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Si4542DY
Vishay Siliconix

N- and P-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY

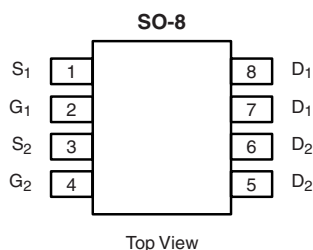
	V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
N-Channel	30	0.025 at V _{GS} = 10 V	6.9
		0.035 at V _{GS} = 4.5 V	5.8
P-Channel	- 30	0.032 at V _{GS} = - 10 V	- 6.1
		0.045 at V _{GS} = - 4.5 V	- 5.1

FEATURES

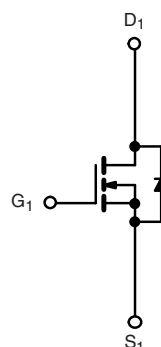
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC



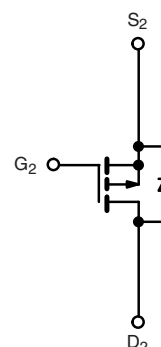
RoHS
COMPLIANT
HALOGEN
FREE
Available



Ordering Information: Si4542DY-T1-E3 (Lead (Pb)-free)
Si4542DY-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
Drain-Source Voltage		V _{DS}	30	- 30	V
Gate-Source Voltage		V _{GS}	± 20	± 20	
Continuous Drain Current (T _J = 150 °C) ^a	T _A = 25 °C	I _D	6.9	- 6.1	A
	T _A = 70 °C		5.5	- 4.9	
Pulsed Drain Current		I _{DM}	40	- 40	
Continuous Source Current (Diode Conduction) ^a		I _S	1.7	- 1.7	
Maximum Power Dissipation ^a	T _A = 25 °C	P _D	2.0		W
	T _A = 70 °C		1.3		
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}	62.5	°C/W

Notes:

a. Surface Mounted on FR4 board, t ≤ 10 s.

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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	1.0			V	
		V _{DS} = V _{GS} , I _D = - 250 μA	P-Ch	- 1.0				
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	N-Ch P-Ch			± 100 ± 100	nA	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V	N-Ch			1	μA	
		V _{DS} = - 30 V, V _{GS} = 0 V	P-Ch			- 1		
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 55 °C	N-Ch			25		
		V _{DS} = - 30 V, V _{GS} = 0 V, T _J = 55 °C	P-Ch			- 25		
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	N-Ch	20			A	
		V _{DS} ≤ - 5 V, V _{GS} = - 10 V	P-Ch	- 20				
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 6.9 A	N-Ch		0.020	0.025	Ω	
		V _{GS} = - 10 V, I _D = - 6.1 A	P-Ch		0.026	0.032		
		V _{GS} = 4.5 V, I _D = 5.8 A	N-Ch		0.026	0.035		
		V _{GS} = - 4.5 V, I _D = - 5.1 A	P-Ch		0.036	0.045		
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 6.9 A	N-Ch		25		S	
		V _{DS} = - 15 V, I _D = - 6.1 A	P-Ch		16			
Diode Forward Voltage ^a	V _{SD}	I _S = 1.7 A, V _{GS} = 0 V	N-Ch			1.2	V	
		I _S = - 1.7 A, V _{GS} = 0 V	P-Ch			- 1.2		
Dynamic ^b								
Total Gate Charge	Q _g	N-Channel V _{DS} = 15 V, V _{GS} = 10 V, I _D = 6.9 A	N-Ch P-Ch		30 32	50 50	nC	
Gate-Source Charge	Q _{gs}		N-Ch P-Ch		7.5 7.0			
Gate-Drain Charge	Q _{gd}	P-Channel V _{DS} = - 15 V, V _{GS} = - 10 V, I _D = - 6.1 A	N-Ch P-Ch		3.5 5.0			
Gate Resistance	R _g		N-Ch P-Ch	0.5 2	2 4	3.4 6.8	Ω	
Turn-On Delay Time	t _{d(on)}	N-Channel V _{DD} = 15 V, R _L = 10 Ω I _D ≅ 1 A, V _{GEN} = 10 V, R _g = 6 Ω	N-Ch P-Ch		12 10	20 20	ns	
Rise Time	t _r		N-Ch P-Ch		10 10	20 20		
Turn-Off Delay Time	t _{d(off)}	P-Channel V _{DD} = - 15 V, R _L = 10 Ω I _D ≅ - 1 A, V _{GEN} = - 10 V, R _g = 6 Ω	N-Ch P-Ch		60 55	90 80		
Fall Time	t _f		N-Ch P-Ch		15 25	30 40		
Source-Drain Reverse Recovery Time	t _{rr}		I _F = 1.7 A, dI/dt = 100 A/μs	N-Ch		50		90
			I _F = - 1.7 A, dI/dt = 100 A/μs	P-Ch		50		90
Reverse Recovery Time	Q _{rr}	I _F = 1.7 A, dI/dt = 100 A/μs	N-Ch		45		nC	
		I _F = - 1.7 A, dI/dt = 100 A/μs	P-Ch		55			

