TEMIC
Semiconductors

Si9950DY

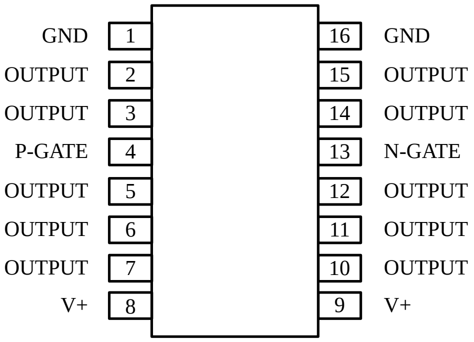
Complementary MOSFET Half-Bridge

Product Summary

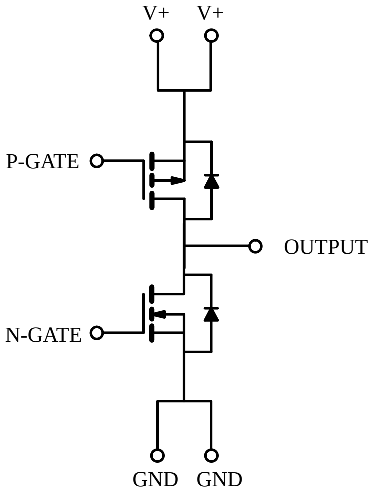
	V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
N- or P-Channel	50	0.3 @ V_{GS} = 10 V	± 2.0
		1.0 @ V_{GS} = 5 V	± 1.2

Alternate Solution: one Si9948DY and one Si9945DY

SO-16



Top View



Absolute Maximum Ratings (T_A = 25°C Unless Otherwise Noted)

Parameter		Symbol	N- or P-Channel	Unit
Drain-Source Voltage		V_{DS}	50	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150°C)[a]	T_A = 25°C	I_D	± 2.0	A
	T_A = 70°C		± 1.7	
Pulsed Drain Current		I_{DM}	± 8	
Continuous Source Current (Diode Conduction)[a]		I_S	2.8	
Maximum Power Dissipation[a]	T_A = 25°C	P_D	2.3	W
	T_A = 70°C		1.5	
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[a]	R_{thJA}	55	°C/W

Notes
a. Surface Mounted on FR4 Board, t ≤ 10 sec.

Subsequent updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #1218 .

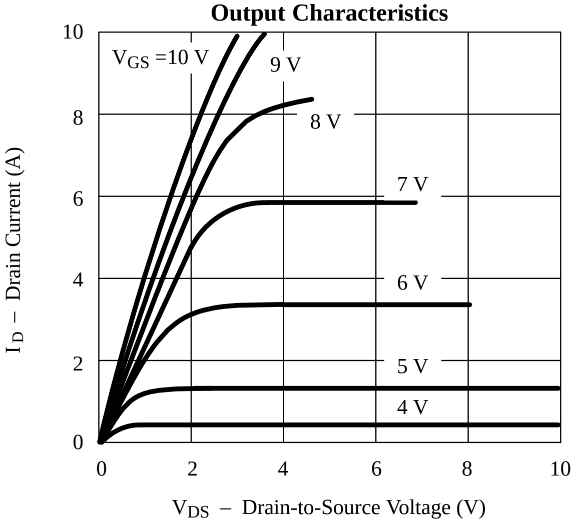
Specifications (T_J = 25°C Unless Otherwise Noted)

