

# Power MOSFET

## PRODUCT SUMMARY

$V_{DS}$ (V) at $T_J$ max.	560 V	
$R_{DS(on)}$ ( $\Omega$ )	$V_{GS} = 10$ V	0.38
$Q_g$ (Max.) (nC)	68	
$Q_{gs}$ (nC)	17.6	
$Q_{gd}$ (nC)	21.8	
Configuration	Single	

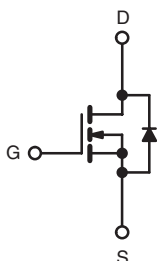
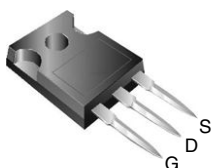
## FEATURES

- Low Figure-of-Merit  $R_{on} \times Q_g$
- 100 % Avalanche Tested
- Gate Charge Improved
- $T_{rr}/Q_{rr}$  Improved
- Compliant to RoHS Directive 2002/95/EC



Available  
**RoHS\***  
COMPLIANT

TO-247AC



N-Channel MOSFET

## ORDERING INFORMATION

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

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

PARAMETER			SYMBOL	LIMIT	UNIT
Drain-Source Voltage			V <sub>DS</sub>	500	V
Gate-Source Voltage			V <sub>GS</sub>	± 30	
Continuous Drain Current (T <sub>J</sub> = 150 °C) <sup>a</sup>	V <sub>GS</sub> at 10 V	T <sub>C</sub> = 25 °C	I <sub>D</sub>	16	A
		T <sub>C</sub> = 100 °C		10	
Pulsed Drain Current <sup>c</sup>			I <sub>DM</sub>	40	
Linear Derating Factor				2	W/°C
Single Pulse Avalanche Energy <sup>b</sup>			E <sub>AS</sub>	320	mJ
Maximum Power Dissipation			P <sub>D</sub>	250	W
Operating Junction and Storage Temperature Range			T <sub>J</sub> , T <sub>stg</sub>	- 55 to + 150	°C
Soldering Recommendations (Peak Temperature) <sup>d</sup>	for 10 s			300	

### Notes


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

\* Pb containing terminations are not RoHS compliant, exemptions may apply

**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	

**SPECIFICATIONS**  $T_J = 25\text{ °C}$ , unless otherwise noted

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}$ , $I_D = 250\text{ }\mu\text{A}$	500	-	-	V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to $25\text{ °C}$ , $I_D = 1\text{ mA}$	-	0.6	-	V/°C
Gate-Source Threshold Voltage (N)	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250\text{ }\mu\text{A}$	3.0	-	5.0	V
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 30\text{ V}$	-	-	$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 500\text{ V}$ , $V_{GS} = 0\text{ V}$	-	-	50	$\mu\text{A}$
		$V_{DS} = 400\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 125\text{ °C}$	-	-	250	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$ , $I_D = 8\text{ A}$	-	0.317	0.38	$\Omega$
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 50\text{ V}$ , $I_D = 3\text{ A}$	-	3	-	S
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1.0\text{ MHz}$	-	1900	-	pF
Output Capacitance	$C_{oss}$		-	230	-	
Reverse Transfer Capacitance	$C_{rss}$		-	24	-	
Total Gate Charge	$Q_g$	$V_{GS} = 10\text{ V}$ , $I_D = 16\text{ A}$ , $V_{DS} = 400\text{ V}$	-	45	68	nC
Gate-Source Charge	$Q_{gs}$		-	18	-	
Gate-Drain Charge	$Q_{gd}$		-	22	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 250\text{ V}$ , $I_D = 16\text{ A}$ , $R_g = 9.1\text{ }\Omega$ , $V_{GS} = 10\text{ V}$	-	27	-	ns
Rise Time	$t_r$		-	156	-	
Turn-Off Delay Time	$t_{d(off)}$		-	29	-	
Fall Time	$t_f$		-	31	-	
Gate Input Resistance	$R_g$	$f = 1\text{ MHz}$ , open drain	-	1.6	-	$\Omega$
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	MOSFET symbol showing the integral reverse p - n junction diode 	-	-	16	A
Pulsed Diode Forward Current	$I_{SM}$		-	-	30	
Body Diode Voltage	$V_{SD}$	$T_J = 25\text{ °C}$ , $I_S = 10\text{ A}$ , $V_{GS} = 0\text{ V}$	-	-	1.8	V
Body Diode Reverse Recovery Time	$t_{rr}$	$T_J = 25\text{ °C}$ , $I_F = I_S$ , $dI/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 20\text{ V}$	-	555	-	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$		-	5.5	-	$\mu\text{C}$
Body Diode Reverse Recovery Current	$I_{RRM}$		-	18	-	A