Notes:

a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

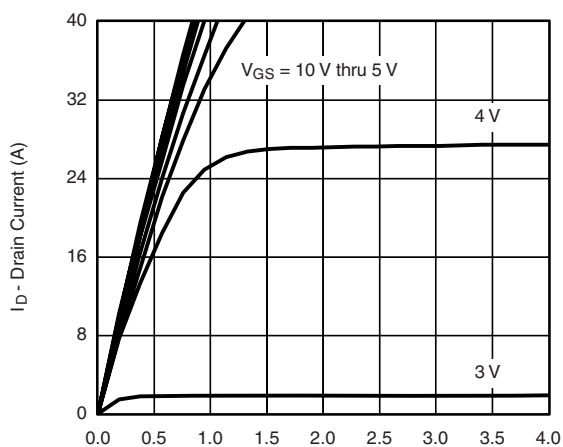
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



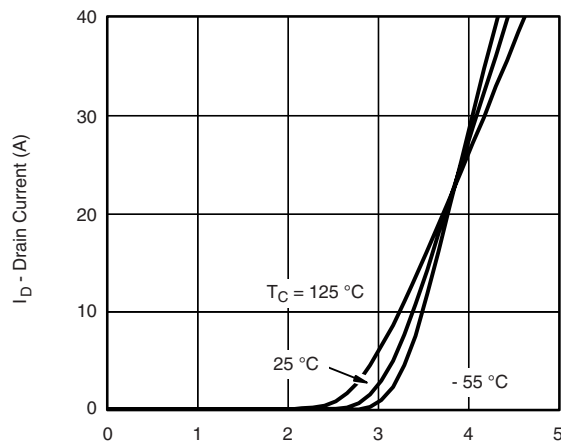
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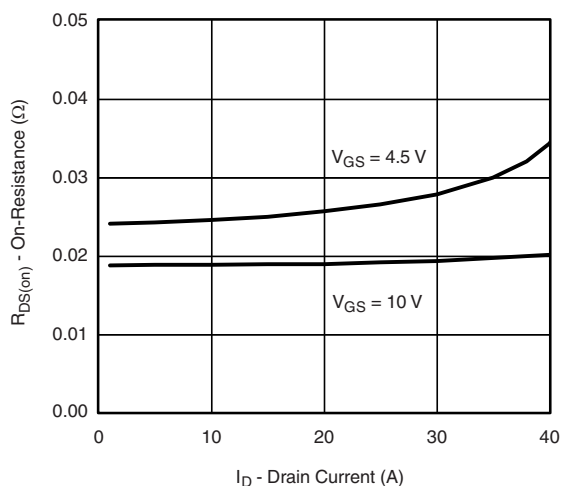
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C unless otherwise noted



