

Dual N-Channel 40-V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
40	0.021 at $V_{GS} = 10$ V	7.4
	0.028 at $V_{GS} = 4.5$ V	6.4

FEATURES

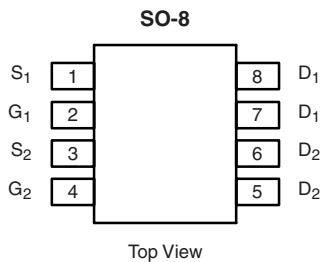
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFET
- Compliant to RoHS Directive 2002/95/EC



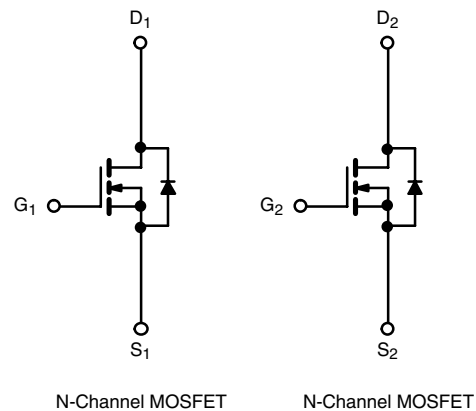
RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- Low Power Synchronous Rectifier
- Automotive 12 V Systems



Ordering Information: Si4942DY-T1-E3 (Lead (Pb)-free)
Si4942DY-T1-GE3 (Lead (Pb)-free and Halogen-free)



ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted						
Parameter	Symbol	10 s	Steady State	Unit		
Drain-Source Voltage	V_{DS}	40		V		
Gate-Source Voltage	V_{GS}	± 20				
Continuous Drain Current ($T_J = 150$ °C) ^a	I_D	$T_A = 25$ °C	7.4	5.3	A	
		$T_A = 70$ °C	5.8	4.3		
Pulsed Drain Current	I_{DM}	30		W		
Avalanche Current	I_{AS}	25				
Continuous Source Current (Diode Conduction) ^a	I_S	1.8	0.9	°C		
Maximum Power Dissipation ^a	P_D	$T_A = 25$ °C	2.1			1.1
		$T_A = 70$ °C	1.3			0.7
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150				

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^a	R_{thJA}	$t \leq 10$ s	50	60	°C/W
		Steady State	90	110	
Maximum Junction-to-Foot (Drain)	R_{thJF}	28	34		

Notes:

a. Surface Mounted on 1" x 1" FR4 board.

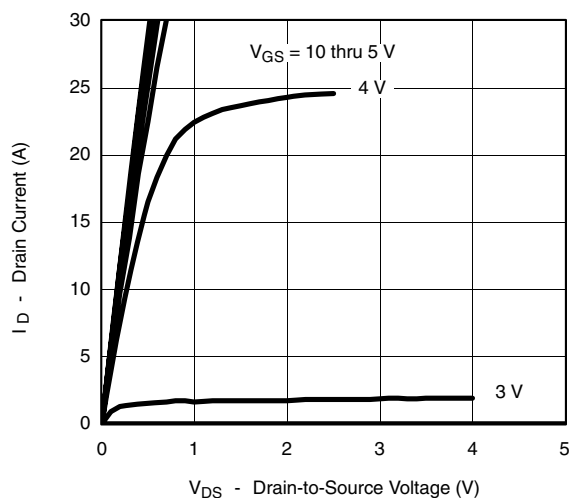
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.0		3	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	30			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 7.4\text{ A}$		0.017	0.021	Ω
		$V_{GS} = 4.5\text{ V}, I_D = 6.4\text{ A}$		0.023	0.028	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 7.4\text{ A}$		25		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 1.8\text{ A}, V_{GS} = 0\text{ V}$		0.75	1.1	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 20\text{ V}, V_{GS} = 10\text{ V}, I_D = 5.7\text{ A}$		21	32	nC
Gate-Source Charge	Q_{gs}			3.3		
Gate-Drain Charge	Q_{gd}			5.8		
Gate Resistance	R_g		0.5	1.1	1.6	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 20\text{ V}, R_L = 20\text{ }\Omega$ $I_D \cong 1\text{ A}, V_{GEN} = 10\text{ V}, R_g = 6\text{ }\Omega$		13	20	ns
Rise Time	t_r			10	15	
Turn-Off Delay Time	$t_{d(off)}$			31	50	
Fall Time	t_f			11	20	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 1.8\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		30	60	

