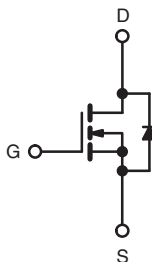
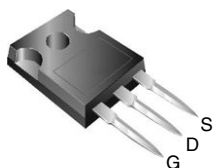


S Series Power MOSFET

PRODUCT SUMMARY

V_{DS} (V) at T_J max.	650	
$R_{DS(on)}$ max. at 25 °C (Ω)	$V_{GS} = 10$ V	0.07
Q_g max. (nC)	216	
Q_{gs} (nC)	39	
Q_{gd} (nC)	57	
Configuration	Single	

TO-247AC


N-Channel MOSFET

FEATURES

- Generation One
- Low Figure-of-Merit $R_{on} \times Q_g$
- 100 % Avalanche Tested
- Ultra Low Gate Charge
- Ultra Low R_{on}
- Compliant to RoHS Directive 2002/95/EC


RoHS
COMPLIANT

APPLICATIONS

- PFC Power Supply Stages
- Hard Switching Topologies
- Solar Inverters
- UPS
- Motor Control
- Server Telecom

ORDERING INFORMATION

Package	TO-247AC
Lead (Pb)-free	SiHG47N60S-E3

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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	600	V
Gate-Source Voltage	V_{GS}	± 20	
Gate-Source Voltage AC ($f > 1$ Hz)		30	
Continuous Drain Current ($T_J = 150$ °C)	V_{GS} at 10 V	$T_C = 25$ °C	A
		$T_C = 100$ °C	
Pulsed Drain Current ^a	I_{DM}	140	W/°C
Linear Derating Factor		3.3	
Avalanche Energy (repetitive)	E_{AR}	0.42	
Single Pulse Avalanche Energy ^b	E_{AS}	1800	mJ
Maximum Power Dissipation	P_D	417	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 150	°C
Drain-Source Voltage Slope	dV/dt	$T_J = 125$ °C	V/ns
Reverse Diode dV/dt ^d			
Soldering Recommendations (Peak Temperature) ^c	for 10 s	300	°C


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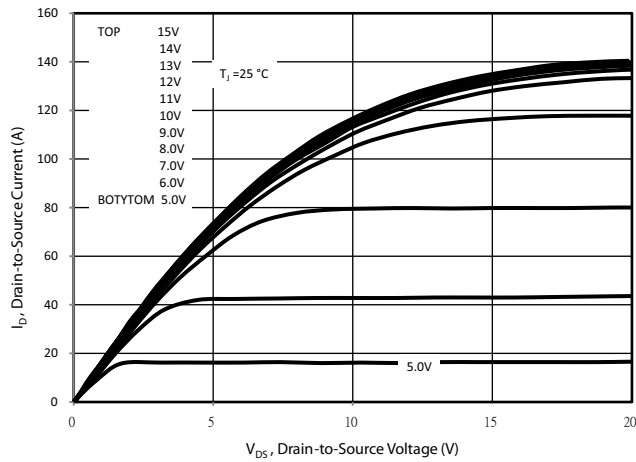
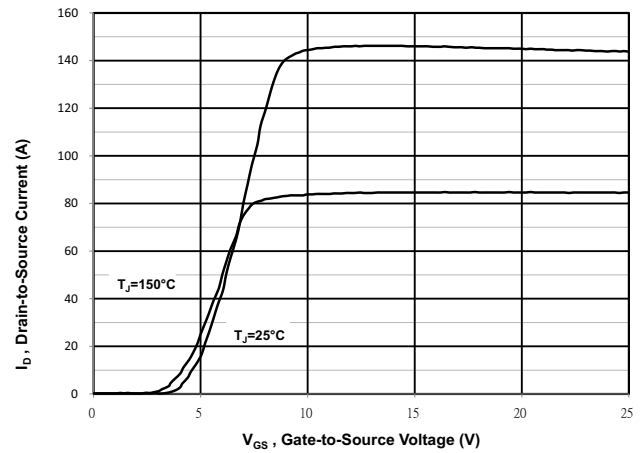
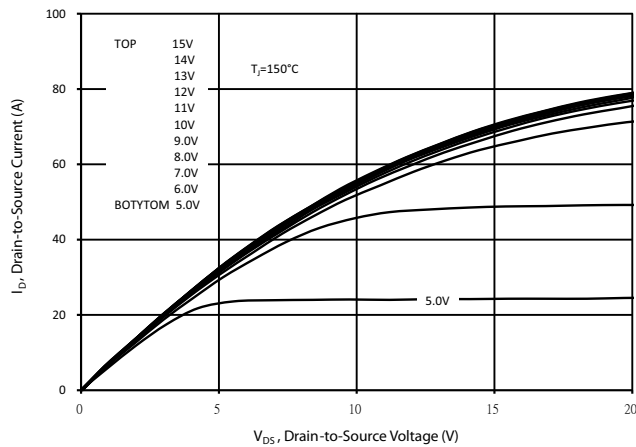
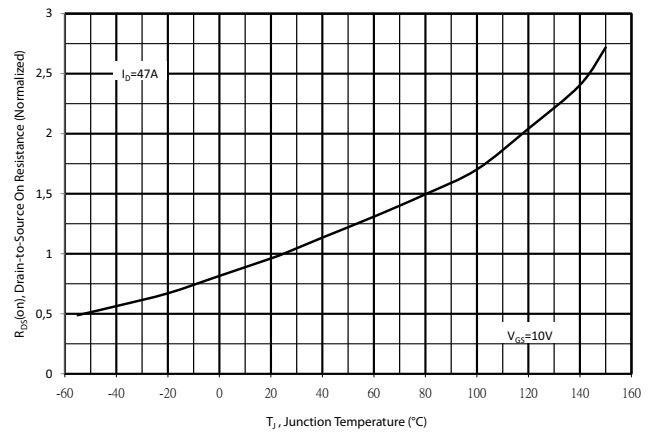
- Repetitive rating; pulse width limited by maximum junction temperature.
- $V_{DD} = 50$ V, starting $T_J = 25$ °C, $L = 73.5$ mH, $R_g = 25$ Ω , $I_{AS} = 7$ A.
- 1.6 mm from case.
- $I_{SD} \leq I_D$, $dI/dt = 100$ A/ μ s, starting $T_J = 25$ °C.

