

Vishay Siliconix

Power MOSFET

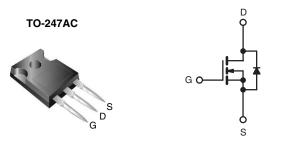
PRODUCT SUMMARY				
V _{DS} (V) at T _J max.	560 \	560 V		
R _{DS(on)} (Ω)	V _{GS} = 10 V	0.38		
Q _g (Max.) (nC)	68	68		
Q _{gs} (nC)	17.6	17.6		
Q _{gd} (nC)	21.8			
Configuration	Single			

FEATURES

- Low Figure-of-Merit Ron x Qg
- 100 % Avalanche Tested
- Gate Charge Improved
- \bullet T_{rr}/Q_{rr} Improved
- Compliant to RoHS Directive 2002/95/EC







ORDERING INFORMATION	
Package	TO-247AC
Lead (Pb)-free	SiHG16N50C-E3

N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T _C = 25 °C, unless otherwise noted					
PARAMETER			SYMBOL	LIMIT	UNIT
Drain-Source Voltage			V_{DS}	500	V
Gate-Source Voltage			V_{GS}	± 30	\ \
Continuous Drain Current /T 150 °C\s	V at 10 V	T _C = 25 °C		16	
Continuous Drain Current (T _J = 150 °C) ^a	V _{GS} at 10 V	$T_C = 25 ^{\circ}C$ $T_C = 100 ^{\circ}C$	I _D	10	Α
Pulsed Drain Current ^c			I _{DM}	40	
Linear Derating Factor				2	W/°C
Single Pulse Avalanche Energy ^b			E _{AS}	320	mJ
Maximum Power Dissipation			P_D	250	W
Operating Junction and Storage Temperature Range			T _J , T _{stg}	- 55 to + 150	°C
Soldering Recommendations (Peak Temperature) ^d for 10 s			300		

- a. Limited by maximum junction temperature.
- b. $V_{DD} = 50$ V, starting $T_J = 25$ °C, L = 2.5 mH, $R_g = 25$ Ω , $I_{AS} = 16$ A.
- c. Repetitive rating; pulse width limited by maximum junction temperature.
- d. 1.6 mm from case.

^{*} Pb containing terminations are not RoHS compliant, exemptions may apply

SiHG16N50C

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THERMAL RESISTANCE RATINGS				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	R _{thJA}	-	40	°C/W
Maximum Junction-to-Case (Drain)	R _{thJC}	-	0.5	C/VV

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static		•					
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0$	V, I _D = 250 μA	500	-	-	V
V _{DS} Temperature Coefficient	$\Delta V_{DS}/T_{J}$	Reference t	to 25 °C, I _D = 1 mA	-	0.6	-	V/°C
Gate-Source Threshold Voltage (N)	V _{GS(th)}	$V_{DS} = V$	_{GS} , I _D = 250 μA	3.0	-	5.0	V
Gate-Source Leakage	I _{GSS}	V _G	_S = ± 30 V	1	-	± 100	nA
Zero Gate Voltage Drain Current		$V_{DS} = 50$	00 V, V _{GS} = 0 V	1	-	50	
Zero Gate Voltage Drain Current	I _{DSS}	$V_{DS} = 400 \text{ V}, \text{ V}$	_{GS} = 0 V, T _J = 125 °C	1	-	250	μA
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = 10 V	I _D = 8 A	1	0.317	0.38	Ω
Forward Transconductance ^a	9 _{fs}	V _{DS} =	50 V, I _D = 3 A	1	3	-	S
Dynamic							
Input Capacitance	C_{iss}	$V_{GS} = 0 \text{ V}$		1	1900	-	
Output Capacitance	C _{oss}	V	$V_{DS} = 25 \text{ V},$		230	-	рF
Reverse Transfer Capacitance	C_{rss}	f = 1.0 MHz		ı	24	-	
Total Gate Charge	Q_g			-	45	68	
Gate-Source Charge	Q _{gs}	V _{GS} = 10 V	$I_D = 16 \text{ A}, V_{DS} = 400 \text{ V}$	1	18	-	nC
Gate-Drain Charge	Q _{gd}	1		1	22	-	
Turn-On Delay Time	t _{d(on)}			-	27	-	
Rise Time	t _r	V _{DD} = 250 V, I _D = 16 A,		-	156	-	
Turn-Off Delay Time	t _{d(off)}	$R_g = 9.1$	$1 \Omega, V_{GS} = 10 V$	-	29	-	ns
Fall Time	t _f			-	31	-	
Gate Input Resistance	R_g	f = 1 M	Hz, open drain	-	1.6	-	Ω
Drain-Source Body Diode Characteristic	s						
Continuous Source-Drain Diode Current	I _S	MOSFET symbol showing the		-	-	16	^
Pulsed Diode Forward Current	I _{SM}	integral reverse p - n junction diode		-	-	30	- A
Body Diode Voltage	V _{SD}	T _J = 25 °C, I	I _S = 10 A, V _{GS} = 0 V	-	-	1.8	V
Body Diode Reverse Recovery Time	t _{rr}	_		-	555	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}	$T_J = 25 \text{ °C}, I_F = I_S, dI/dt = 100 A/\mu s, V_R = 20 V$		-	5.5	-	μC
Body Diode Reverse Recovery Current	I _{RRM}			-	18	-	Α