Notes:

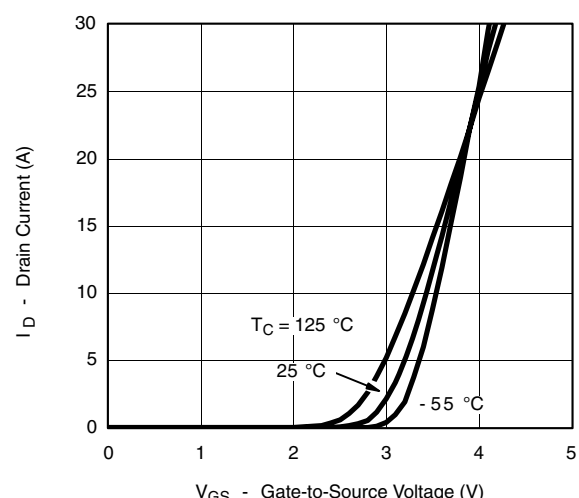
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.

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.

TYPICAL CHARACTERISTICS $25\text{ }^\circ\text{C}$ unless otherwise noted

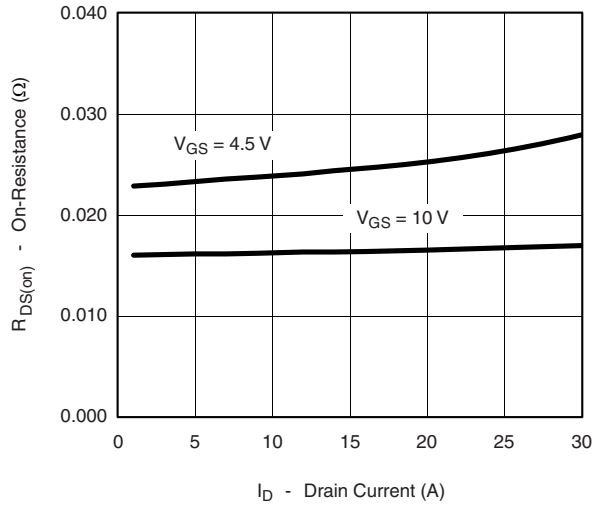


Output Characteristics

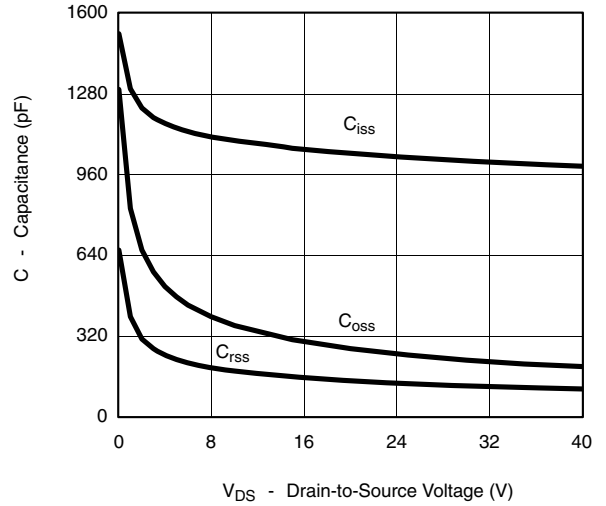


Transfer Characteristics

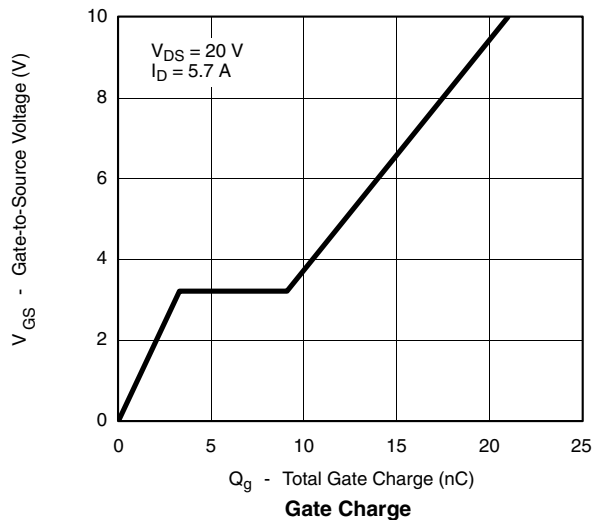
TYPICAL CHARACTERISTICS 25 °C unless otherwise noted