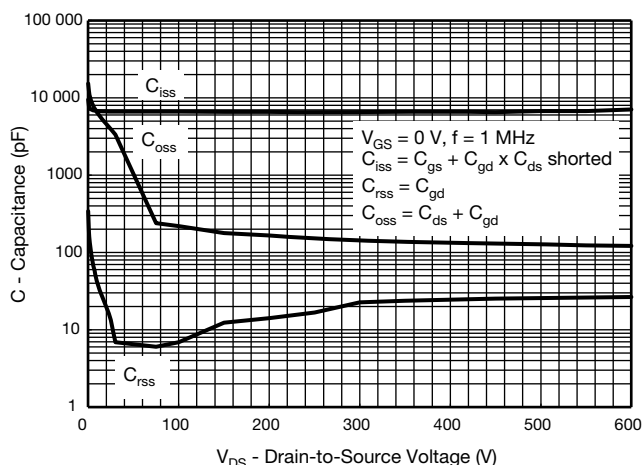
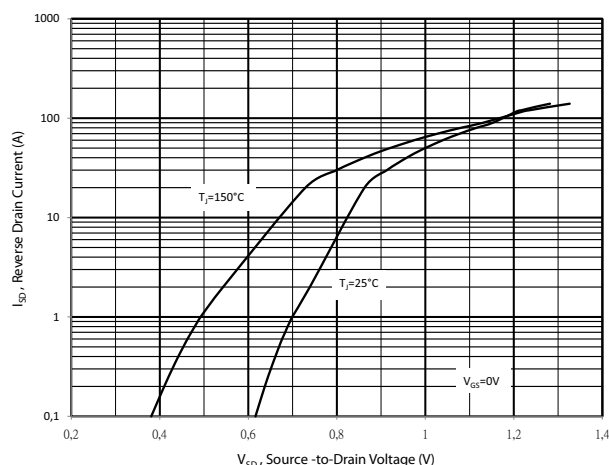
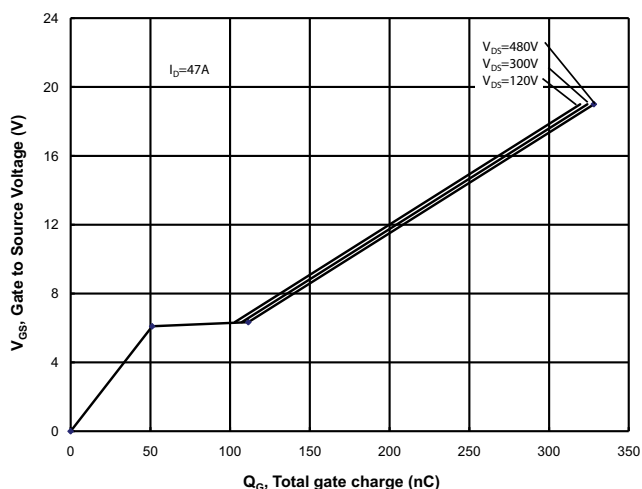
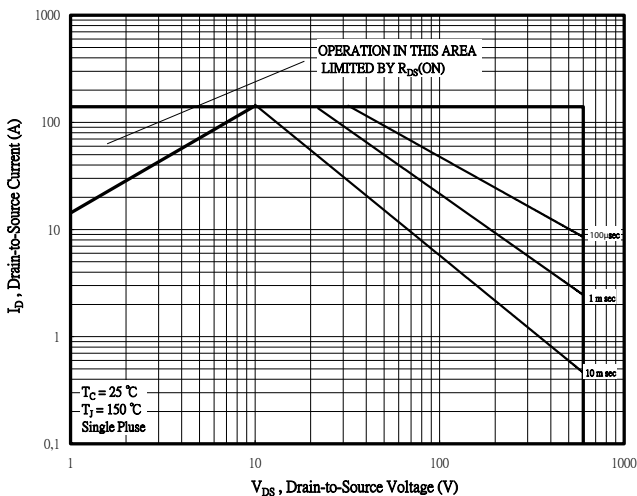
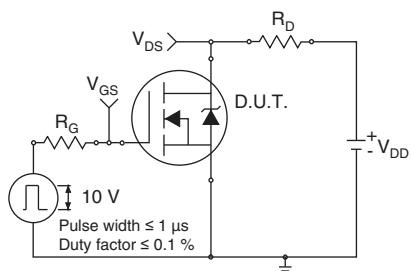
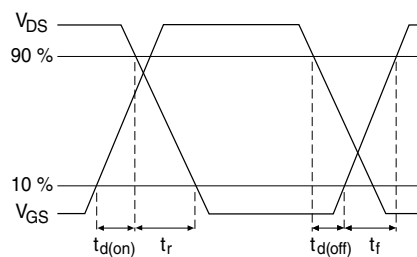
**THERMAL RESISTANCE RATINGS**

PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	R_{thJA}	-	40	°C/W
Maximum Junction-to-Case (Drain)	R_{thJC}	-	0.3	

SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	600	-	-	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to $25\text{ }^{\circ}\text{C}$, $I_D = 1\text{ mA}$	-	0.7	-	V/ $^{\circ}\text{C}$
Gate-Source Threshold Voltage (N)	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	2	-	4	V
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20\text{ V}$	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 600\text{ V}$, $V_{GS} = 0\text{ V}$	-	-	1	μA
		$V_{DS} = 600\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 150\text{ }^{\circ}\text{C}$	-	-	10	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 24\text{ A}$	-	0.057	0.07	Ω
Forward Transconductance ^a	g_{fs}	$V_{DS} = 8\text{ V}$, $I_D = 3\text{ A}$	-	7.5	-	S
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}$, $V_{DS} = 100\text{ V}$, $f = 1\text{ MHz}$	-	6630	-	pF
Output Capacitance	C_{oss}		-	220	-	
Reverse Transfer Capacitance	C_{rss}		-	7	-	
Total Gate Charge	Q_g	$V_{GS} = 10\text{ V}$, $I_D = 20\text{ A}$, $V_{DS} = 400\text{ V}$	-	180	216	nC
Gate-Source Charge	Q_{gs}		-	39	-	
Gate-Drain Charge	Q_{gd}		-	57	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 380\text{ V}$, $I_D = 47\text{ A}$, $R_g = 4.4\text{ }\Omega$, $V_{GS} = 13\text{ V}$	-	30	60	ns
Rise Time	t_r		-	12	25	
Turn-Off Delay Time	$t_{d(off)}$		-	115	175	
Fall Time	t_f		-	9	20	
Gate Input Resistance	R_g	$f = 1\text{ MHz}$, open drain	-	0.62	-	Ω
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	MOSFET symbol showing the integral reverse p - n junction diode 	-	-	47	A
Pulsed Diode Forward Current	I_{SM}		-	-	140	
Body Diode Voltage	V_{SD}	$T_J = 25\text{ }^{\circ}\text{C}$, $I_S = 47\text{ A}$, $V_{GS} = 0\text{ V}$	-	-	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$, $I_F = I_S$, $dI/dt = 100\text{ A}/\mu\text{s}$, $V_R = 25\text{ V}$	-	750	1125	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	18	36	μC
Body Diode Reverse Recovery Current	I_{RRM}		-	39	80	A

