

Vishay Siliconix

N-Channel 20-V (D-S) MOSFET

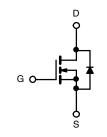
PRODUCT SUMMARY					
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)			
20	0.0027 at V_{GS} = 4.5 V	25			
	0.0042 at V _{GS} = 2.5 V	22			



- Halogen-free According to IEC 61249-2-21
 Available
- Ultra Low On-Resistance Using High Density TrenchFET[®] Gen II Power MOSFET Technology
- Q_g Optimized
- 100 % Rg Tested

APPLICATIONS

- Synchronous Rectification
- Point-Of-Load



N-Channel MOSFET

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

Ordering Information: Si4378DY-T1-E3 (Lead (Pb)-free) Si4378DY-T1-GE3 (Lead (Pb)-free and Halogen-free)

ABSOLUTE MAXIMUM RATINGS $T_A = 25 \degree C$, unless otherwise noted						
Parameter		Symbol	10 s	Steady State	Unit	
Drain-Source Voltage		V _{DS}	20		v	
Gate-Source Voltage		V _{GS}	± 12			
	T _A = 25 °C	- I _D	25	19		
Continuous Drain Current (T _J = 150 °C) ^a	T _A = 70 °C		20	13		
Pulsed Drain Current (10 µs Pulse Width)		I _{DM}	70		А	
Continuous Source Current (Diode Conduction) ^a		۱ _S	2.9	1.3		
Avalanche Current	L = 0.1 mH	I _{AS}	40			
	T _A = 25 °C	- P _D	3.5	1.6	W	
Maximum Power Dissipation ^a	T _A = 70 °C		2.2	1	vv	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 150		°C	

THERMAL RESISTANCE RATINGS						
Parameter		Symbol	Typical	Maximum	Unit	
	t ≤ 10 s	R _{thJA}	29	35		
Maximum Junction-to-Ambient ^a	Steady State		67	80	°C/W	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	13	16		

Notes:

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



HALOGEN FREE Available

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Parameter	Symbol	Test Conditions Min.		Тур.	Max.	Unit
Static	•				•	
Gate Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_D = 250 \ \mu A$ 0.6			1.8	V
Gate-Body Leakage	I _{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 12 V$			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	$V_{DS} = 20 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$			1	
		V_{DS} = 20 V, V_{GS} = 0 V, T_{J} = 55 °C			5	μA
On-State Drain Current ^a	I _{D(on)}	$V_{DS} \ge 5 \text{ V}, V_{GS} = 4.5 \text{ V}$	30			Α
	Р	$V_{GS} = 4.5 \text{ V}, \text{ I}_{D} = 25 \text{ A}$		0.0022	0.0027	Ω
Drain-Source On-State Resistance ^a	R _{DS(on)}	$V_{GS} = 2.5 \text{ V}, \text{ I}_{\text{D}} = 22 \text{ A}$		0.0034	0.0042	
Forward Transconductance ^a	9 _{fs}	$V_{DS} = 10 \text{ V}, I_{D} = 25 \text{ A}$		150		S
Diode Forward Voltage ^a	V _{SD}	$I_{S} = 2.9 \text{ A}, V_{GS} = 0 \text{ V}$		0.72	1.1	V
Dynamic ^b						
Input Capacitance	C _{iss}			8500		
Output Capacitance	C _{oss}	V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz		1250		pF
Reverse Transfer Capacitance	C _{rss}			650		
Total Gate Charge	Qg			55		
Gate-Source Charge	Q _{gs}	V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 25 A		16		nC
Gate-Drain Charge	Q _{gd}			10		
Gate Resistance	R _g		0.8	1.3	2.0	Ω
Turn-On Delay Time	t _{d(on)}			85	130	
Rise Time	t _r	V_{DD} = 10 V, R_L = 10 Ω		65	100	ns
Turn-Off Delay Time	t _{d(off)}	$\text{I}_\text{D}\cong \text{1}$ A, V_GEN = 4.5 V, R_g = 6 Ω		140	210	
Fall Time	t _f			50	80	
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 2.9 A, dI/dt = 100 A/μs		50	80	

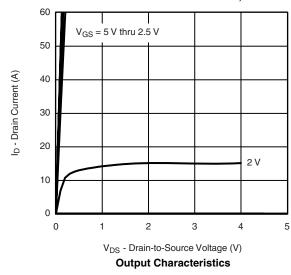
Notes:

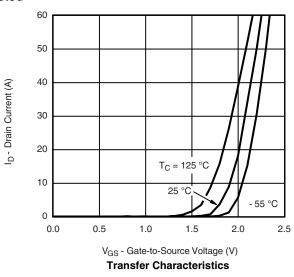
a. Pulse test; pulse width \leq 300 $\mu s,$ duty cycle \leq 2 %.

