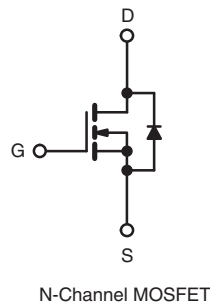
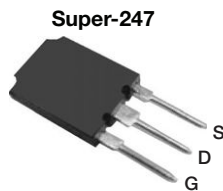


Power MOSFET

PRODUCT SUMMARY	
V_{DS} (V) at T_J max.	560
$R_{DS(on)}$ (Ω)	$V_{GS} = 10\text{ V}$ 0.270
Q_g (Max.) (nC)	76
Q_{gs} (nC)	21
Q_{gd} (nC)	34
Configuration	Single

FEATURES

- Low Figure-of-Merit $R_{on} \times Q_g$
- 100 % Avalanche Tested
- High Peak Current Capability
- dV/dt Ruggedness
- Improved t_{rr}/Q_{rr}
- Improved Gate Charge
- High Power Dissipations Capability
- Compliant to RoHS Directive 2002/95/EC




ORDERING INFORMATION	
Package	Super-247
Lead (Pb)-free	SiHS20N50C-E3

ABSOLUTE MAXIMUM RATINGS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	500	V
Gate-Source Voltage	V_{GS}	± 30	
Continuous Drain Current ($T_J = 150\text{ }^\circ\text{C}$) ^e	V_{GS} at 10 V	$T_C = 25\text{ }^\circ\text{C}$	A
		$T_C = 100\text{ }^\circ\text{C}$	
Pulsed Drain Current ^a	I_{DM}	80	
Linear Derating Factor		1.8	W/ $^\circ\text{C}$
Single Pulse Avalanche Energy ^b	E_{AS}	361	mJ
Maximum Power Dissipation	P_D	250	W
Peak Diode Recovery dV/dt ^c	dV/dt	5	V/ns
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 150	$^\circ\text{C}$
Soldering Recommendations (Peak Temperature)	for 10 s	300 ^d	

Notes

- Repetitive rating; pulse width limited by maximum junction temperature.
- $V_{DD} = 50\text{ V}$, starting $T_J = 25\text{ }^\circ\text{C}$, $L = 2.5\text{ mH}$, $R_g = 25\text{ }\Omega$, $I_{AS} = 17\text{ A}$.
- $I_{SD} \leq 18\text{ A}$, $dI/dt \leq 380\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DS}$, $T_J \leq 150\text{ }^\circ\text{C}$.
- 1.6 mm from case.
- Limited by maximum junction temperature.

THERMAL RESISTANCE RATINGS				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	R_{thJA}	-	40	$^\circ\text{C}/\text{W}$
Maximum Junction-to-Case (Drain)	R_{thJC}	-	0.5	

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}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	500	-	-	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to $25\text{ }^\circ\text{C}$, $I_D = 1\text{ mA}$	-	700	-	mV/ $^\circ\text{C}$
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}	$V_{GS} = \pm 30\text{ V}$	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 500\text{ V}, V_{GS} = 0\text{ V}$	-	-	25	μA
		$V_{DS} = 400\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	250	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$ $I_D = 10\text{ A}$	-	0.225	0.270	Ω
Forward Transconductance	g_{fs}	$V_{DS} = 50\text{ V}, I_D = 10\text{ A}$	-	6.4	-	S
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V},$ $V_{DS} = 25\text{ V},$ $f = 1.0\text{ MHz}$	-	2451	2942	μF
Output Capacitance	C_{oss}		-	300	360	
Reverse Transfer Capacitance	C_{rss}		-	26	32	
Total Gate Charge	Q_g	$V_{GS} = 10\text{ V}$ $I_D = 18\text{ A}, V_{DS} = 400\text{ V}$	-	65	76	nC
Gate-Source Charge	Q_{gs}		-	21	-	
Gate-Drain Charge	Q_{gd}		-	29	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 250\text{ V}, I_D = 18\text{ A},$ $R_g = 9.1\text{ }\Omega$	-	80	-	ns
Rise Time	t_r		-	27	-	
Turn-Off Delay Time	$t_{d(off)}$		-	32	-	
Fall Time	t_f		-	44	-	
Gate Input Resistance	R_g	$f = 1\text{ MHz}, \text{open drain}$	-	1.1	-	Ω
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	MOSFET symbol showing the integral reverse p - n junction diode 	-	-	20	A
Pulsed Diode Forward Current	I_{SM}		-	-	80	
Body Diode Voltage	V_{SD}	$T_J = 25\text{ }^\circ\text{C}, I_S = 18\text{ A}, V_{GS} = 0\text{ V}$	-	-	1.5	V
Body Diode Reverse Recovery Time	t_{rr}	$T_J = 25\text{ }^\circ\text{C}, I_F = I_S,$ $di/dt = 100\text{ A}/\mu\text{s}, V = 35\text{ V}$	-	503	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	6.7	-	μC
Reverse Recovery Current	I_{RRM}		-	30	-	A

