

Vishay Siliconix

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

PRODUCT SUMMARY				
V _{DS} (V)	$R_{DS(on)}(\Omega)$	I _D (A) ^a	Q _g (Typ.)	
30	0.0055 at V _{GS} = 10 V	25	13.8 nC	
30	0.0076 at V _{GS} = 4.5 V	21	10.0110	

SO-8 S 1 8 D S 2 7 D S 3 6 D G 4 5 D Top View

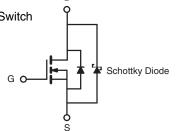
FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- SkyFET[®] Monolithic TrenchFET[®] Power MOSFET and Schottky Diode
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2002/95/EC

ROHS COMPLIANT HALOGEN FREE

APPLICATIONS

- Notebook PC
 - System Power
- VRM, POL, Server
- Synchronous Rectifier Switch



N-Channel MOSFET

Ordering Information: Si4752DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

Parameter	Symbol	Limit	Unit		
Drain-Source Voltage	V_{DS}	30	V		
Gate-Source Voltage	V_{GS}	± 20	v		
	T _C = 25 °C		25		
Continuous Drain Current /T 150 °C)	T _C = 70 °C	, [20	^	
Continuous Drain Current (T _J = 150 °C)	T _A = 25 °C	I _D	17.4 ^{b, c}		
	T _A = 70 °C		13.8 ^{b, c}		
Pulsed Drain Current (300 μs)		I _{DM}	80	A	
Continuous Source-Drain Diode Current	T _C = 25 °C	1	5.6	1	
Continuous Source-Drain Diode Current	T _A = 25 °C	I _S	2.7 ^{b, c}		
Single Pulse Avalanche Current	1 0.1 ml l	I _{AS}	20		
Single Pulse Avalanche Energy	L = 0.1 mH	E _{AS}	20	mJ	
	T _C = 25 °C		6.25		
Marian na Daviar Dissination	T _C = 70 °C		4.0	W	
Maximum Power Dissipation	T _A = 25 °C	P _D	3.0 ^{b, c}		
	T _A = 70 °C		1.9 ^{b, c}		
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C		

THERMAL RESISTANCE RATINGS						
Parameter	Symbol	Тур.	Max.	Unit		
Maximum Junction-to-Ambient ^{b, d}	t ≤ 10 s	R _{thJA}	33	42	°C/W	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	16	20		

Notes:

- a. Based on T_C = 25 °C.
- b. Surface mounted on 1" x 1" FR4 board.
- c. t = 10 s
- d. Maximum under Steady State conditions is 85 °C/W.

Si4752DY

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SPECIFICATIONS ($T_J = 25$ °C	, unless oth	nerwise noted)					
Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_D = 1 \text{ mA}$	30			V	
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}$, $I_D = 1 \text{ mA}$	1.0		2.2		
Gate-Source 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} = 30 V, V _{GS} = 0 V		0.018	0.15	- mA	
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 100 °C		2.0	20		
On -State Drain Current ^a	I _{D(on)}	$V_{DS} \ge 5 \text{ V}, V_{GS} = 10 \text{ V}$	20			Α	
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 10 A		0.0045	0.0055	0	
		V _{GS} = 4.5 V, I _D = 7 A		0.0063	0.0076	Ω	
Forward Transconductance ^a	9 _{fs}	V _{DS} = 15 V, I _D = 10 A		45		S	
Dynamic ^b							
Input Capacitance	C _{iss}			1700		pF	
Output Capacitance	C _{oss}	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		410			
Reverse Transfer Capacitance	C _{rss}			130			
Total Gate Charge	Q_g	$V_{DS} = 15 \text{ V}, V_{GS} = 10 \text{ V}, I_{D} = 10 \text{ A}$		28.5	43	nC	
Total date onlinge		V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 10 A		13.8	21		
Gate-Source Charge	Q_{gs}			4.2			
Gate-Drain Charge	Q_{gd}			3.8			
Gate Resistance	R_g	f = 1 MHz	0.3	1.4	2.8	Ω	
Turn-On Delay Time	t _{d(on)}			18	35	ns	
Rise Time	t _r	V_{DD} = 15 V, R_L = 1.5 Ω		15	30		
Turn-Off Delay Time	t _{d(off)}	$I_D \cong 10 \text{ A}, V_{GEN} = 4.5 \text{ V}, R_g = 1 \Omega$		25	50		
Fall Time	t _f			8	16		
Turn-On Delay Time	t _{d(on)}			11	22		
Rise Time	t _r	. DD / L		12	24		
Turn-Off Delay Time	t _{d(off)}	$I_D \cong 10 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 1 \Omega$		25	50		
Fall Time	t _f			8	16		
Drain-Source Body Diode and Schottky	Characteris	tics					
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			5.6	А	
Pulse Diode Forward Current ^a	I _{SM}				80		
Body Diode Voltage	V_{SD}	I _S = 3 A		0.46	0.65	V	
Body Diode Reverse Recovery Time	t _{rr}			23	45	ns	
Body Diode Reverse Recovery Charge	Q _{rr}			12	24	nC	
Reverse Recovery Fall Time	t _a	- I _F = 10 A, dl/dt = 100 A/μs, T _J = 25 °C -		11			
Reverse Recovery Rise Time	t _b	t _b		12		ns	

Notes:

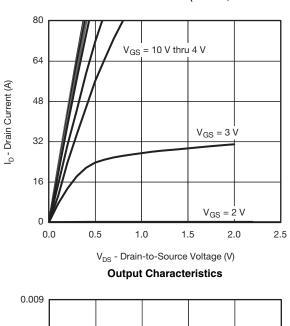
- a. Pulse test; pulse width \leq 300 $\mu s,$ duty cycle \leq 2 %.
- b. Guaranteed by design, not subject to production testing.