Parameter	Symbol	Test Condition		Min	Typ[a]	Max	Unit
Static							
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250 µA	N-Ch	2.0			V
		$V_{DS} = V_{GS}$, I_D = –250 µA	P-Ch	–1.5			
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V				± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40 V, V_{GS} = 0 V	N-Ch			2	µA
		V_{DS} = –40 V, V_{GS} = 0 V	P-Ch			–2	
		V_{DS} = 40 V, V_{GS} = 0 V, T_J = 55°C	N-Ch			25	
		V_{DS} = –40 V, V_{GS} = 0 V, T_J = 55°C	P-Ch			–25	
On-State Drain Current[b]	$I_{D(on)}$	$V_{DS} \geq$ 5 V, V_{GS} = 10 V	N-Ch	8			A
		$V_{DS} \leq$ –5 V, V_{GS} = –10 V	P-Ch	–8			
Drain-Source On-State Resistance[b]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 1 A				0.3	Ω
		V_{GS} = 5 V, I_D = 0.5 A				1.0	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 1 A	N-Ch		1.1		S
		V_{DS} = –15 V, I_D = –1 A	P-Ch		1.4		
Diode Forward Voltage[b]	V_{SD}	I_S = 2 A, V_{GS} = 0 V	N-Ch		0.9	1.2	V
		I_S = –2 A, V_{GS} = 0 V	P-Ch		–1.0	–1.3	
Dynamic[a]							
Total Gate Charge	Q_g	N-Channel V_{DS} = 25 V, V_{GS} = 10 V, I_D = 2 A P-Channel V_{DS} = –25 V, V_{GS} = –10 V, I_D = –2 A	N-Ch		3.7	6.0	nC
			P-Ch		17.0	26.0	
Gate-Source Charge	Q_{gs}		N-Ch		1.0		
			P-Ch		2.3		
Gate-Drain Charge	Q_{gd}		N-Ch		1.2		
			P-Ch		8.5		
Turn-On Delay Time	$t_{d(on)}$	N-Channel V_{DD} = 25 V, R_L = 25 Ω $I_D \cong$ 1 A, V_{GEN} = 10 V, R_G = 6 Ω P-Channel V_{DD} = –25 V, R_L = 25 Ω $I_D \cong$ –1 A, V_{GEN} = –10 V, R_G = 6 Ω	N-Ch		7	20	ns
			P-Ch		10	30	
Rise Time	t_r		N-Ch		13	30	
			P-Ch		25	50	
Turn-Off Delay Time	$t_{d(off)}$		N-Ch		18	40	
			P-Ch		65	100	
Fall Time	t_f		N-Ch		13	25	
			P-Ch		60	100	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = 2 A, di/dt = 100 A/µs	N-Ch		70	100	
			P-Ch		70	100	

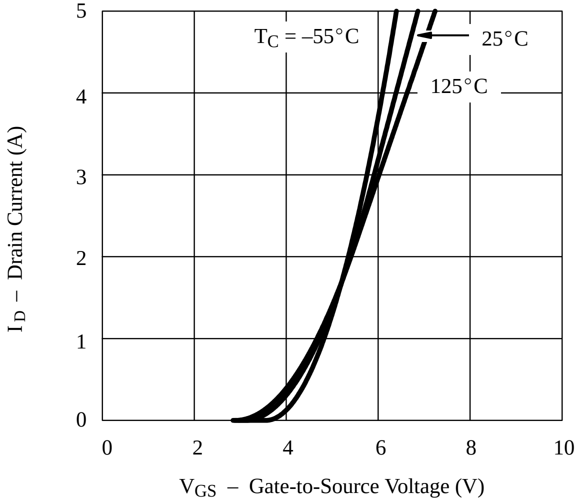
Notes
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.

