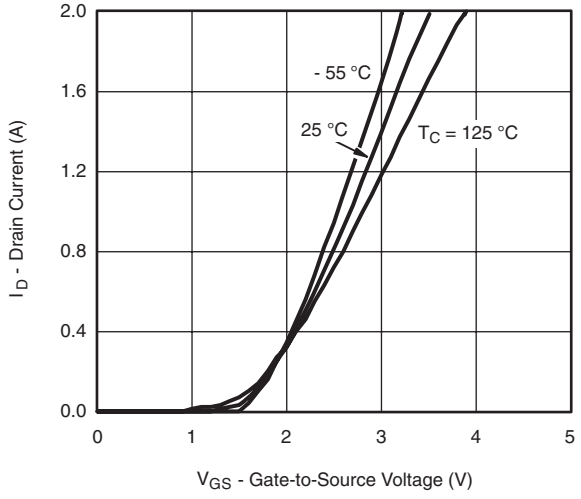


Normalized Thermal Transient Impedance, Junction-to-Ambient

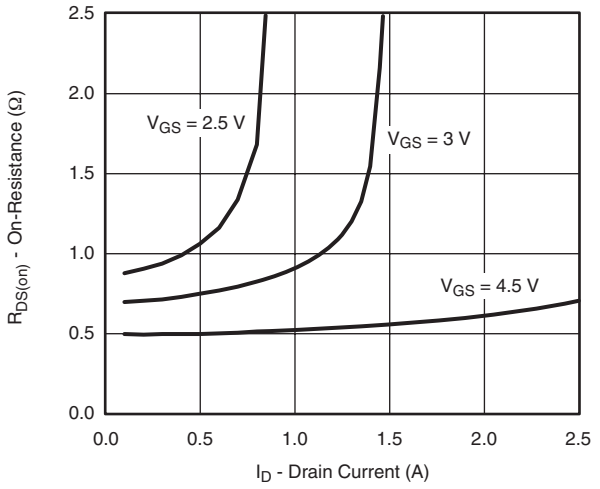
P-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