**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)

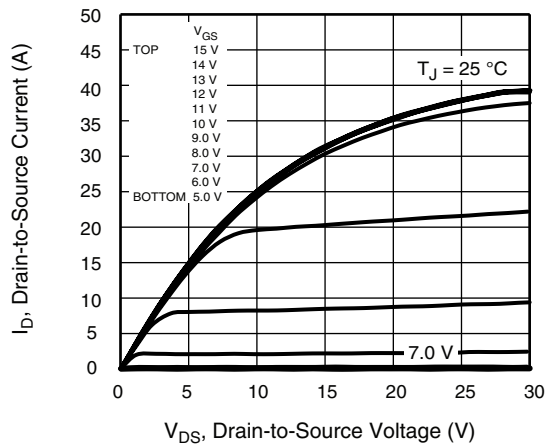


Fig. 1 - Typical Output Characteristics

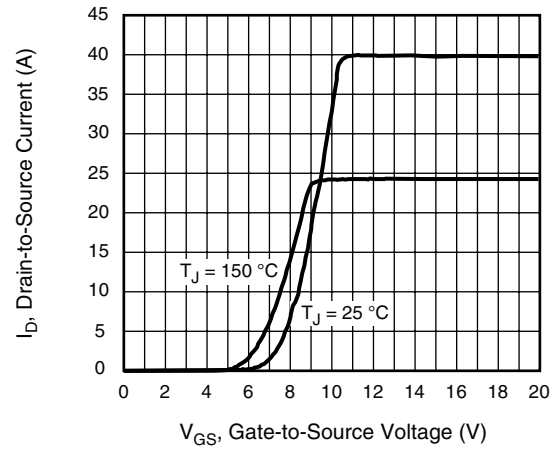


Fig. 3 - Typical Transfer Characteristics