The information shown here is a preliminary product proposal, not a commercial product datasheet. 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)

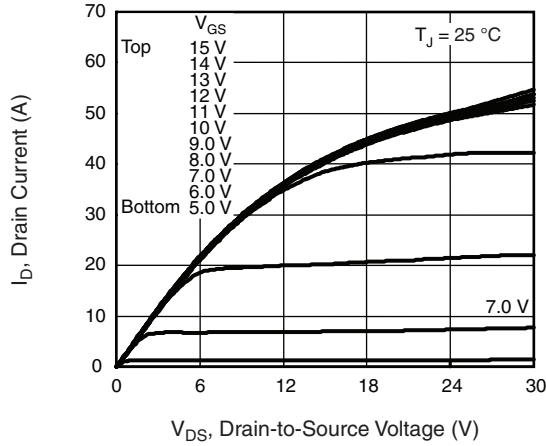


Fig. 1 - Typical Output Characteristics, $T_C = 25\text{ }^\circ\text{C}$

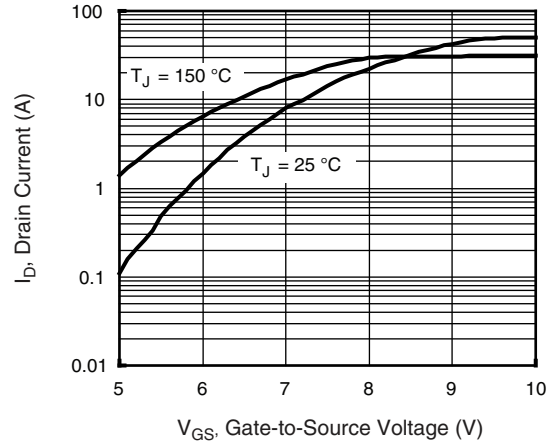


Fig. 3 - Typical Transfer Characteristics

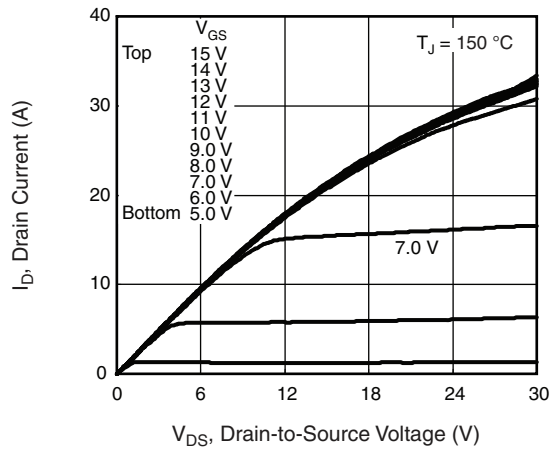


Fig. 2 - Typical Output Characteristics, $T_C = 150\text{ }^\circ\text{C}$

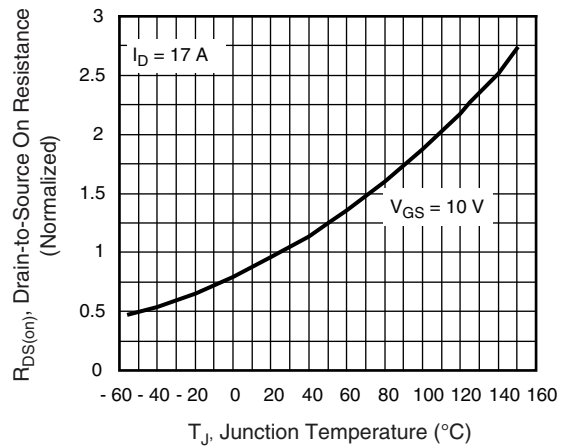


Fig. 4 - Normalized On-Resistance vs. Temperature