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Fig. 1 - Typical Output Characteristics (TO-247)

Fig. 3 - Typical Transfer Characteristics

Fig. 2 - Typical Output Characteristics (TO-247)

Fig. 4 - Normalized On-Resistance vs. Temperature


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

Fig. 7 - Typical Source-Drain Diode Forward Voltage

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

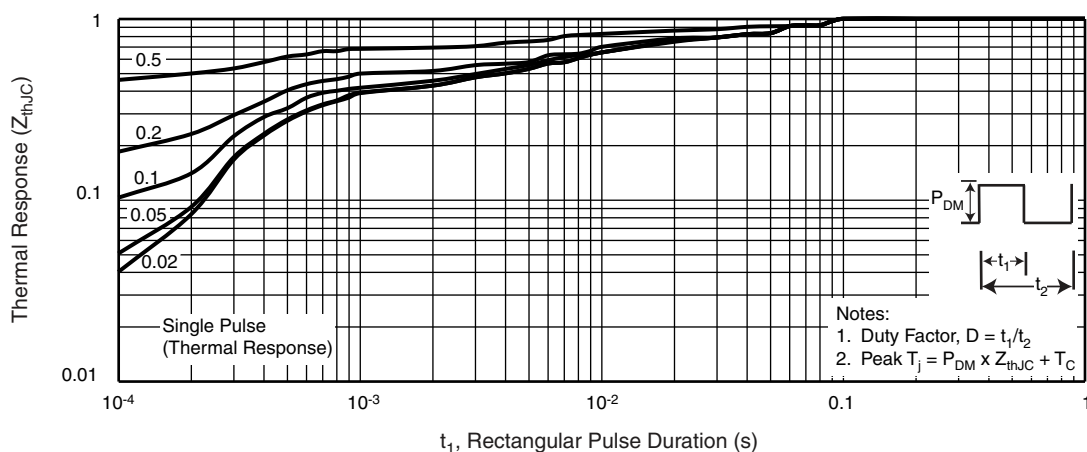


Fig. 10 - Maximum Effective Transient Thermal Impedance, Junction-to-Case (TO-247AC)

