

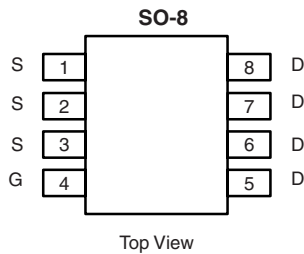
N-Channel 30-V (D-S) MOSFET with Schottky Diode

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
30	0.0095 at $V_{GS} = 10$ V	13
	0.0105 at $V_{GS} = 4.5$ V	12

SCHOTTKY PRODUCT SUMMARY

V_{DS} (V)	V_{SD} (V) Diode Forward Voltage	I_F (A)
30	0.53 V at 3.0 A	3.0



Ordering Information: Si4736DY-T1-E3 (Lead (Pb)-free)
Si4736DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

FEATURES

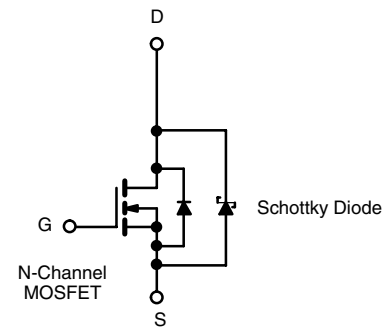
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- LITTLE FOOT® Plus Schottky
- Shoot-Thru-Free
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- DC/DC Converters Optimized for "Low-Side" Synchronous Rectifier Operation



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

Parameter		Symbol	10 s	Steady State	Unit
Drain-Source Voltage		V _{DS}	30		V
Gate-Source Voltage		V _{GS}	± 12		
Continuous Drain Current (T _J = 150 °C) ^a	T _A = 25 °C	I _D	13	9	A
	T _A = 70 °C		10	7	
Pulsed Drain Current		I _{DM}	50		
Continuous Source Current (Diode Conduction) ^a		I _S	5	3.0	W
Maximum Power Dissipation ^a	T _A = 25 °C	P _D	3.1	1.40	
	T _A = 70 °C		2.0	0.90	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 150		°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typ.	Max.	Unit
Maximum Junction-to-Ambient ^a	R_{thJA}	33	40	°C/W
		70	85	
Maximum Junction-to-Foot (Drain)	R_{thJF}	17	21	

Notes:

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

This data sheet contains preliminary specifications that are subject to change.

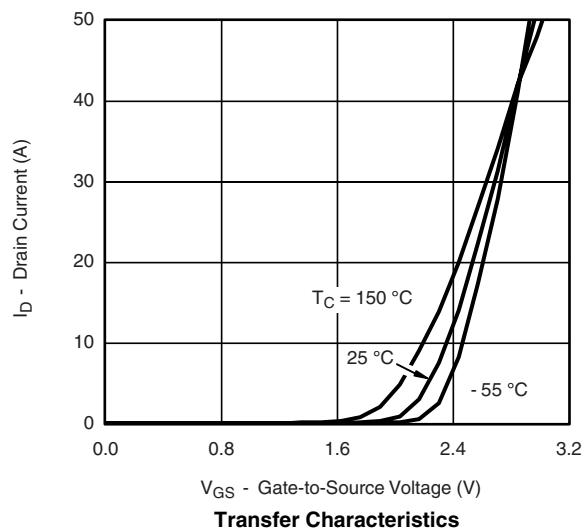
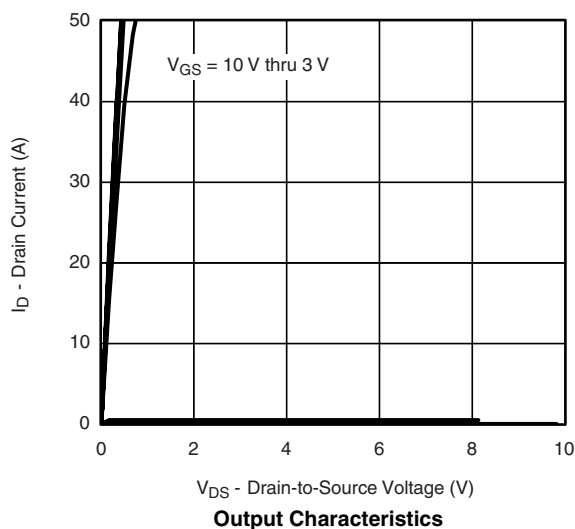
MOSFET SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	0.8	1.35	1.9	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 12\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$		0.007	0.100	mA
		$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 100\text{ }^{\circ}\text{C}$		1.5	10	
		$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 125\text{ }^{\circ}\text{C}$		6.5	20	
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}$, $V_{GS} = 10\text{ V}$	20			A
Drain-Source On-State Resistance ^b	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 13\text{ A}$		0.0070	0.0095	Ω
		$V_{GS} = 4.5\text{ V}$, $I_D = 12\text{ A}$		0.0083	0.0105	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}$, $I_D = 13\text{ A}$		56		S
Diode Forward Voltage ^b	V_{SD}	$I_S = 3.0\text{ A}$, $V_{GS} = 0\text{ V}$		0.495	0.53	V
		$I_S = 3.0\text{ A}$, $V_{GS} = 0\text{ V}$, $T_J = 125\text{ }^{\circ}\text{C}$		0.430	0.47	
Dynamic ^a						
Total Gate Charge	Q_g	$V_{DS} = 15\text{ V}$, $V_{GS} = 4.5\text{ V}$, $I_D = 13\text{ A}$		37	55	nC
Gate-Source Charge	Q_{gs}			10		
Gate-Drain Charge	Q_{gd}			8.8		
Gate Resistance	R_g			0.8		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}$, $R_L = 15\text{ }\Omega$ $I_D \cong 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 6\text{ }\Omega$		17	26	ns
Rise Time	t_r			14	21	
Turn-Off Delay Time	$t_{d(off)}$			102	155	
Fall Time	t_f			26	40	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 3.0\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$		42	65	