Typical Characteristics (25°C Unless Otherwise Noted) N-Channel

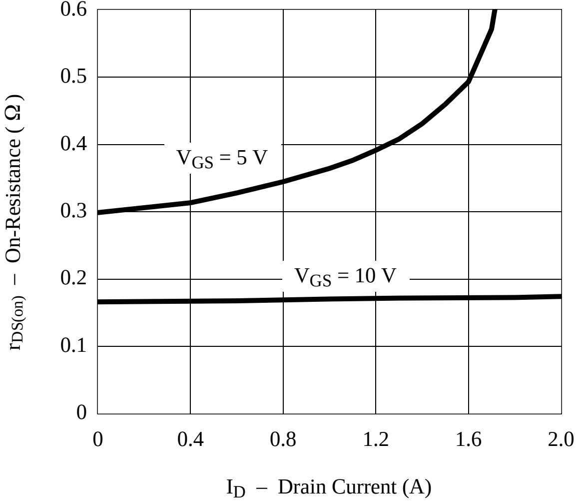
Output Characteristics



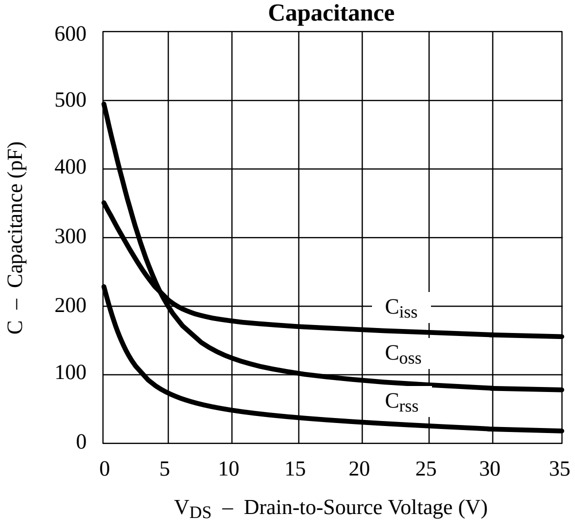
Transfer Characteristics



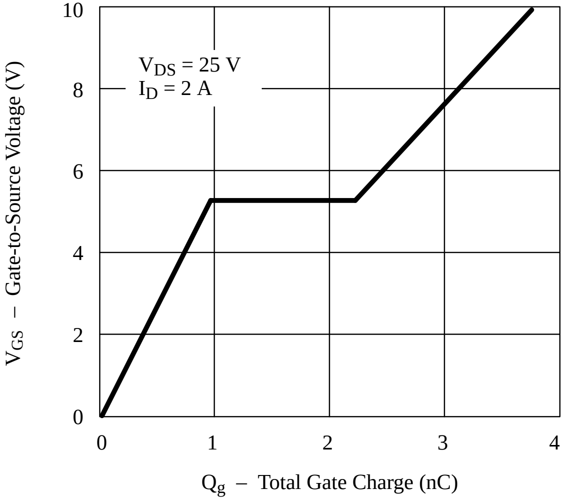
On-Resistance vs. Drain Current



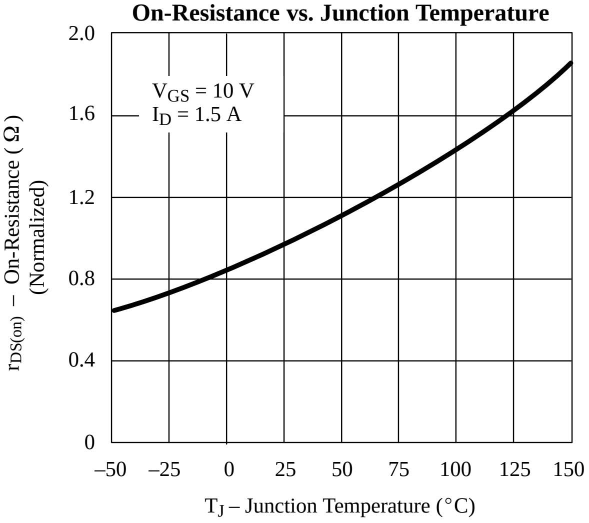
Capacitance



Gate Charge