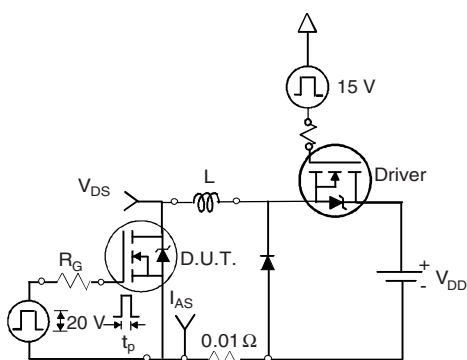


Fig. 11a - Unclamped Inductive Test Circuit

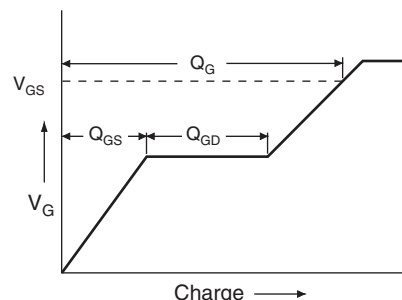


Fig. 12a - Basic Gate Charge Waveform

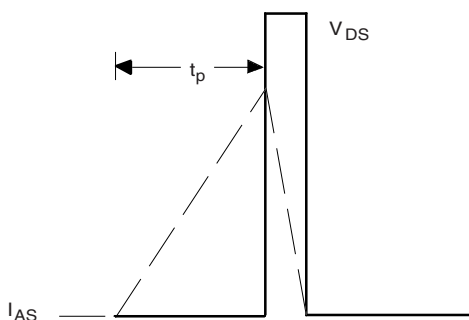


Fig. 11b - Unclamped Inductive Waveforms

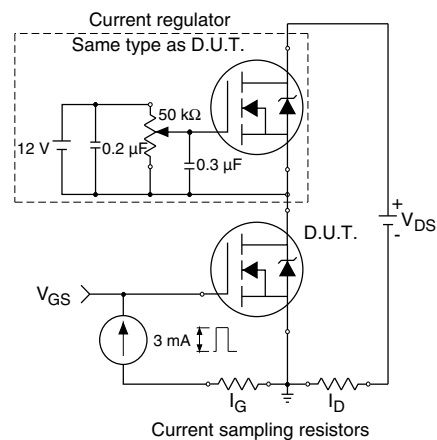


Fig. 12b - Gate Charge Test Circuit

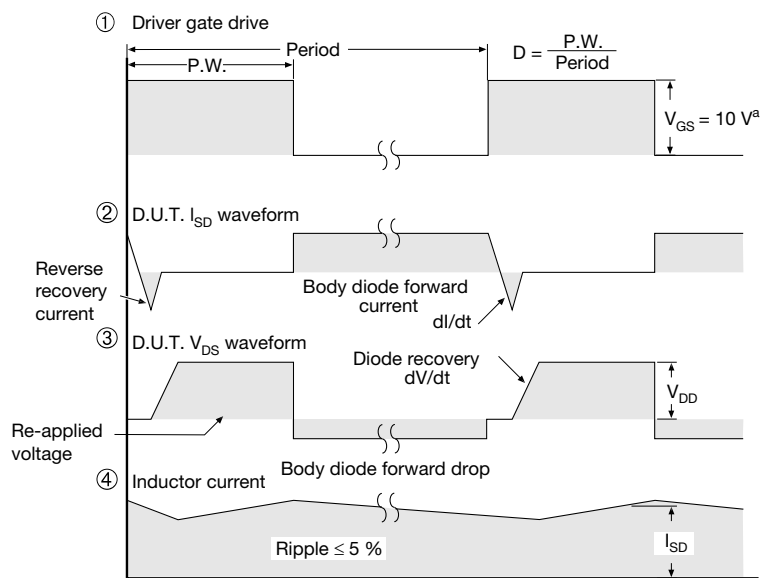
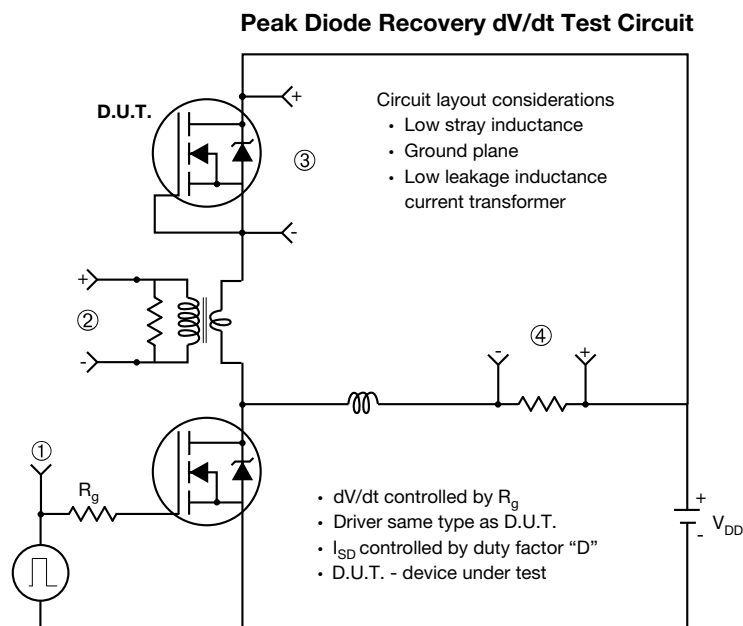


Fig. 13 - For N-Channel

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