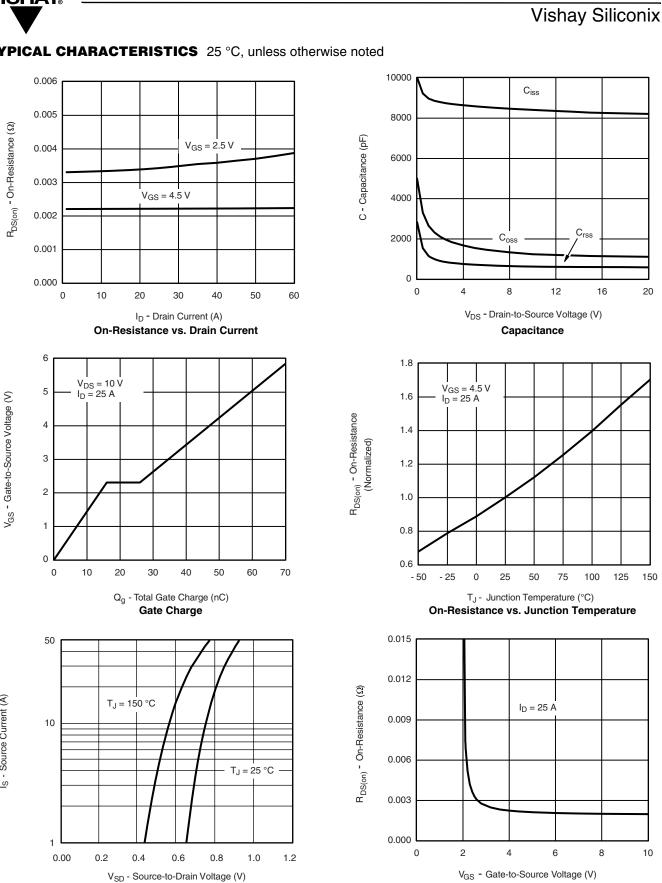
b. Guaranteed by design, not subject to production testing.

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







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Document Number: 72918 S09-0226-Rev. C, 09-Feb-09

Source-Drain Diode Forward Voltage

Is - Source Current (A)

On-Resistance vs. Gate-to-Source Voltage

10

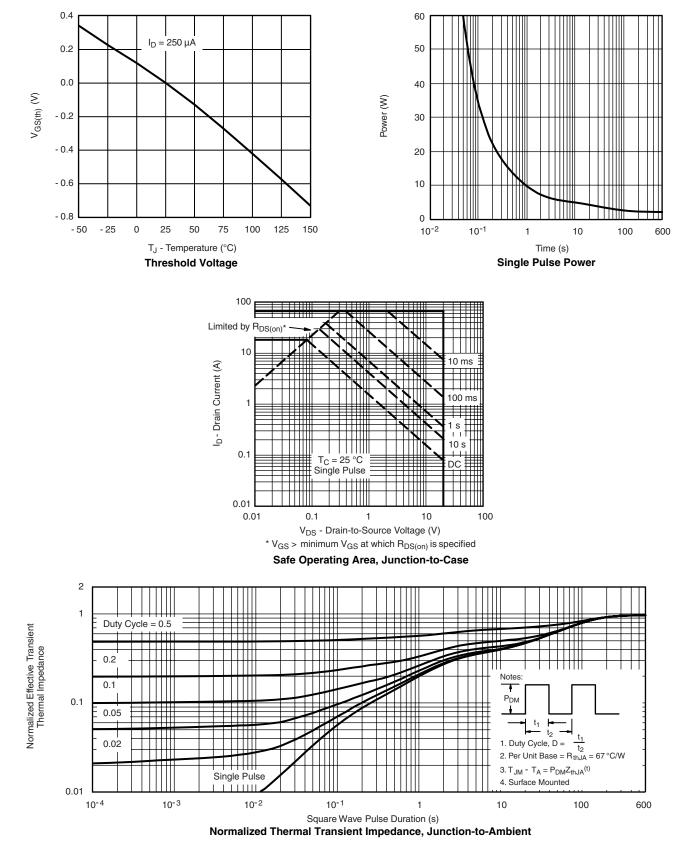
Si4378DY

20

150

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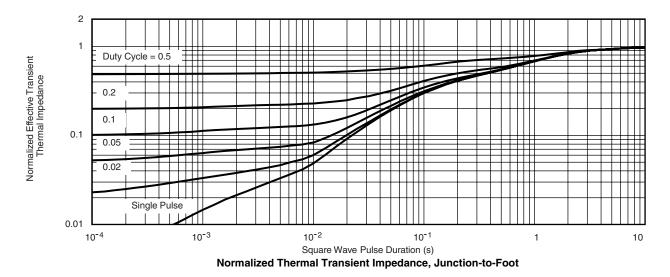






Si4378DY Vishay Siliconix

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?72918.



Package Information

Vishay Siliconix

SOIC (NARROW): 8-LEAD JEDEC Part Number: MS-012





	MILLIM	IETERS	INCHES			
DIM	Min	Мах	Min	Max		
A	1.35	1.75	0.053	0.069		
A ₁	0.10	0.20	0.004	0.008		
В	0.35	0.51	0.014	0.020		
С	0.19	0.25	0.0075	0.010		
D	4.80	5.00	0.189	0.196		
E	3.80	4.00	0.150	0.157		
е	1.27	BSC	0.050 BSC			
н	5.80	6.20	0.228	0.244		
h	0.25	0.50	0.010	0.020		
L	0.50	0.93	0.020	0.037		
q	0°	8°	0°	8°		
S	0.44	0.64	0.018	0.026		
ECN: C-06527-Rev. I, 11-Sep-06 DWG: 5498						

Application Note 826

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RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads Dimensions in Inches/(mm)

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