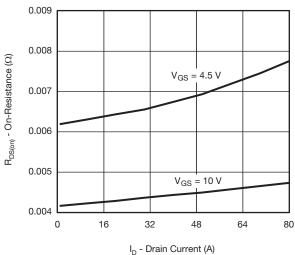
 $Stresses\ beyond\ those\ listed\ under\ "Absolute\ Maximum\ Ratings"\ may\ cause\ permanent\ damage\ to\ the\ device.\ These\ are\ stress\ ratings\ only,\ and\ functional\ operation$ of the device at these or any other conditions beyond those indicated in the operational sections of the specifications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

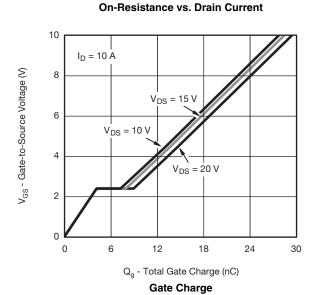


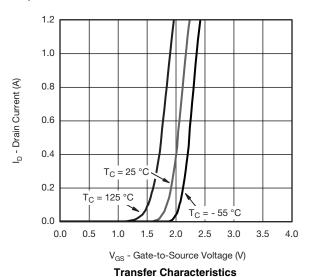


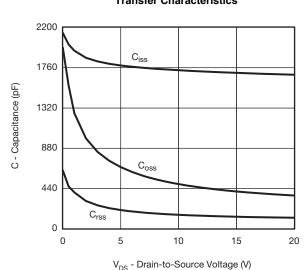
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

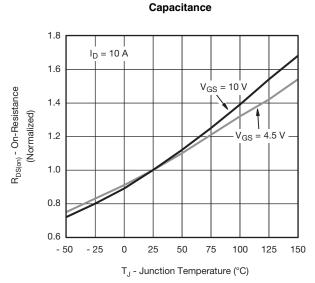










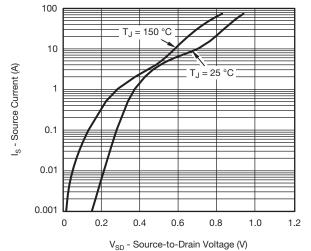


On-Resistance vs. Junction Temperature

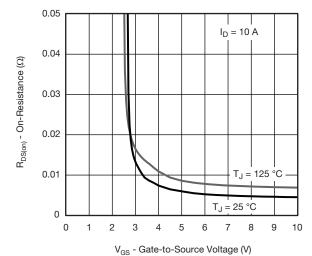
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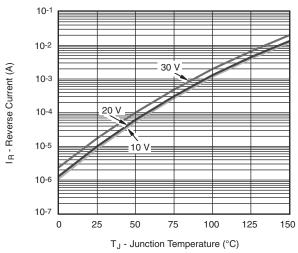
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



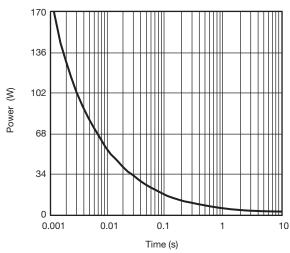
Source-Drain Diode Forward Voltage



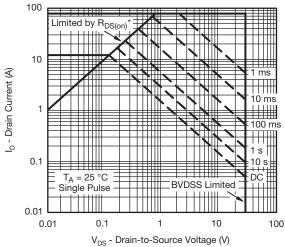
On-Resistance vs. Gate-to-Source Voltage



Reverse Current (Schottky)

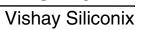


Single Pulse Power, Junction-to-Ambient



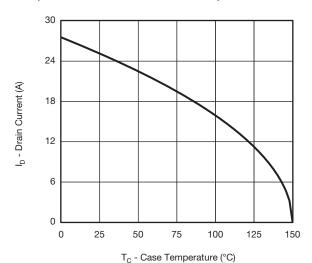
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area

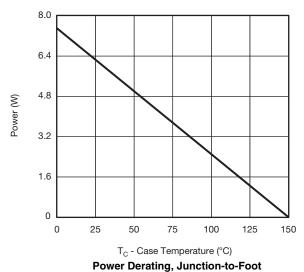


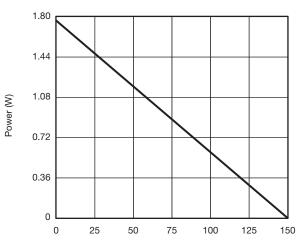


TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating*





T_A - Ambient Temperature (°C)

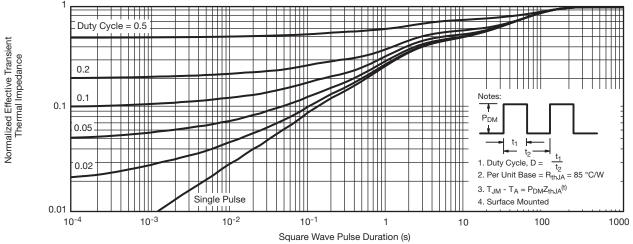
Power Derating, Junction-to-Ambient

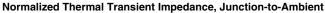
^{*} The power dissipation P_D is based on $T_{J(max)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

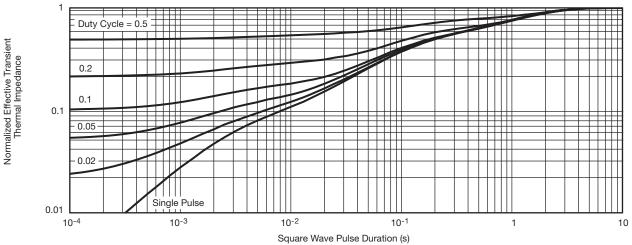
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TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)







Normalized Thermal Transient Impedance, Junction-to-Foot

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