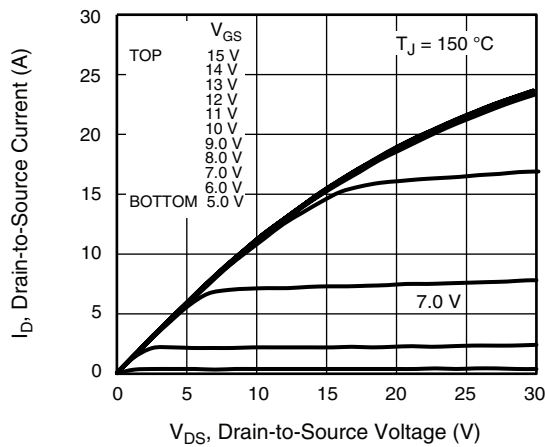


Fig. 2 - Typical Output Characteristics

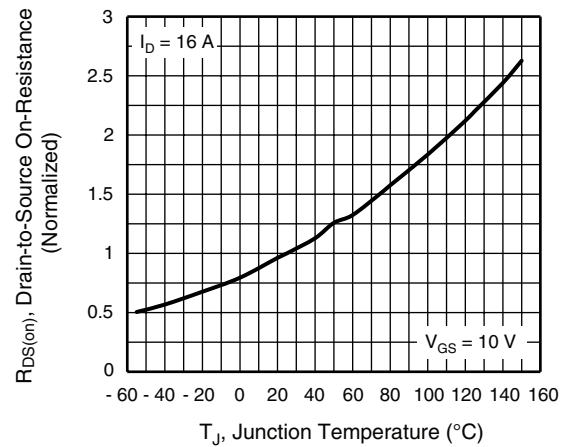
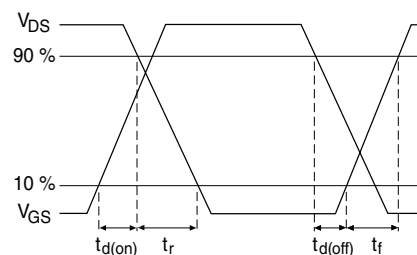
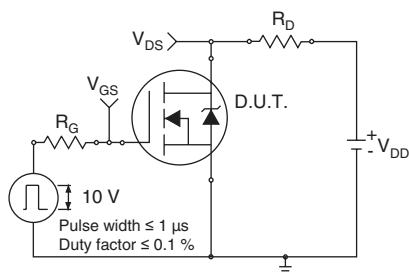