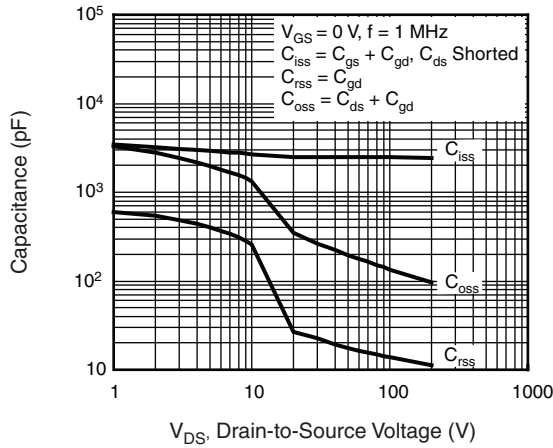


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

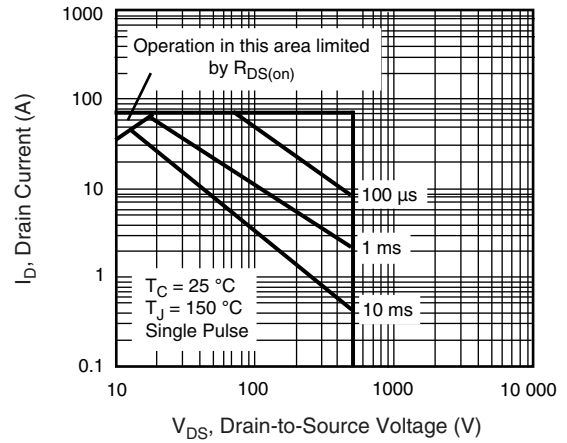


Fig. 8 - Maximum Safe Operating Area

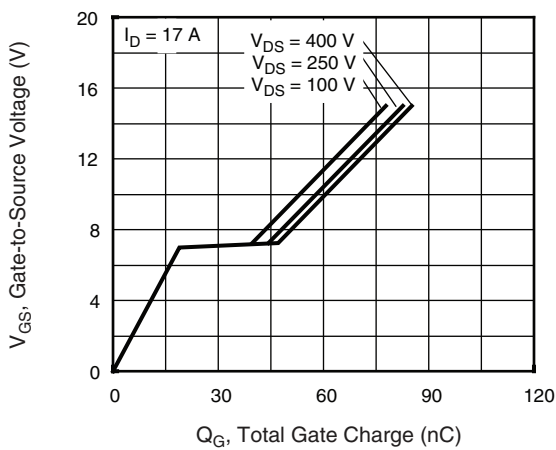


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage

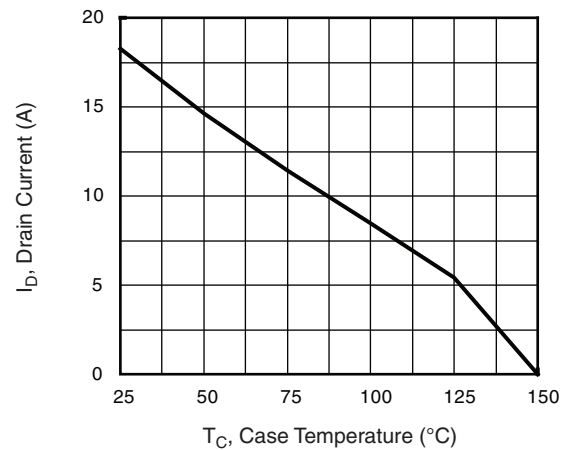


Fig. 9 - Maximum Drain Current vs. Case Temperature

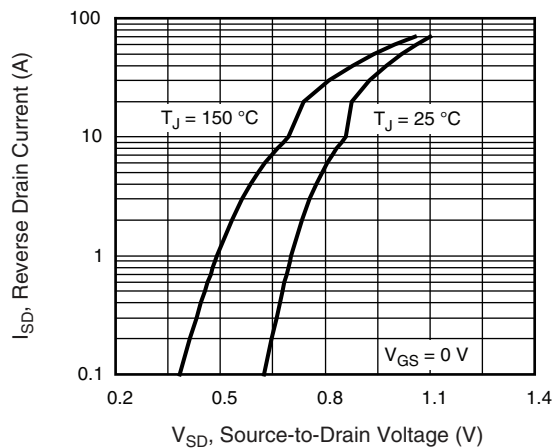


Fig. 7 - Typical Source-Drain Diode Forward Voltage

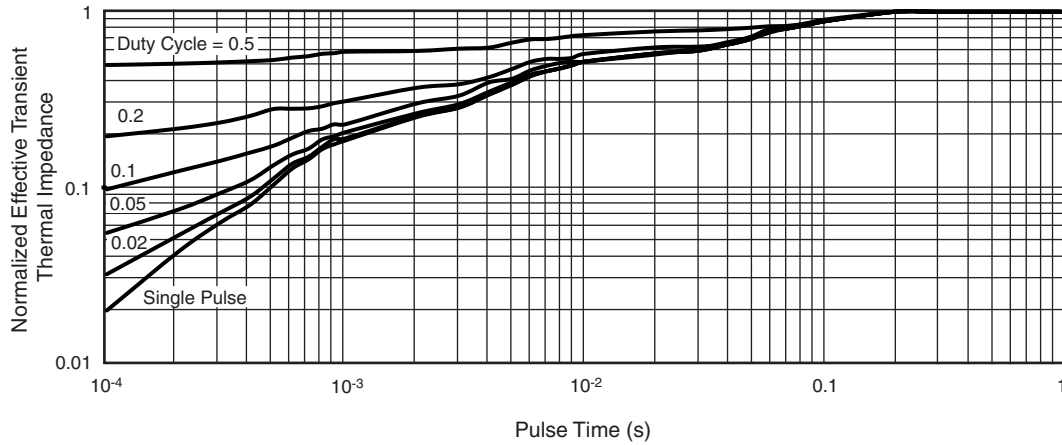


Fig. 10 - Normalized Thermal Transient Impedance, Junction-to-Case (Super-247)