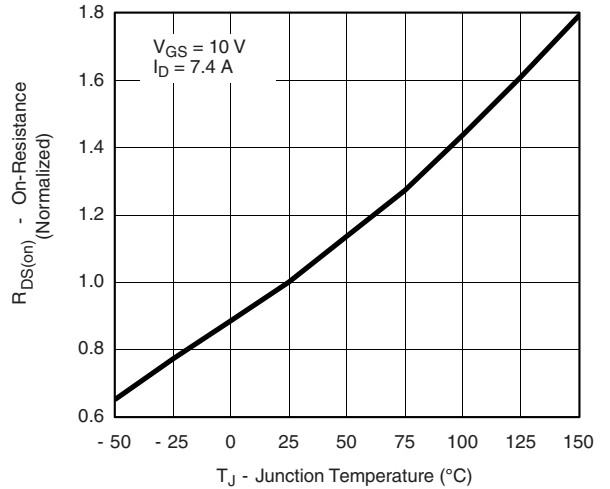
On-Resistance vs. Drain Current



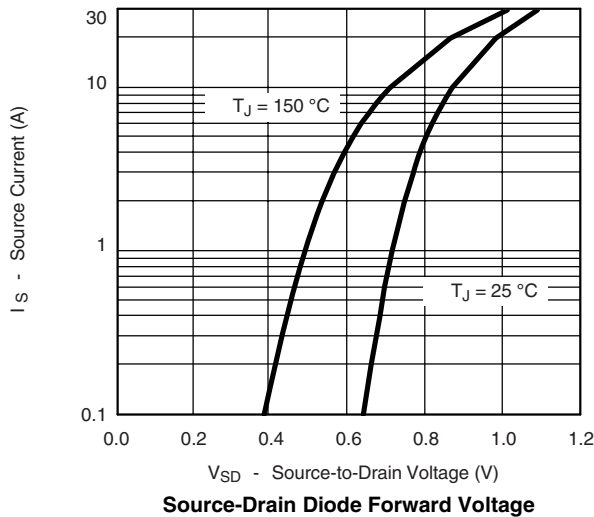
Capacitance



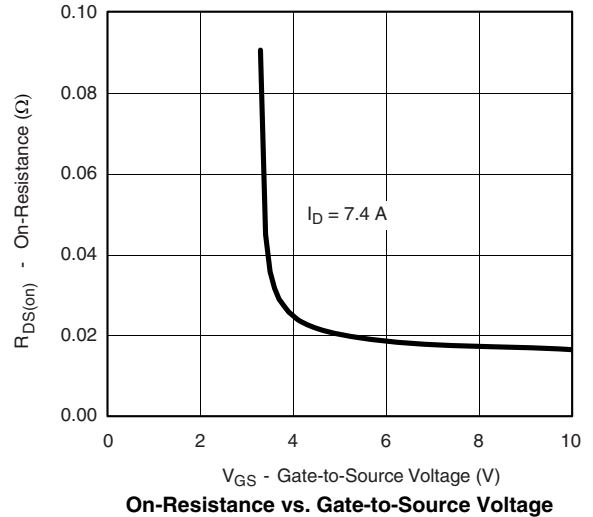
Gate Charge