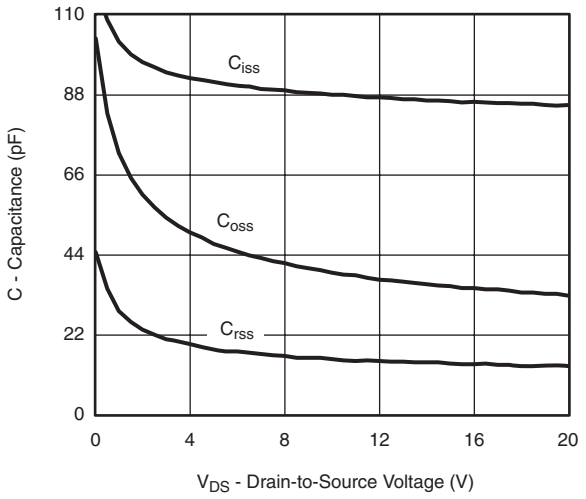
Output Characteristics



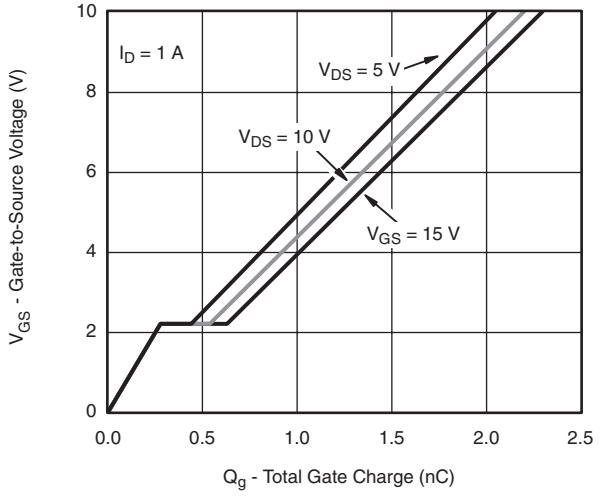
Transfer Characteristics



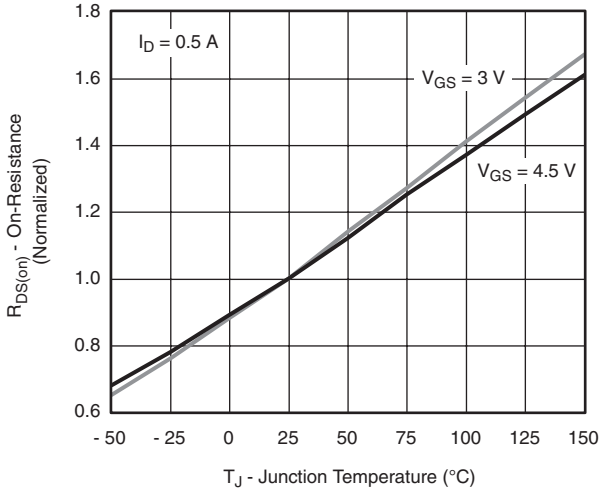
On-Resistance vs. Drain Current



Capacitance

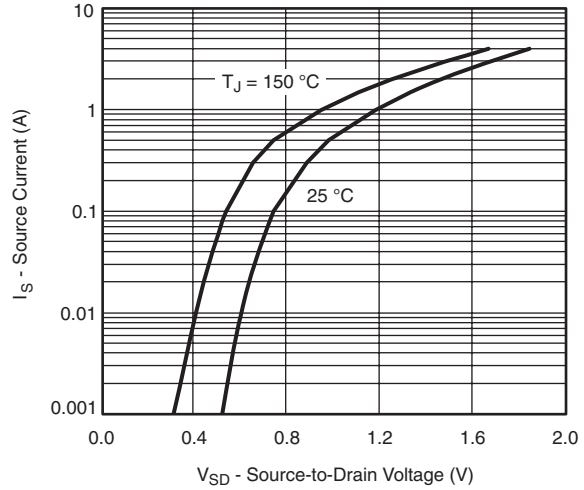


Gate Charge

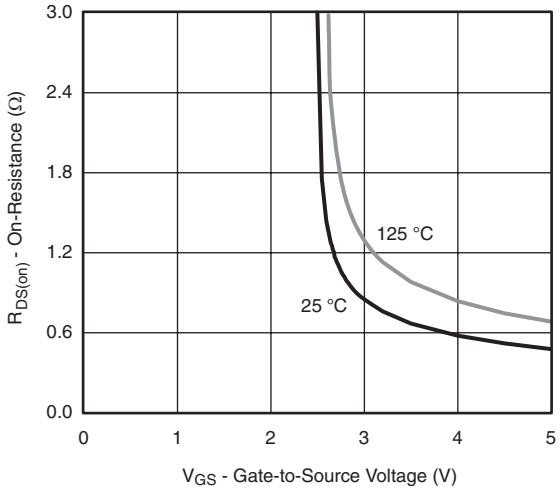


On-Resistance vs. Junction Temperature

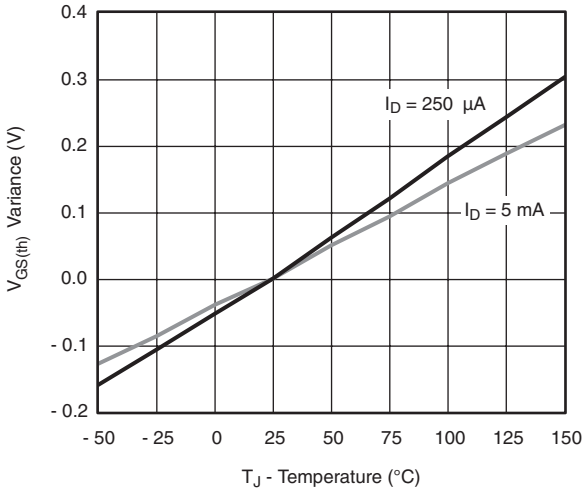
P-CHANNEL TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