Notes:

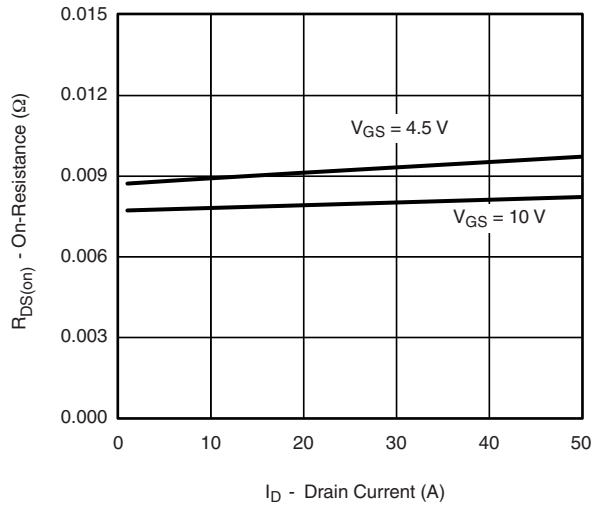
a. Guaranteed by design, not subject to production testing.

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

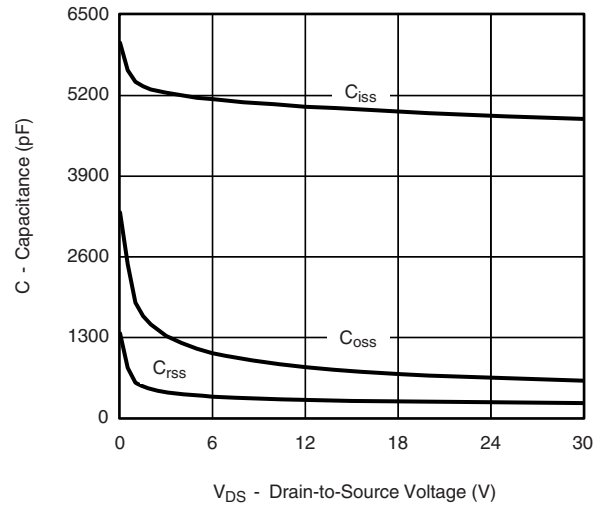
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

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

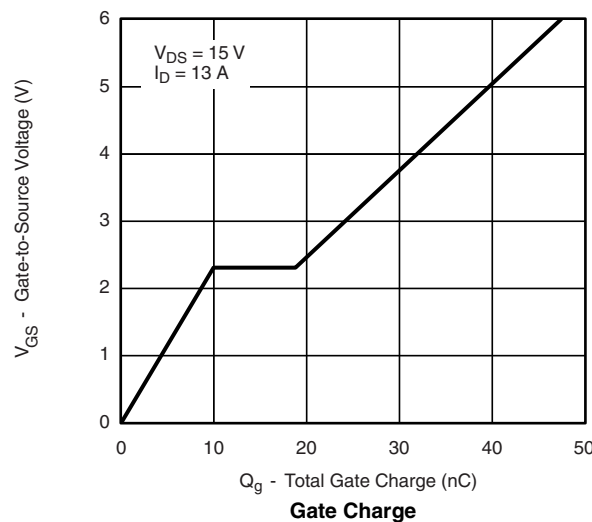
TYPICAL CHARACTERISTICS 25 °C unless otherwise noted