On-Resistance vs. Junction Temperature

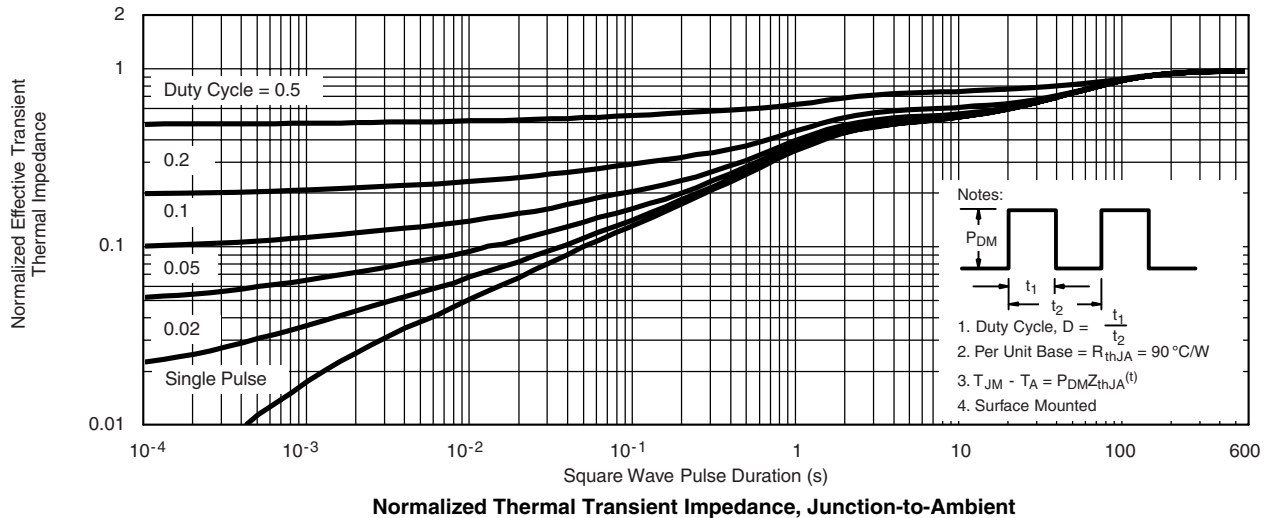
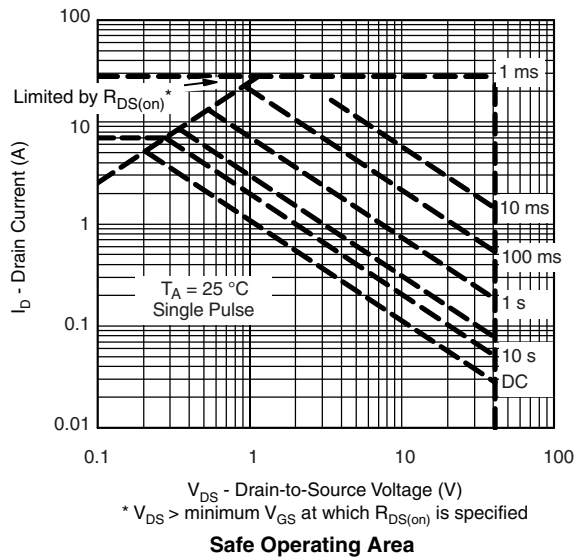
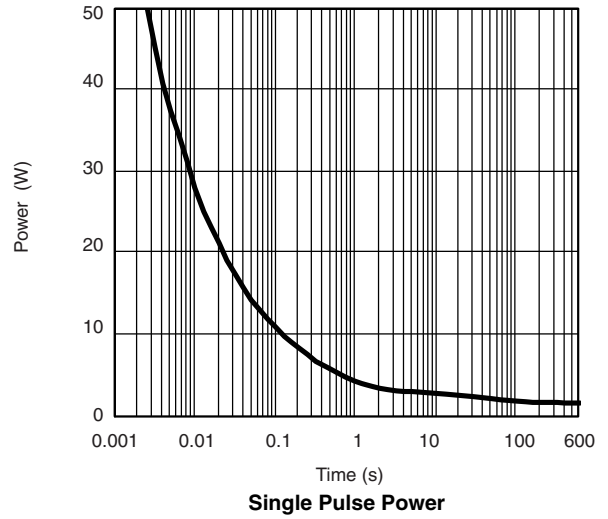
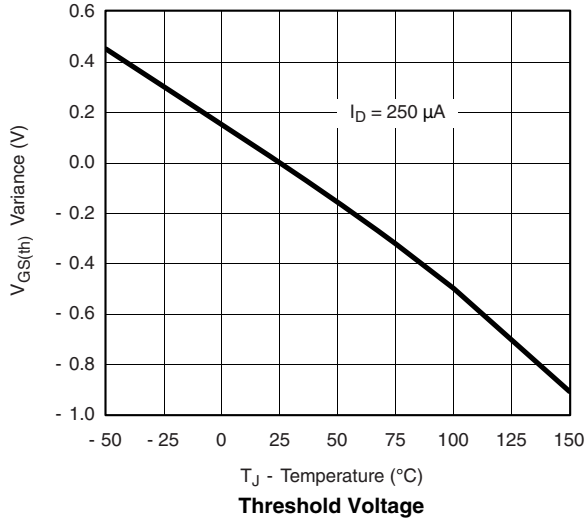