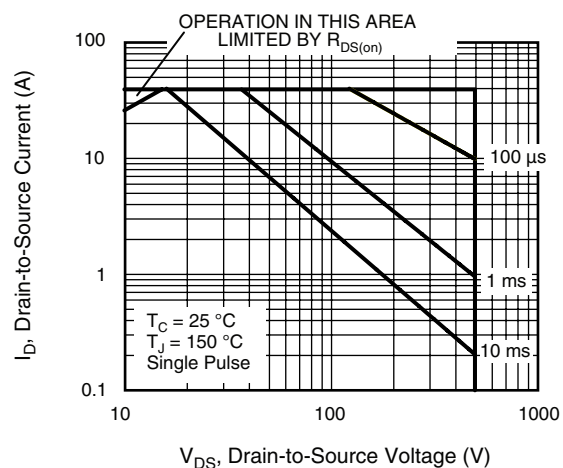
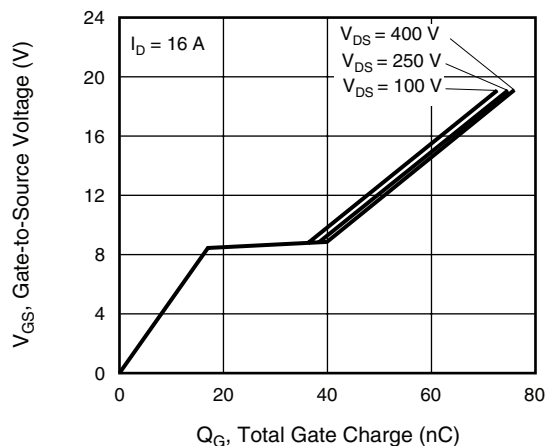
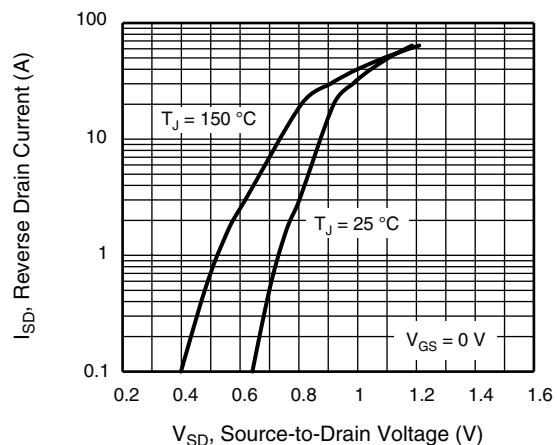
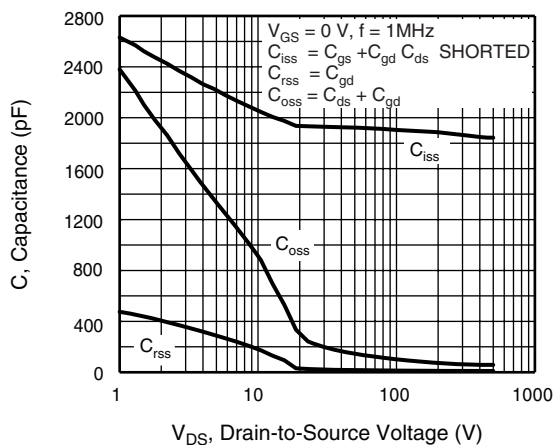
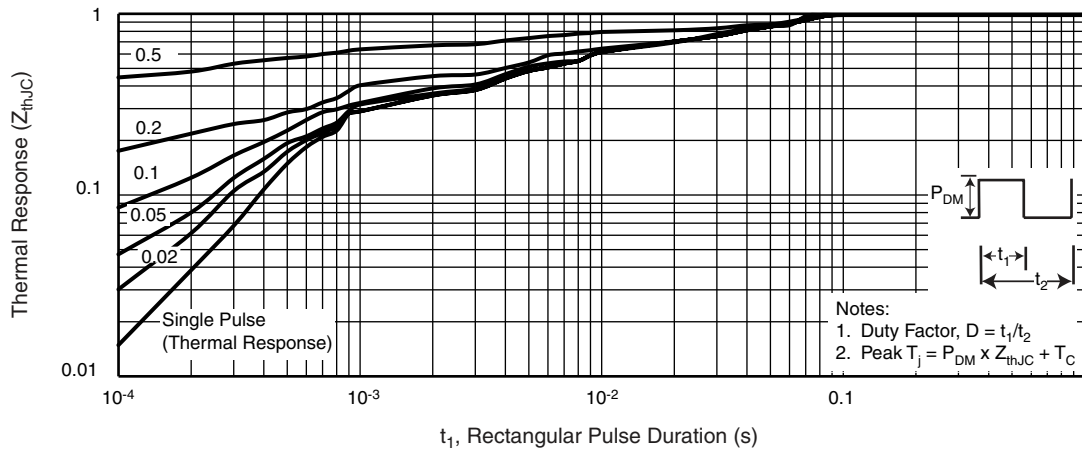
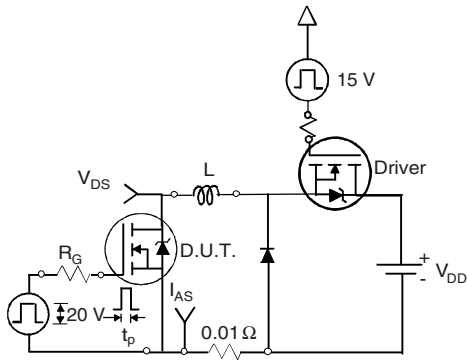