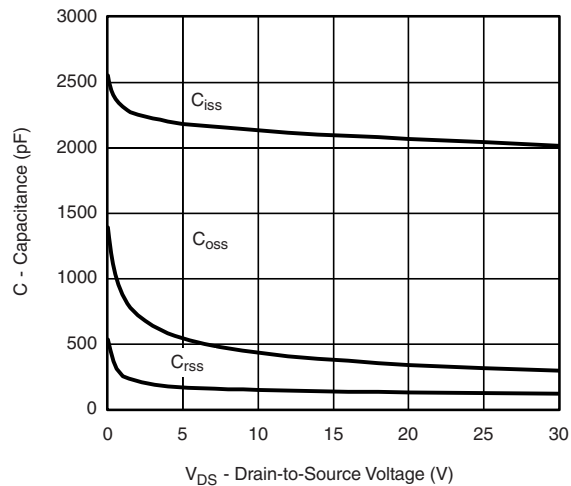
Output Characteristics



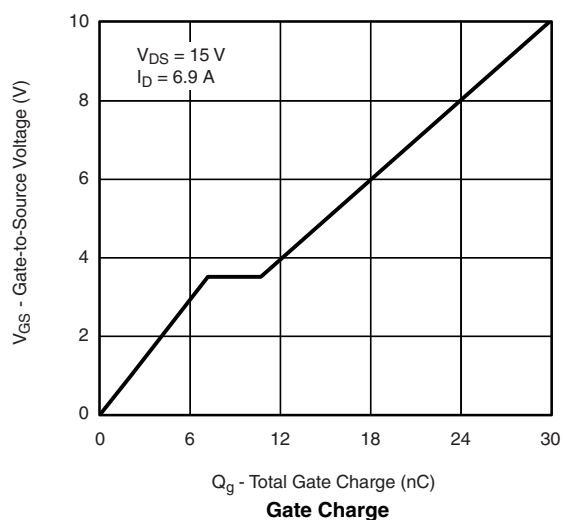
Transfer Characteristics



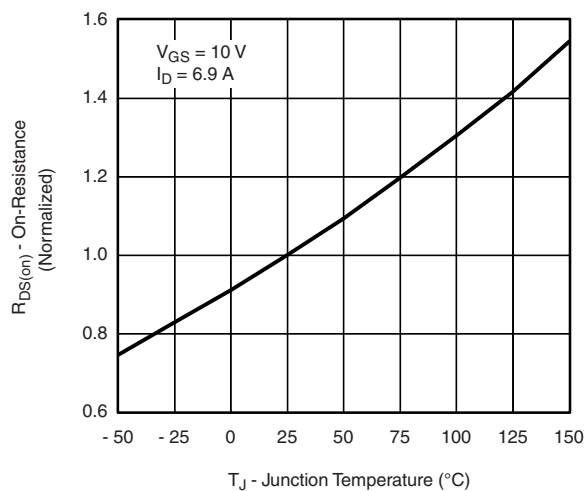
On-Resistance vs. Drain Current



Capacitance



Gate Charge



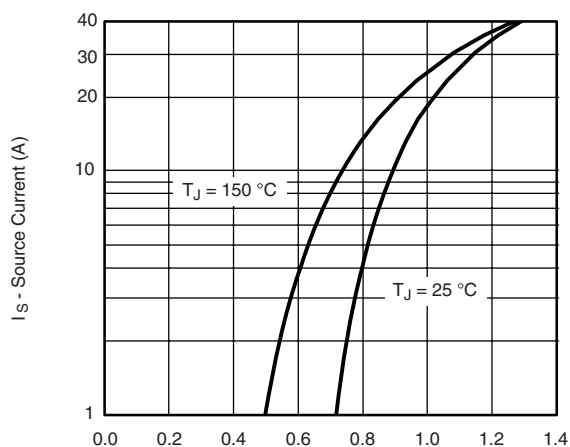
On-Resistance vs. Junction Temperature

Si4542DY