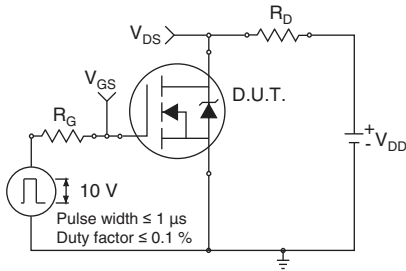


Fig. 11a - Switching Time Test Circuit

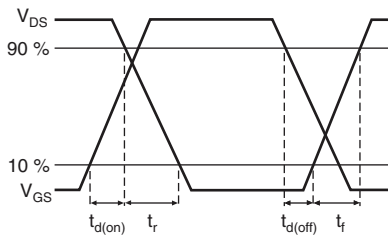


Fig. 11b - Switching Time Waveforms

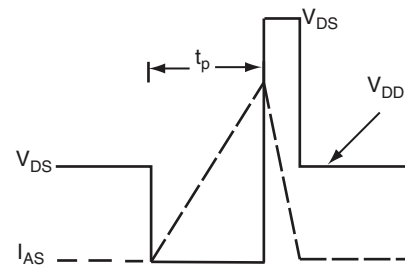


Fig. 12b - Unclamped Inductive Waveforms

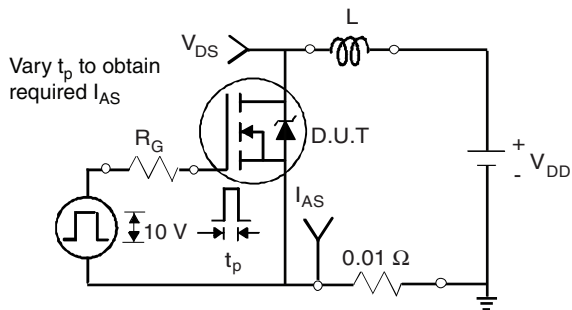


Fig. 12a - Unclamped Inductive Test Circuit

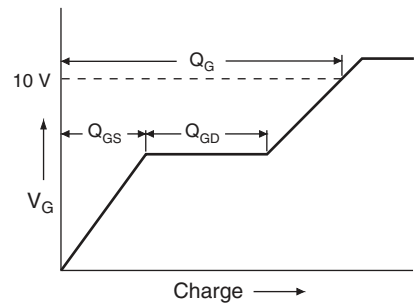