Source-Drain Diode Forward Voltage



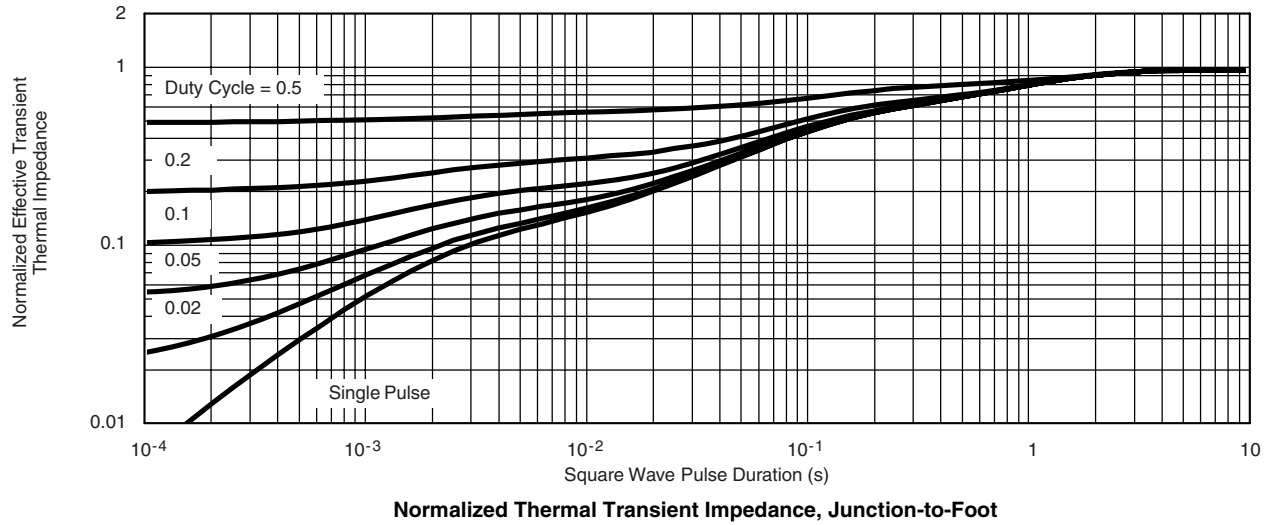
On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C unless otherwise noted





TYPICAL CHARACTERISTICS 25 °C unless otherwise noted



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