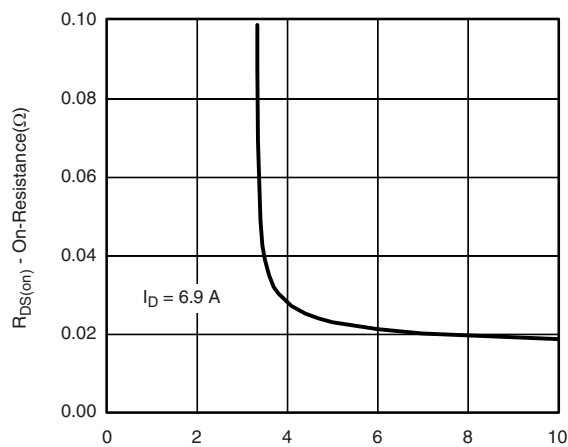
Vishay Siliconix



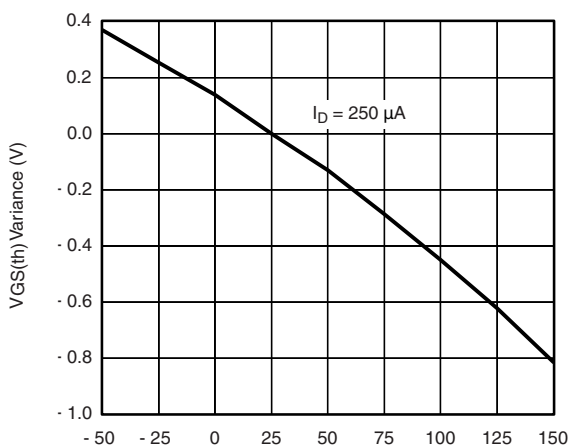
N-CHANNEL TYPICAL CHARACTERISTICS 25 °C unless otherwise noted



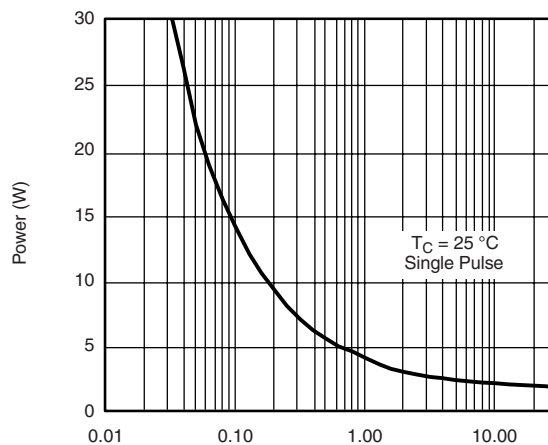
Source-Drain Diode Forward Voltage



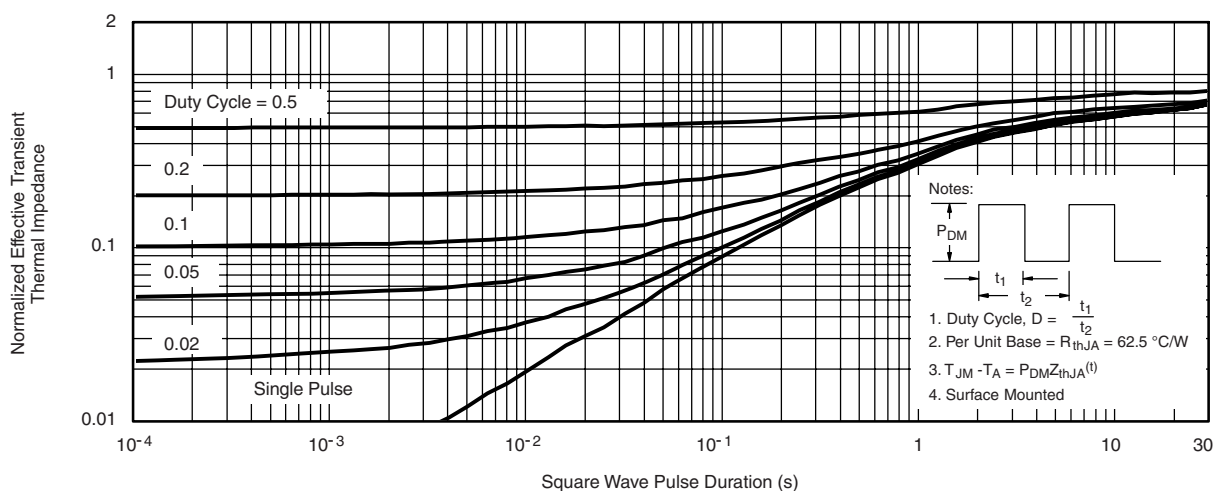
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