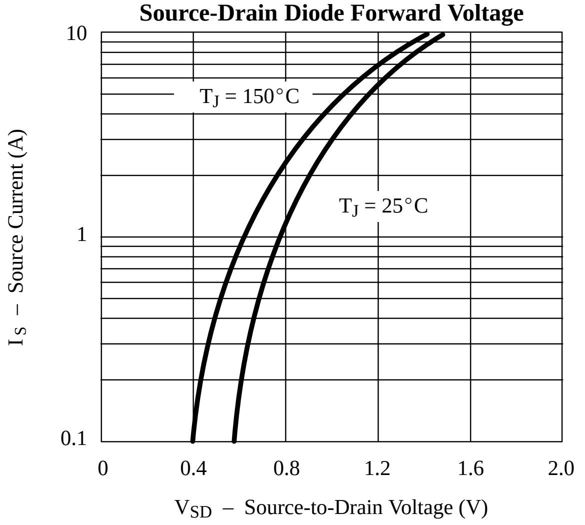


On-Resistance vs. Junction Temperature

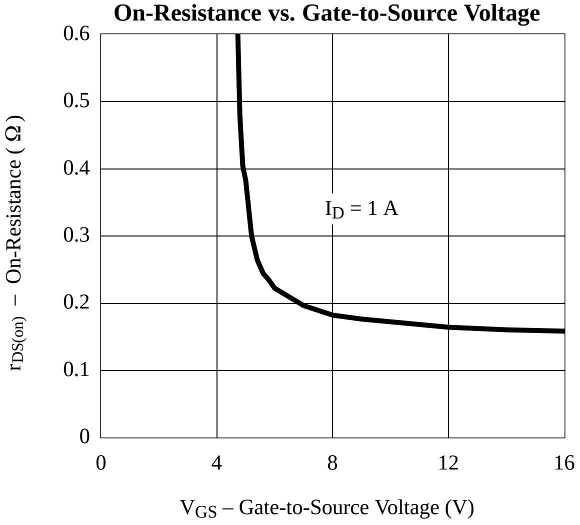


Typical Characteristics (25°C Unless Otherwise Noted) N-Channel

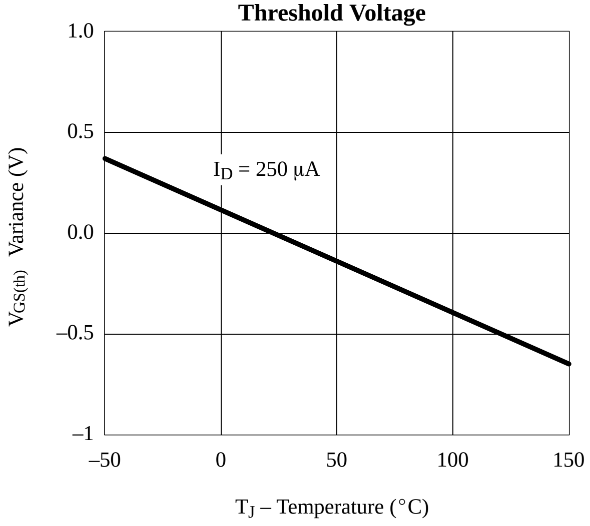
Source-Drain Diode Forward Voltage



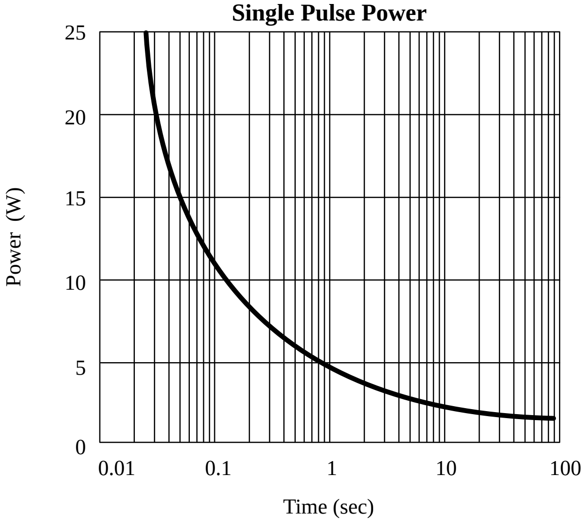
On-Resistance vs. Gate-to-Source Voltage