Note

The information shown here is a preliminary product proposal, not a commercial product data sheet. Vishay Siliconix is not committed to
produce this or any similar product. This information should not be used for design purposes, nor construed as an offer to furnish or sell
such products.



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

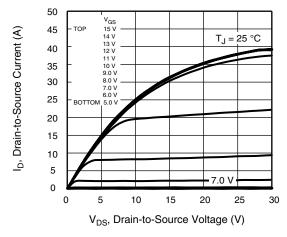


Fig. 1 - Typical Output Characteristics

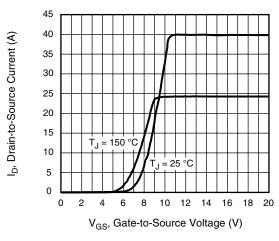


Fig. 3 - Typical Transfer Characteristics

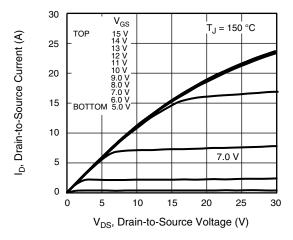


Fig. 2 - Typical Output Characteristics

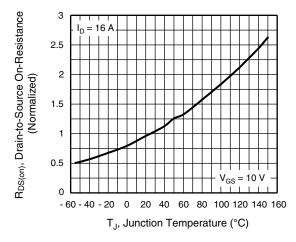


Fig. 4 - Normalized On-Resistance vs. Temperature

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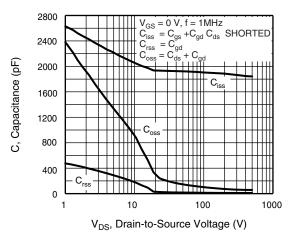
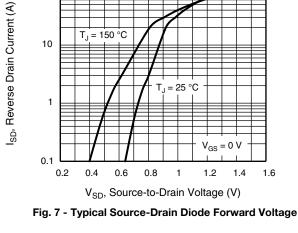