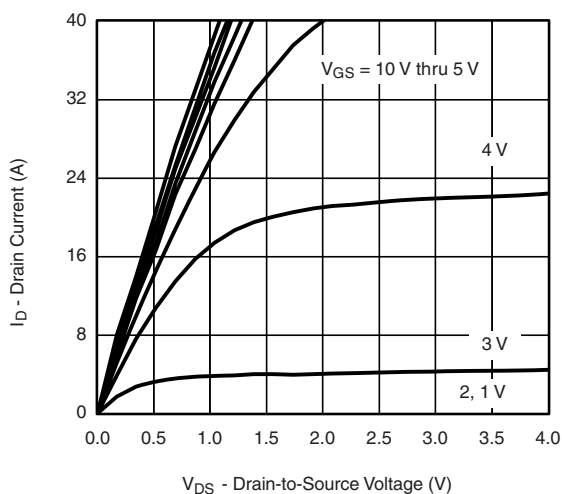
Normalized Thermal Transient Impedance, Junction-to-Ambient



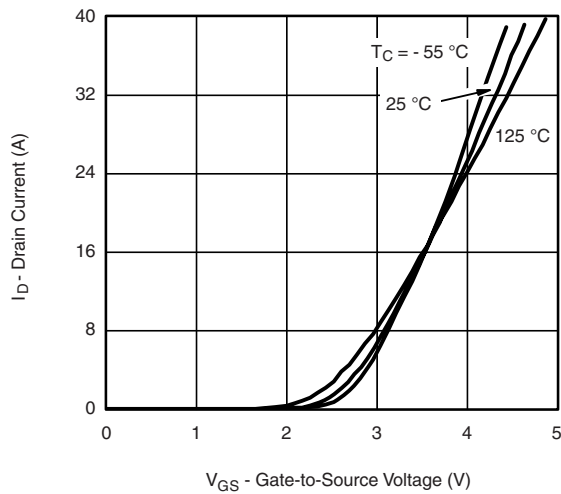
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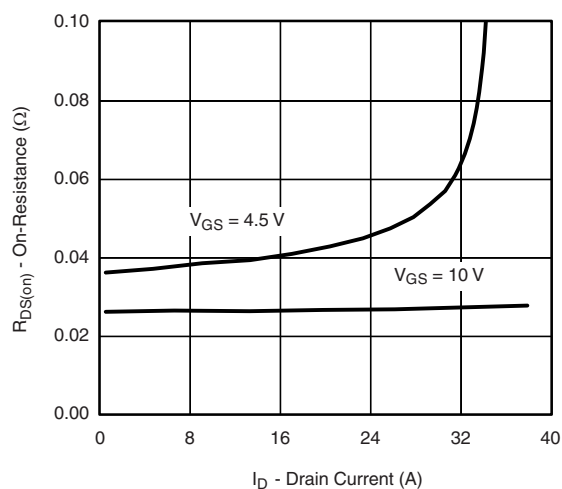
P-CHANNEL TYPICAL CHARACTERISTICS 25 °C unless otherwise noted