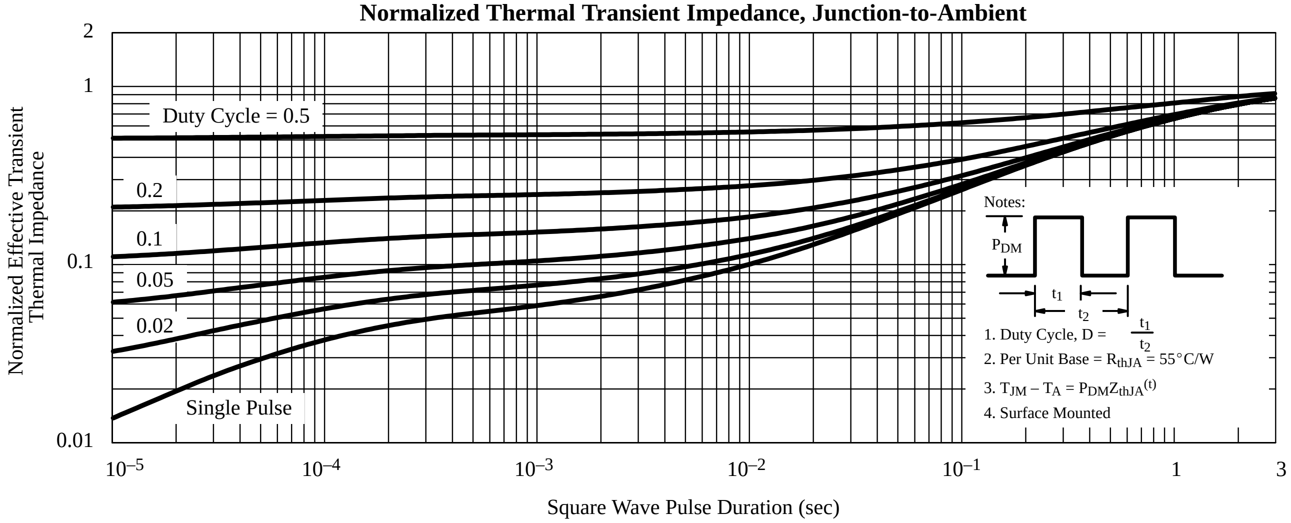
Threshold Voltage



Single Pulse Power



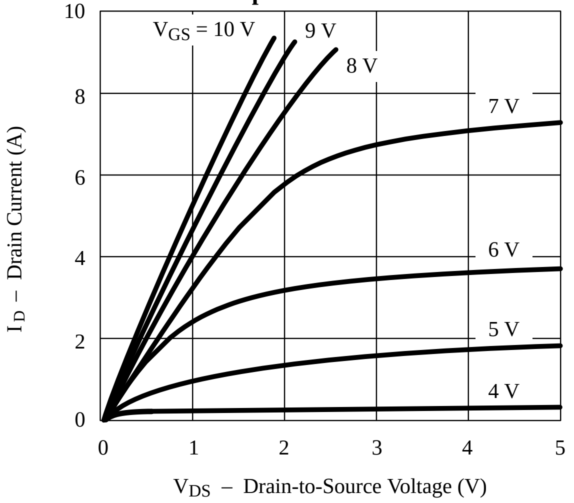
Normalized Thermal Transient Impedance, Junction-to-Ambient

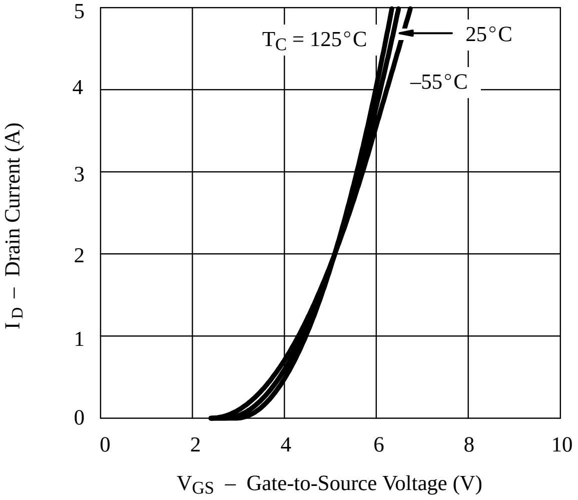


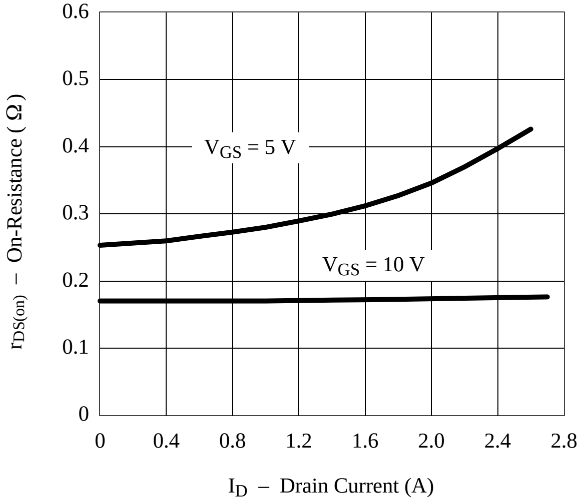
Notes:

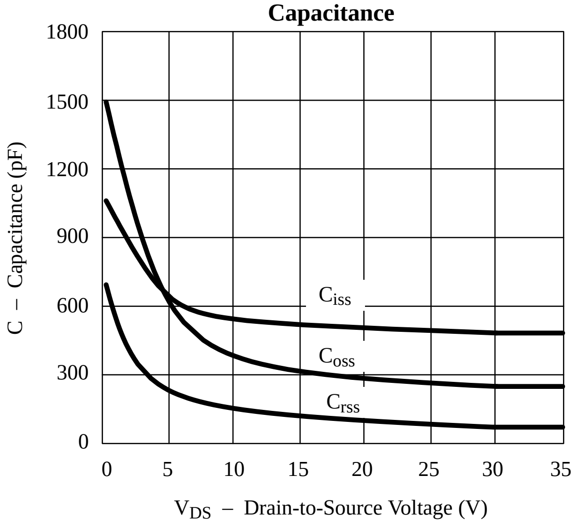
1. Duty Cycle, D = $\frac{t_1}{t_2}$
2. Per Unit Base = R_{thJA} = 55°C/W
3. $T_{JM} - T_A = P_{DM}Z_{thJA}^{(t)}$
4. Surface Mounted