Fig. 4 - Normalized On-Resistance vs. Temperature

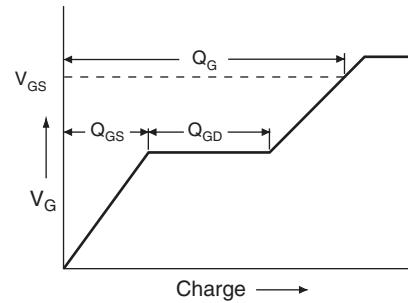




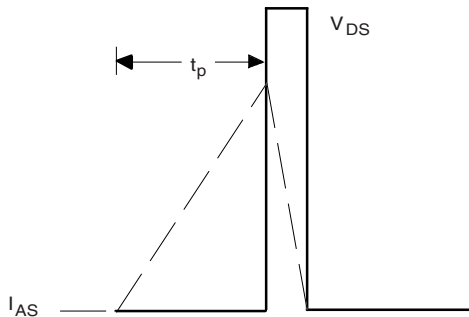
**Fig. 10 - Maximum Effective Transient Thermal Impedance, Junction-to-Case**



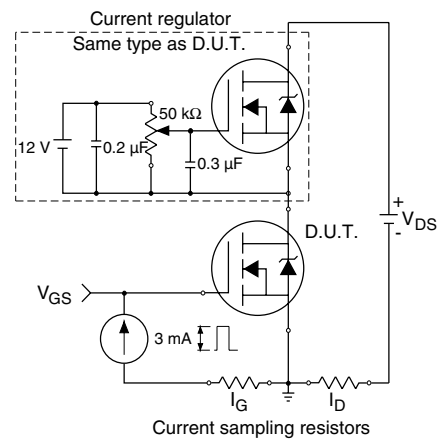
**Fig. 11a - Unclamped Inductive Test Circuit**



**Fig. 12a - Basic Gate Charge Waveform**



**Fig. 11b - Unclamped Inductive Waveforms**



**Fig. 12b - Gate Charge Test Circuit**

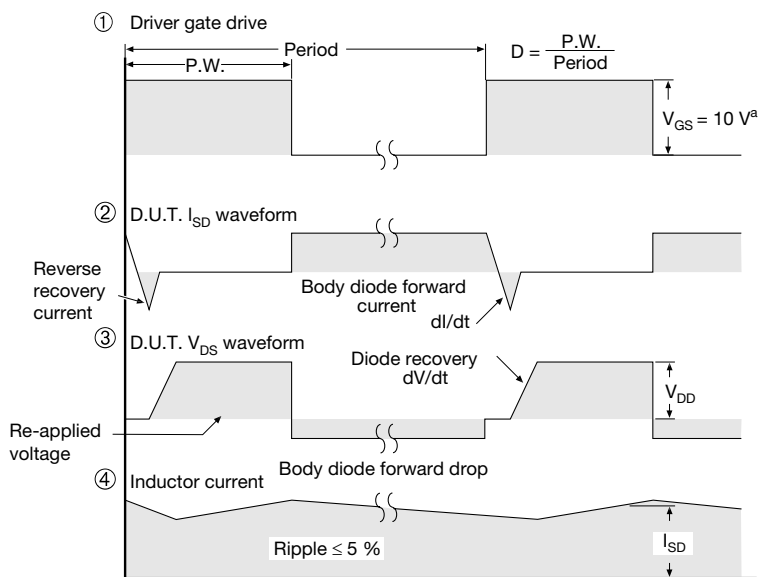
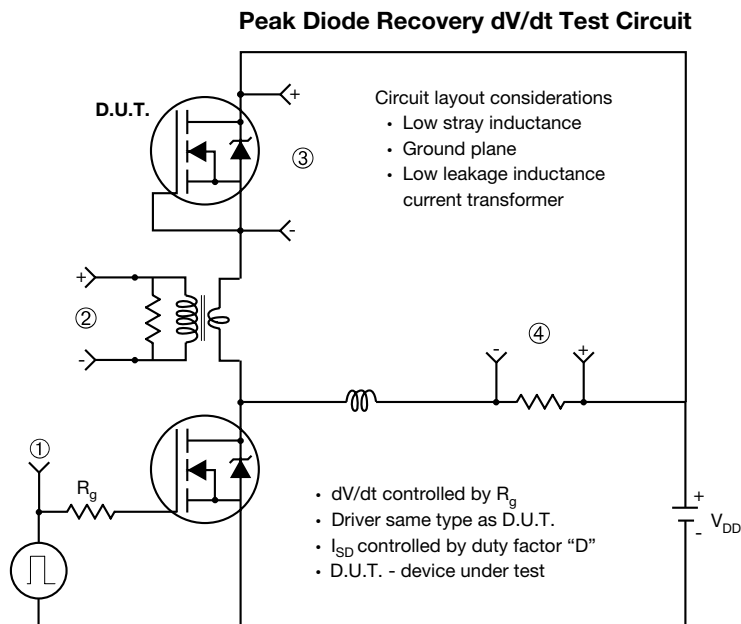


Fig. 13 - For N-Channel

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