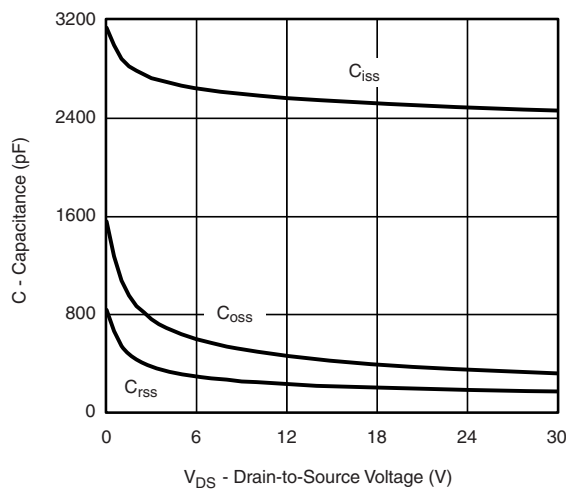
Output Characteristics



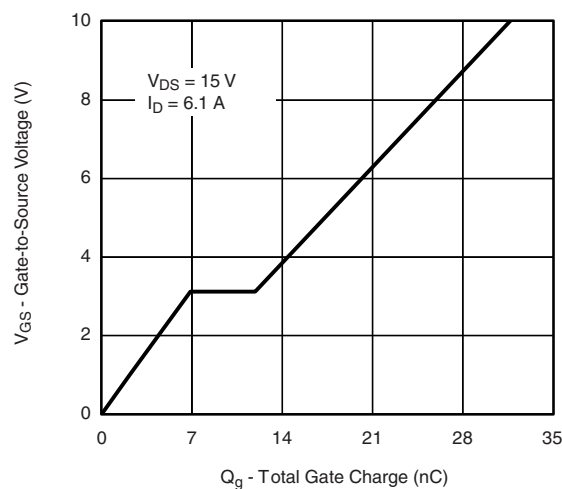
Transfer Characteristics



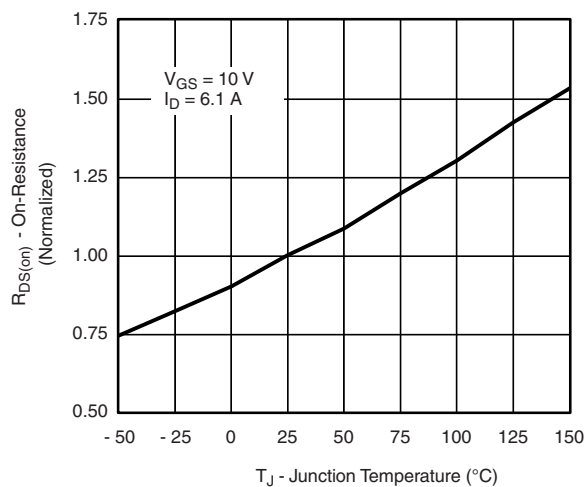
On-Resistance vs. Drain Current



Capacitance



Gate Charge



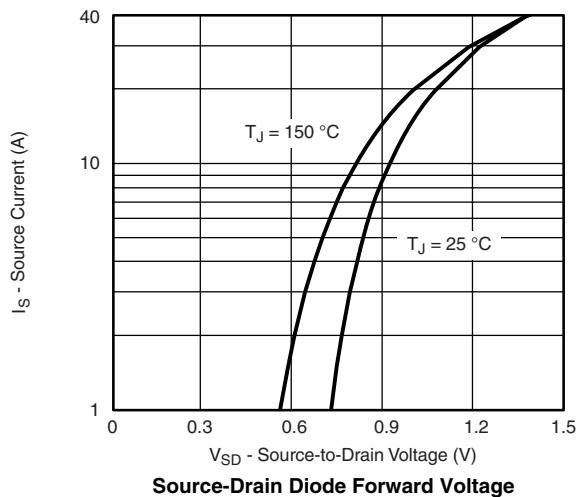
On-Resistance vs. Junction Temperature

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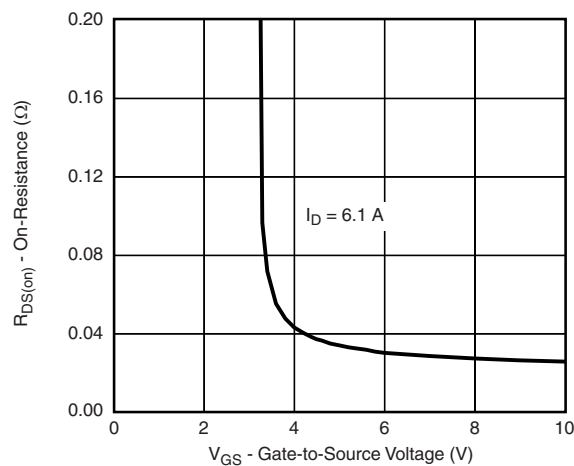
Vishay Siliconix