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage



100

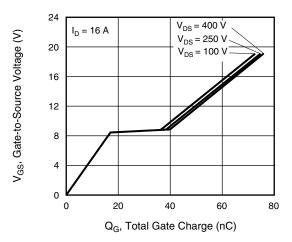


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

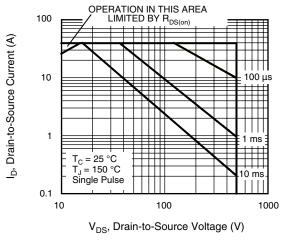


Fig. 8 - Maximum Safe Operating Area

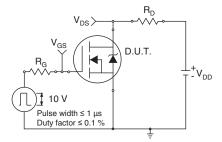


Fig. 9a - Switching Time Test Circuit

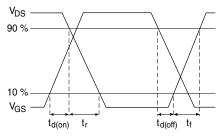


Fig. 9b - Switching Time Waveforms



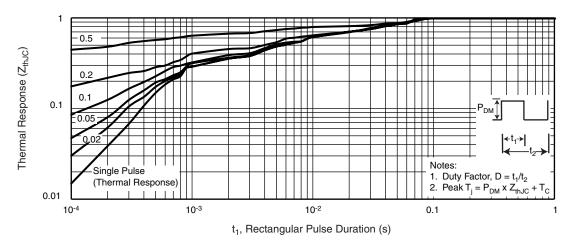


Fig. 10 - Maximum Effective Transient Thermal Impedance, Junction-to-Case

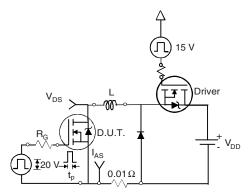
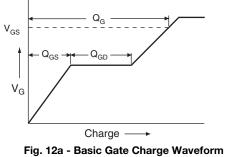


Fig. 11a - Unclamped Inductive Test Circuit



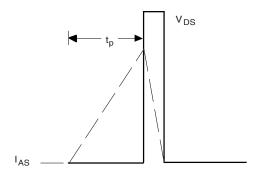


Fig. 11b - Unclamped Inductive Waveforms

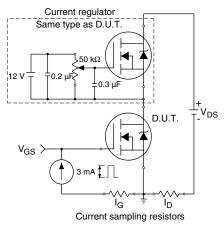
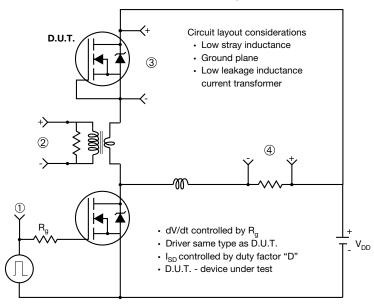


Fig. 12b - Gate Charge Test Circuit

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Peak Diode Recovery dV/dt Test Circuit



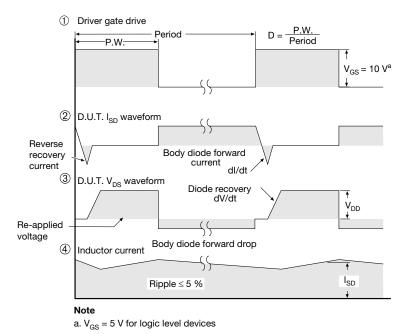


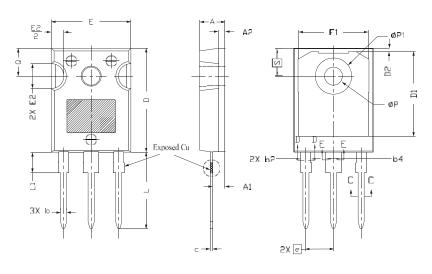
Fig. 13 - For N-Channel

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?91418.



TO-247AC (High Voltage)

VERSION 1: FACILITY CODE = 9







Section C--C,D-D,E-E

	MILLIMETERS			
DIM.	MIN.	NOM.	MAX.	NOTES
Α	4.83	5.02	5.21	
A1	2.29	2.41	2.55	
A2	1.17	1.27	1.37	
b	1.12	1.20	1.33	
b1	1.12	1.20	1.28	
b2	1.91	2.00	2.39	6
b3	1.91	2.00	2.34	
b4	2.87	3.00	3.22	6, 8
b5	2.87	3.00	3.18	
С	0.40	0.50	0.60	6
c1	0.40	0.50	0.56	
D	20.40	20.55	20.70	4

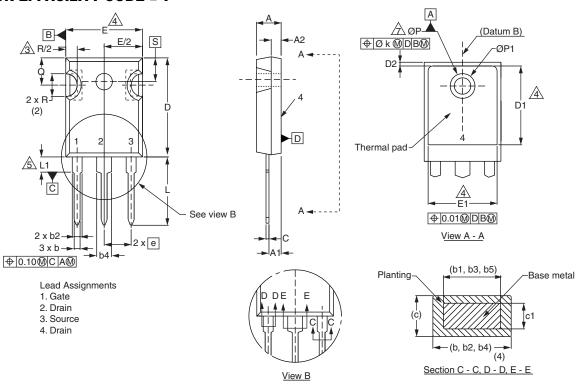
		MILLIMETERS	3	
DIM.	MIN.	NOM.	MAX.	NOTES
D1	16.46	16.76	17.06	5
D2	0.56	0.66	0.76	
Е	15.50	15.70	15.87	4
E1	13.46	14.02	14.16	5
E2	4.52	4.91	5.49	3
е	5.46 BSC			
L	14.90	15.15	15.40	
L1	3.96	4.06	4.16	6
ØΡ	3.56	3.61	3.65	7
Ø P1	7.19 ref.			
Q	5.31	5.50	5.69	
S	5.51 BSC			

