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Vishay Siliconix

Automotive N-Channel 40 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY					
V _{DS} (V)	40				
$R_{DS(on)}(\Omega)$ at $V_{GS} = 10 \text{ V}$	0.0046				
$R_{DS(on)}(\Omega)$ at $V_{GS} = 4.5 \text{ V}$	0.0056				
I _D (A)	29				
Configuration	Single				
Package	SO-8				

FEATURES

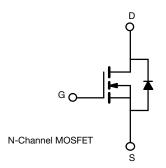
- TrenchFET® power MOSFET
- AEC-Q101 qualified
- 100 % R_q and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912





ROHS COMPLIANT HALOGEN FREE





ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)					
PARAMETER		SYMBOL	LIMIT	UNIT	
Drain-Source Voltage		V _{DS}	40	V	
Gate-Source Voltage	V _{GS}	± 20	V		
Continuous Drain Current	T _C = 25 °C	I _D	29		
Continuous Drain Current	T _C = 125 °C		16.9		
Continuous Source Current (Diode Conduction)	I _S	6.4	А		
Pulsed Drain Current ^a	I _{DM}	84			
Single Pulse Avalanche Current	L = 0.1 mH	I _{AS}	50		
Single Pulse Avalanche Energy	L = 0.1 mm	E _{AS}	125	mJ	
Maximum Dawar Dissination 8	T _C = 25 °C	0	7.1	W	
Maximum Power Dissipation ^a	T _C = 125 °C	P _D	2.3	VV	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to +175	°C	

THERMAL RESISTANCE RATINGS						
PARAMETER		SYMBOL	LIMIT	UNIT		
Junction-to-Ambient F	PCB Mount b	R _{thJA}	80	°C/W		
Junction-to-Foot (Drain)		R_{thJF}	21	C/VV		

Notes

- a. Pulse test; pulse width \leq 300 μ s, duty cycle \leq 2 %.
- b. When mounted on 1" square PCB (FR4 material).

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PARAMETER	SYMBOL	TES	T CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static							,
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$		40	-	-	V
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} =	$V_{DS} = V_{GS}, I_D = 250 \mu A$		2.0	2.5	
Gate-Source Leakage	I _{GSS}	V _{DS} =	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$		-	± 100	nA
		V _{GS} = 0 V	V _{DS} = 40 V	-	-	1	
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V	V _{DS} = 40 V, T _J = 125 °C	-	-	50	μA
		V _{GS} = 0 V	V _{DS} = 40 V, T _J = 175 °C	-	-	250	
On-State Drain Current ^a	I _{D(on)}	V _{GS} = 10 V	$V_{DS} \ge 5 V$	30	-	-	Α
		V _{GS} = 10 V	I _D = 14 A	-	0.0036	0.0046	Ω
Data Octob Octob Bootstone 2		V _{GS} = 10 V	I _D = 14 A, T _J = 125 °C	-	-	0.0070	
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V	I _D = 14 A, T _J = 175 °C	-	-	0.0083	
		V _{GS} = 4.5 V	I _D = 12 A	-	0.0046	0.0056	
Forward Transconductance b	9 _{fs}	V _{DS}	= 15 V, I _D = 14 A	-	78	-	S
Dynamic ^b							
Input Capacitance	C _{iss}			-	4319	5400	
Output Capacitance	C _{oss}	V _{GS} = 0 V	V _{DS} = 20 V, f = 1 MHz	=	512	640	pF
Reverse Transfer Capacitance	C _{rss}			=	240	300	
Total Gate Charge ^c	Qg			-	72	110	
Gate-Source Charge ^c	Q_gs	V _{GS} = 10 V	$V_{DS} = 20 \text{ V}, I_D = 5 \text{ A}$	-	13	-	nC
Gate-Drain Charge ^c	Q_{gd}			=	11	-	
Gate Resistance	R_g		f = 1 MHz		1.6	3.9	Ω
Turn-On Delay Time ^c	t _{d(on)}			-	15	25	
Rise Time °	t _r	V_{DD} = 20 V, R_L = 4 Ω I_D \cong 5 A, V_{GEN} = 10 V, R_g = 1 Ω		-	30	45	- ns
Turn-Off Delay Time ^c	t _{d(off)}			-	43	66	
Fall Time ^c	t _f			-	15	25	
Source-Drain Diode Ratings and Chara	acteristics ^b						
Pulsed Current ^a	I _{SM}					84	Α

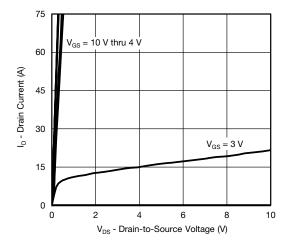
Notes

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

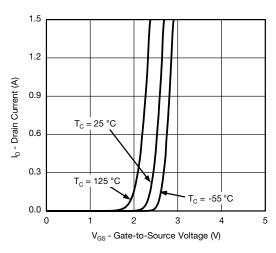
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



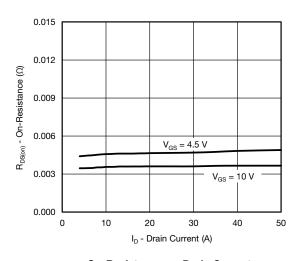
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