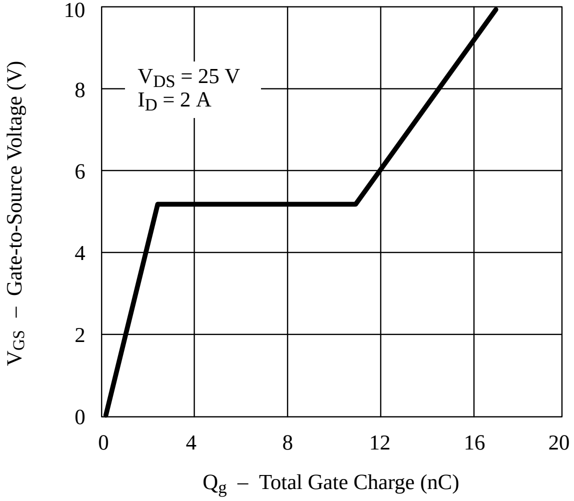
Typical Characteristics (25°C Unless Otherwise Noted) P-Channel

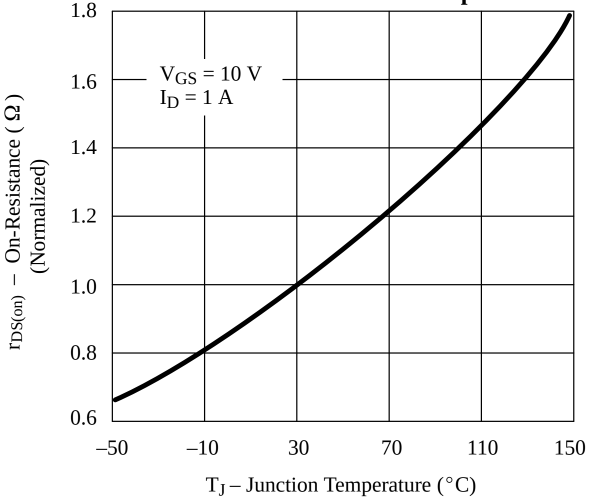

Output Characteristics


Transfer Characteristics


On-Resistance vs. Drain Current

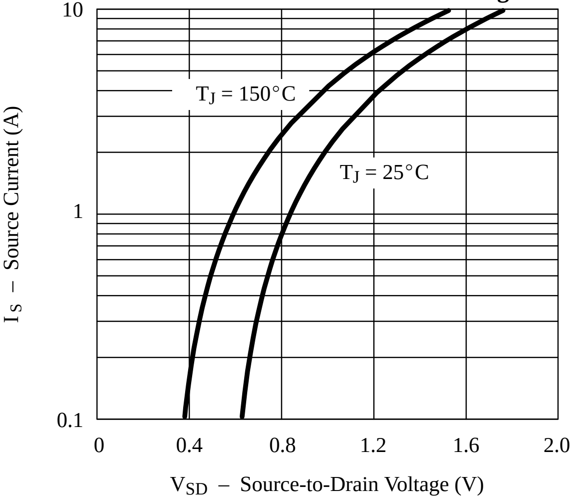

Capacitance


Gate Charge

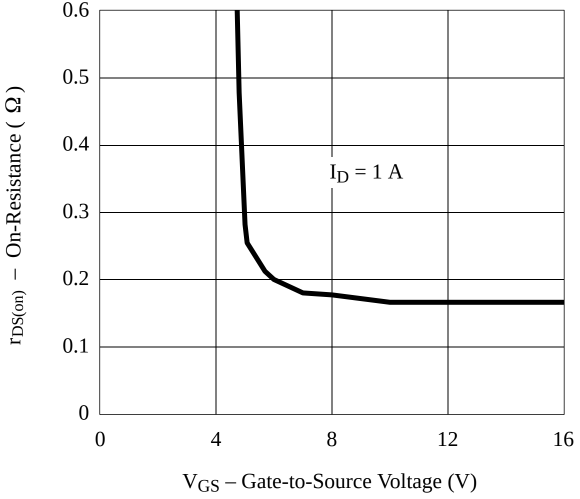

On-Resistance vs. Junction Temperature