Fig. 13a - Basic Gate Charge Waveform

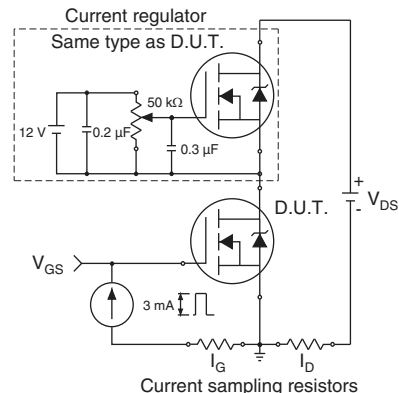
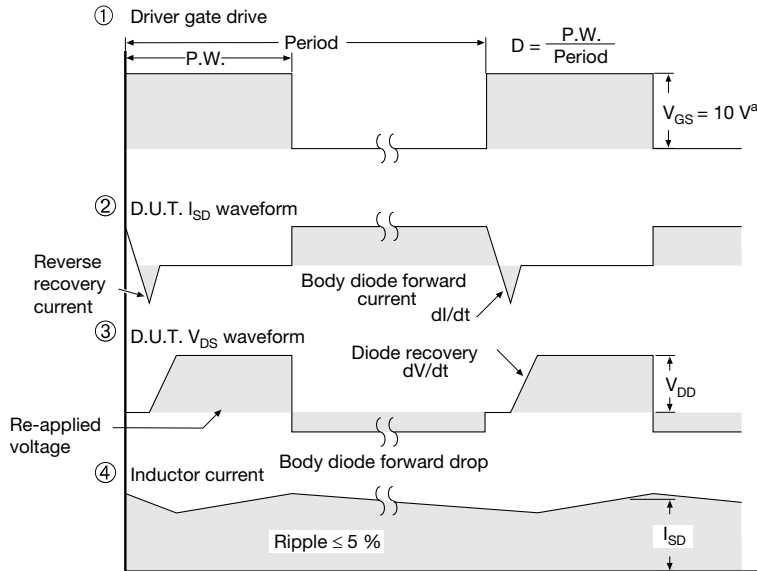
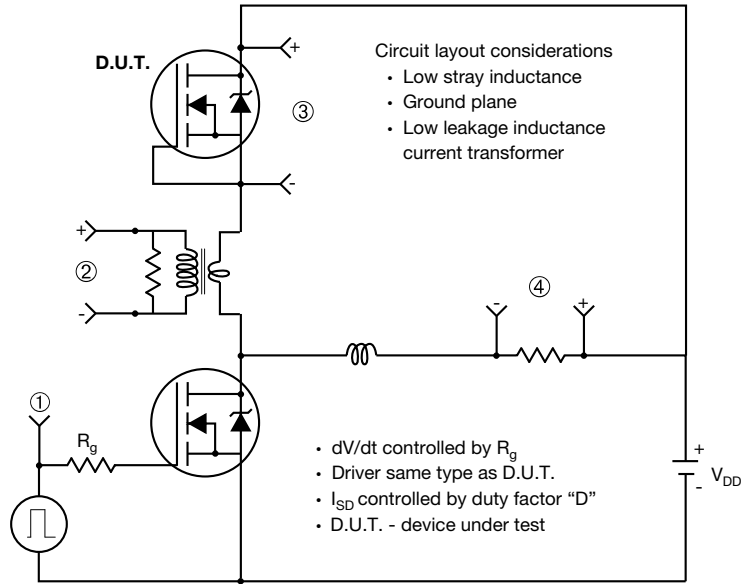


Fig. 13b - Gate Charge Test Circuit

Peak Diode Recovery dV/dt Test Circuit



Note
a. $V_{GS} = 5\text{ V}$ for logic level devices

Fig. 14 - For N-Channel

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