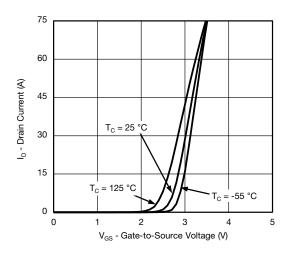
Output Characteristics



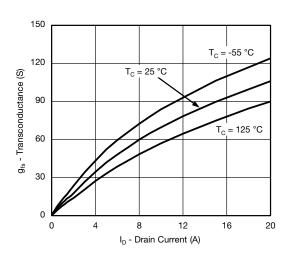
Transfer Characteristics



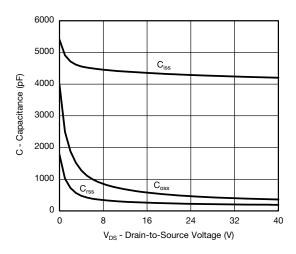
On-Resistance vs. Drain Current



Transfer Characteristics



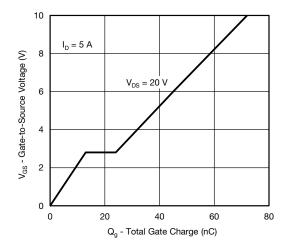
Transconductance



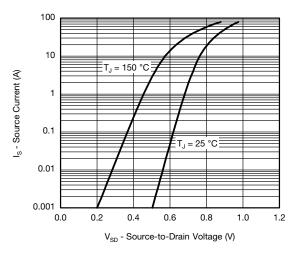
Capacitance



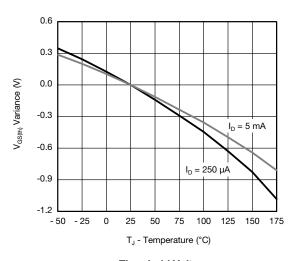
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



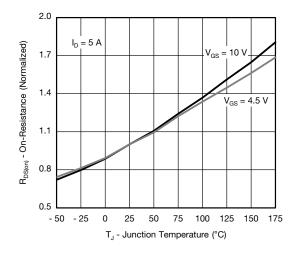
Gate Charge



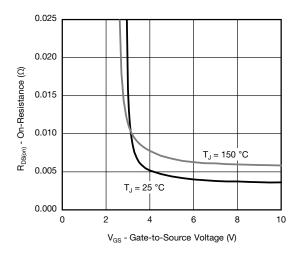
Source Drain Diode Forward Voltage



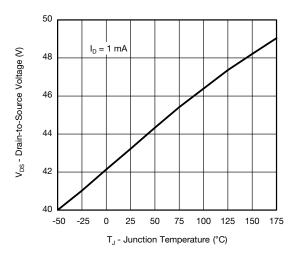
Threshold Voltage



On-Resistance vs. Junction Temperature



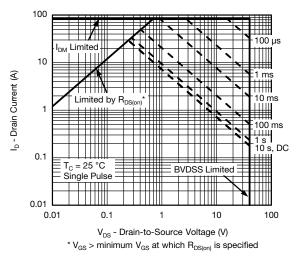
On-Resistance vs. Gate-to-Source Voltage



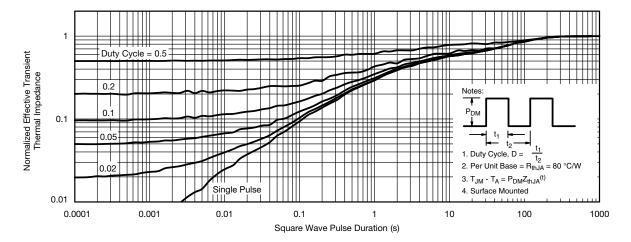
Drain Source Breakdown vs. Junction Temperature



THERMAL RATINGS ($T_A = 25$ °C, unless otherwise noted)



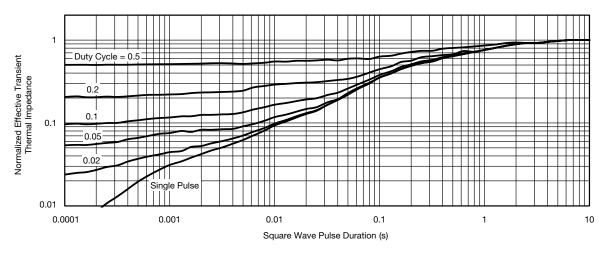
Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient

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THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Foot

Note

- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient (25 °C)
 - Normalized Transient Thermal Impedance Junction-to-Foot (25 °C)

are given for general guidelines only to enable the user to get a "ball park" indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

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/ppg267375.





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REVISION	HISTORY a	
REVISION	DATE	DESCRIPTION OF CHANGE
С	21-Sep-15	R _g and some timing changed

Note

a. As of April 2014



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







	MILLIMETERS INCHES			HES		
DIM	Min	Max	Min	Max		
Α	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		
Е	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

Document Number: 71192 www.vishay.com 11-Sep-06



RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads Dimensions in Inches/(mm)

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