- (1) Package reference: JEDEC® TO247, variation AC
- (2) All dimensions are in mm
- (3) Slot required, notch may be rounded
- (4) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm per side. These dimensions are measured at the outermost extremes of the plastic body
- (5) Thermal pad contour optional with dimensions D1 and E1
- (6) Lead finish uncontrolled in L1
- $^{(7)}$ Ø P to have a maximum draft angle of 1.5° to the top of the part with a maximum hole diameter of 3.91 mm
- (8) Dimension b2 and b4 does not include dambar protrusion. Allowable dambar protrusion shall be 0.1 mm total in excess of b2 and b4 dimension at maximum material condition

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VERSION 2: FACILITY CODE = Y



	MILLIMETERS		
DIM.	MIN.	MAX.	NOTES
Α	4.58	5.31	
A1	2.21	2.59	
A2	1.17	2.49	
b	0.99	1.40	
b1	0.99	1.35	
b2	1.53	2.39	
b3	1.65	2.37	
b4	2.42	3.43	
b5	2.59	3.38	
С	0.38	0.86	
c1	0.38	0.76	
D	19.71	20.82	
D1	13.08	-	

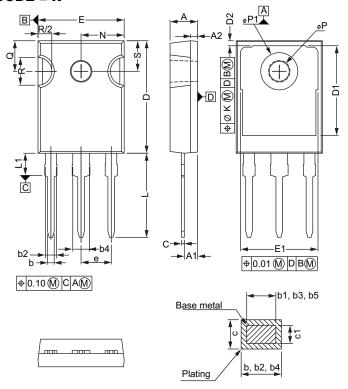
	MILLIN		
DIM.	MIN.	MAX.	NOTES
D2	0.51	1.30	
Е	15.29	15.87	
E1	13.72	-	
е	5.46	BSC	
Øk	0.2	254	
L	14.20	16.25	
L1	3.71	4.29	
ØР	3.51	3.66	
Ø P1	-	7.39	
Q	5.31	5.69	
R	4.52	5.49	
S	5.51 BSC		

- (1) Dimensioning and tolerancing per ASME Y14.5M-1994
- (2) Contour of slot optional
- (3) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- (4) Thermal pad contour optional with dimensions D1 and E1
- (5) Lead finish uncontrolled in L1
- (6) Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
- (7) Outline conforms to JEDEC outline TO-247 with exception of dimension c

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VERSION 3: FACILITY CODE = N



	MILLIMETERS			
DIM.	MIN.	MAX.		
Α	4.65	5.31		
A1	2.21	2.59		
A2	1.17	1.37		
b	0.99	1.40		
b1	0.99	1.35		
b2	1.65	2.39		
b3	1.65	2.34		
b4	2.59	3.43		
b5	2.59	3.38		
С	0.38	0.89		
c1	0.38	0.84		
D	19.71	20.70		
D1	13.08	-		

	MILLIMETERS		
DIM.	MIN.	MAX.	
D2	0.51	1.35	
E	15.29	15.87	
E1	13.46	1	
е	5.46 BSC		
k	0.254		
L	14.20	16.10	
L1	3.71	4.29	
N	7.62	BSC	
Р	3.56	3.66	
P1	-	7.39	
Q	5.31	5.69	
R	4.52	5.49	
S	5.51 BSC		

ECN: E22-0452-Rev. G, 31-Oct-2022

DWG: 5971

- ⁽¹⁾ Dimensioning and tolerancing per ASME Y14.5M-1994
- (2) Contour of slot optional
- (3) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- (4) Thermal pad contour optional with dimensions D1 and E1
- (5) Lead finish uncontrolled in L1
- (6) Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")



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