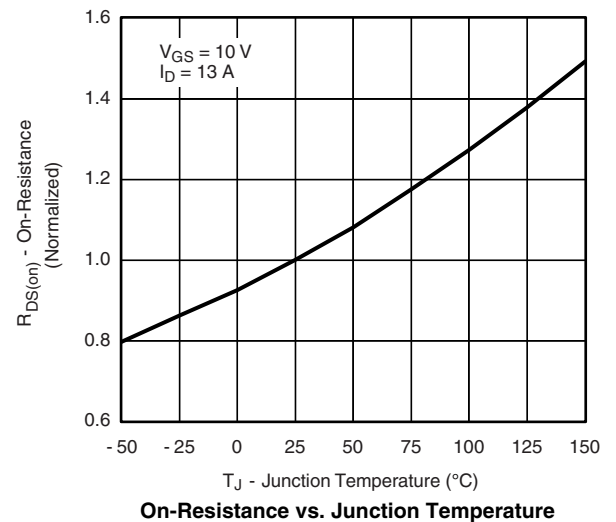
On-Resistance vs. Drain Current



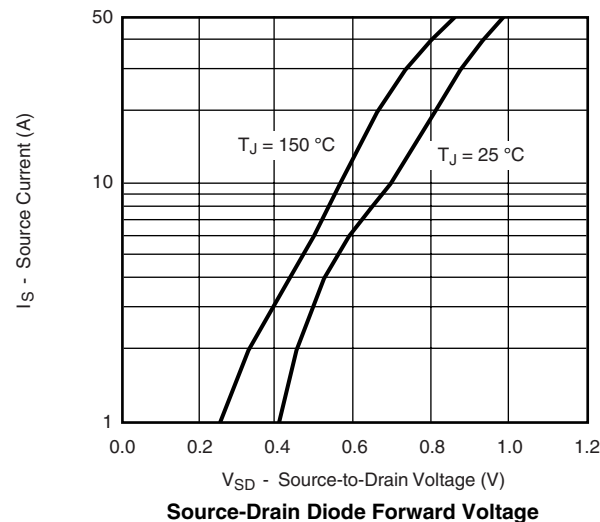
Capacitance



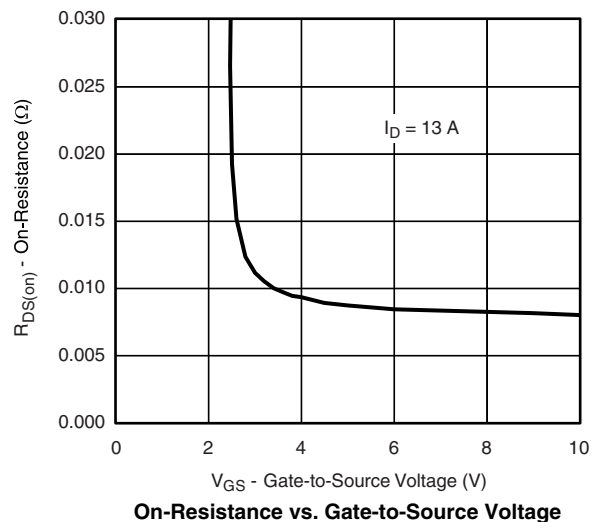
Gate Charge



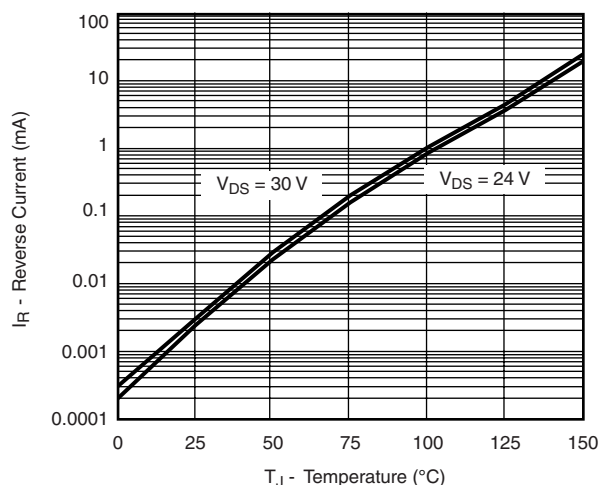
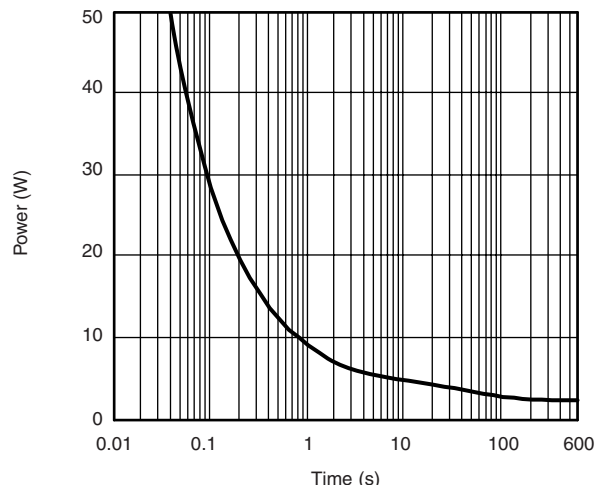
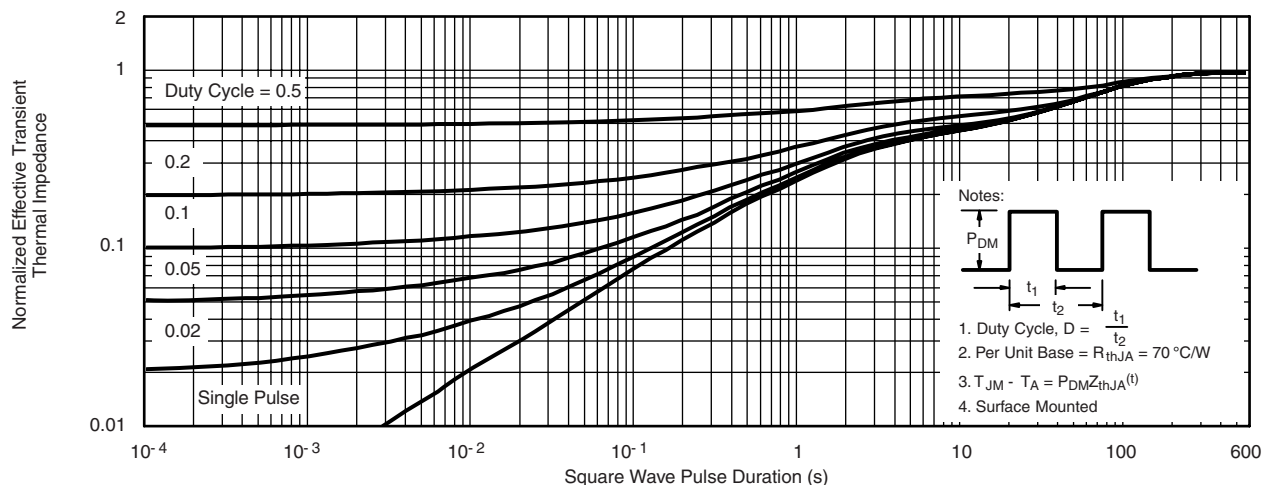
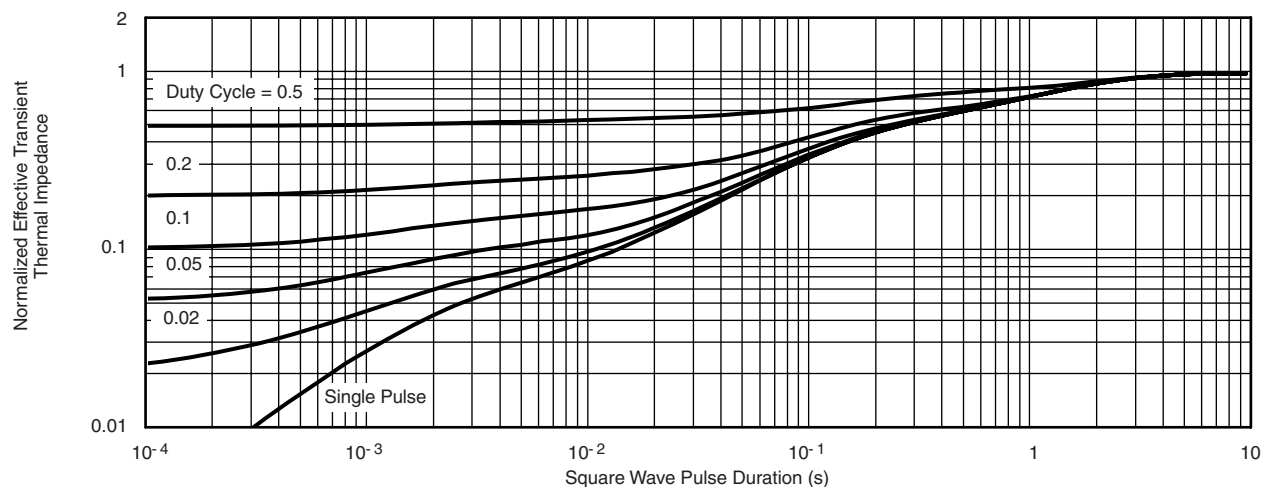
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C unless otherwise noted**Reverse Current vs. Junction Temperature****Single Pulse Power****Normalized Thermal Transient Impedance, Junction-to-Ambient****Normalized Thermal Transient Impedance, Junction-to-Foot**

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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9