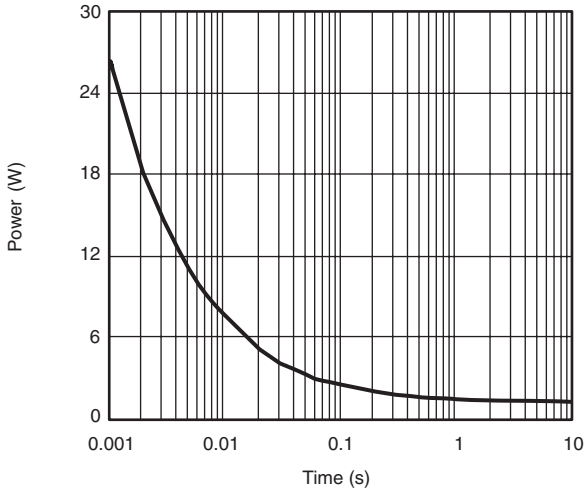
Source-Drain Diode Forward Voltage



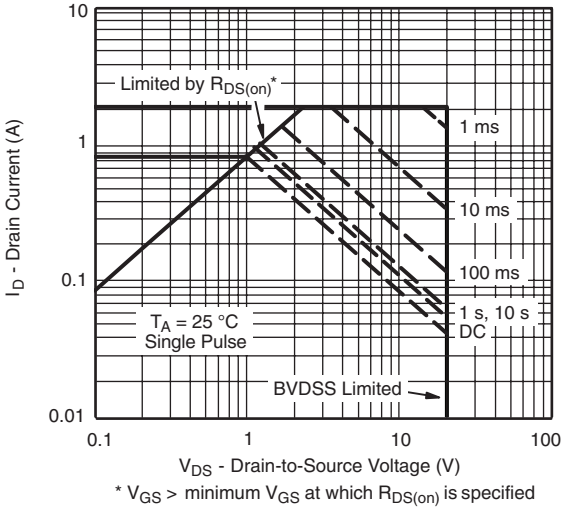
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



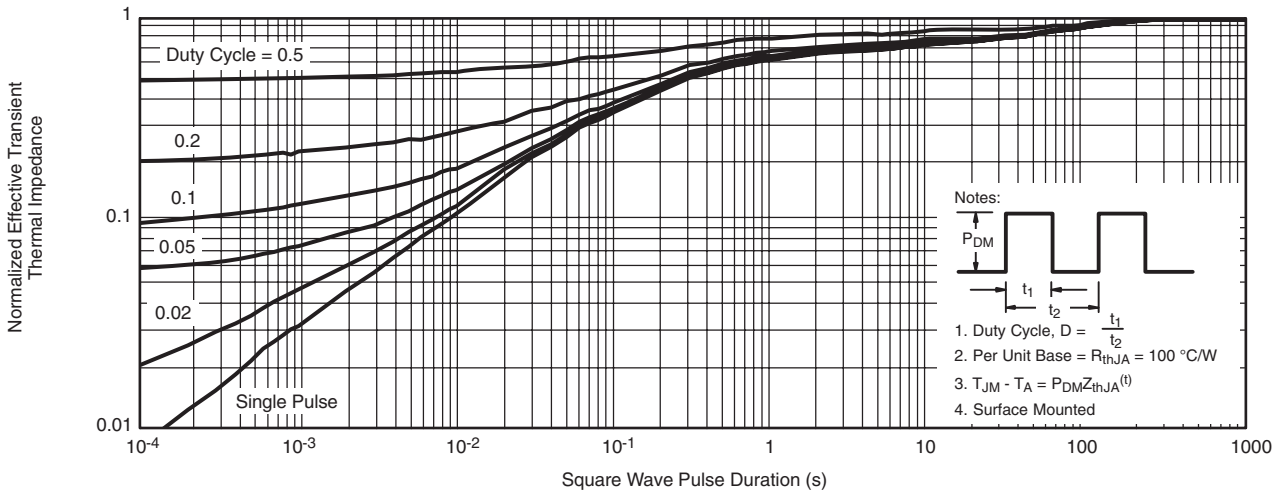
Single Pulse Power vs. Junction-to-Ambient



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

Safe Operating Area

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



Normalized Thermal Transient Impedance, Junction-to-Ambient

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