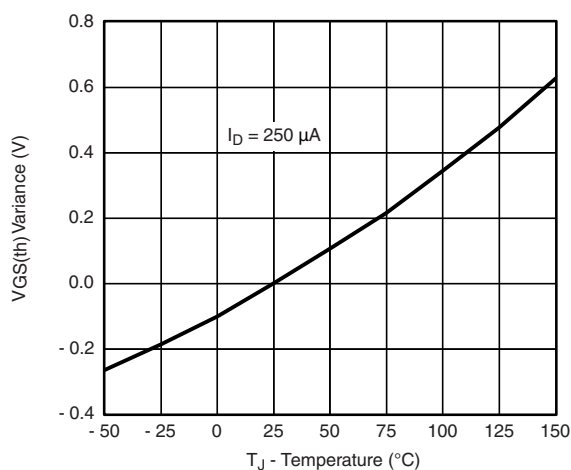
P-CHANNEL TYPICAL CHARACTERISTICS 25 °C unless otherwise noted



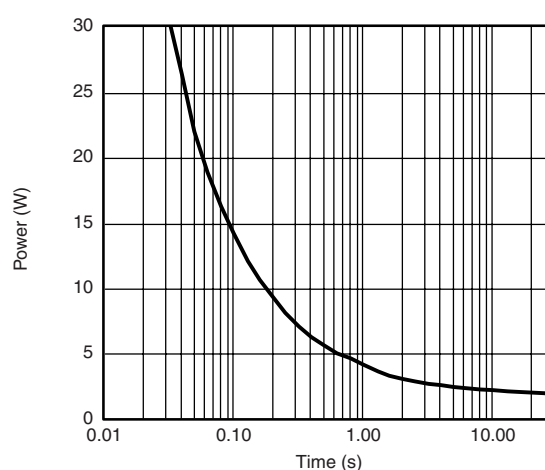
Source-Drain Diode Forward Voltage



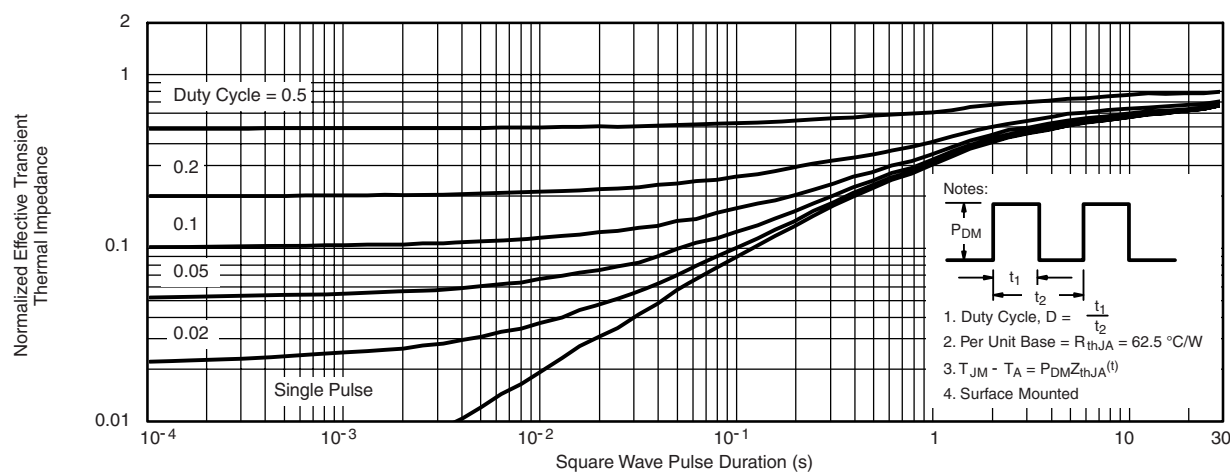
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

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