Typical Characteristics (25°C Unless Otherwise Noted) P-Channel

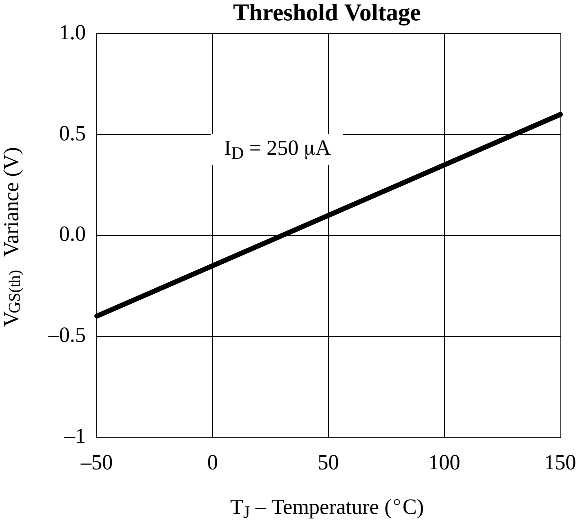
Source-Drain Diode Forward Voltage



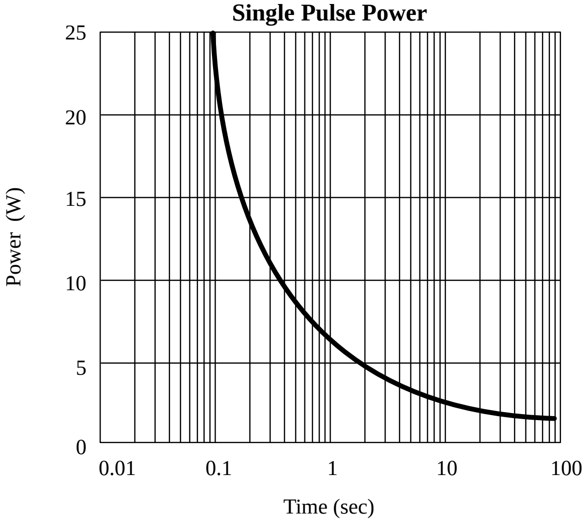
On-Resistance vs. Gate-to-Source Voltage



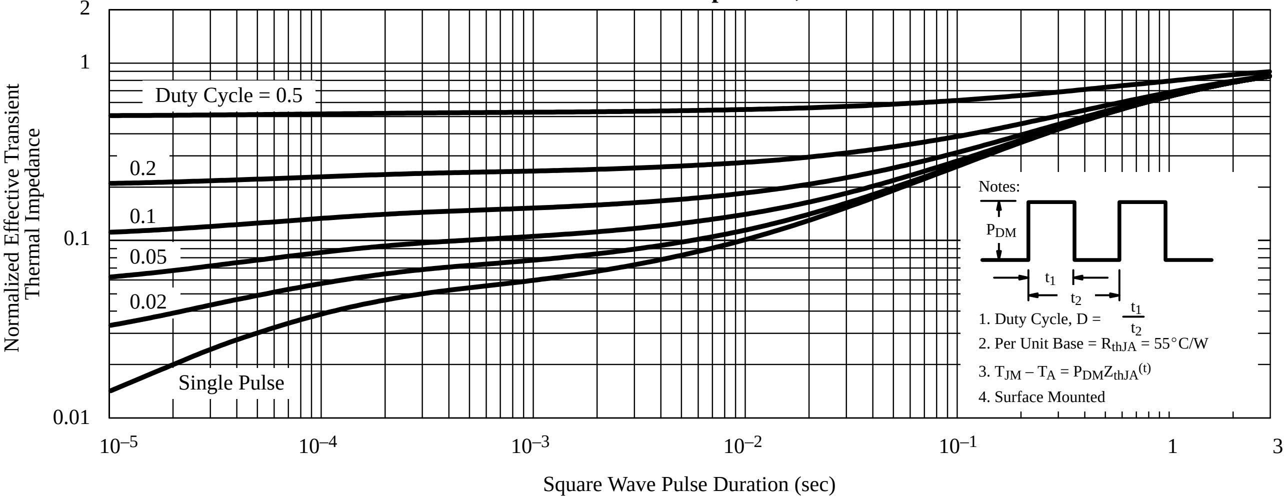
Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient



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