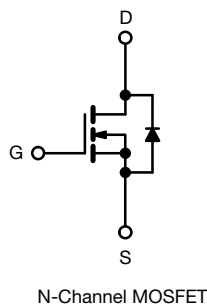
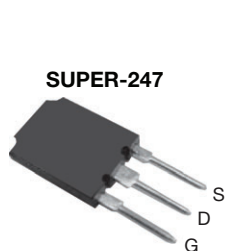


Power MOSFET



N-Channel MOSFET

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 dissipation capability
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



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	

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 ($T_J = 150\text{ }^\circ\text{C}$) ^a	V_{GS} at 10 V	$T_C = 25\text{ }^\circ\text{C}$	A
		$T_C = 100\text{ }^\circ\text{C}$	
Pulsed drain current ^b	I_{DM}	80	
Linear derating factor		1.8	W/ $^\circ\text{C}$
Single pulse avalanche energy ^c	E_{AS}	361	mJ
Maximum power dissipation	P_D	250	W
Reverse diode dv/dt ^d	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) ^d	For 10 s	300	


Notes

- Limited by maximum junction temperature
- 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

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 $25\text{ }^{\circ}\text{C}$, $I_D = 1\text{ mA}$	-	0.7	-	V/ $^{\circ}\text{C}$
Gate-source threshold voltage (N)	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	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}	$V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	-	2451	2942	pF
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	$f = 1\text{ MHz}$, 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	
Diode forward voltage	V_{SD}	$T_J = 25\text{ }^{\circ}\text{C}$, $I_S = 18\text{ A}$, $V_{GS} = 0\text{ V}$	-	-	1.5	V
Reverse recovery time	t_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$, $I_F = I_S$, $di/dt = 100\text{ A}/\mu\text{s}$, $V_R = 35\text{ V}$	-	503	-	ns
Reverse recovery charge	Q_{rr}		-	6.7	-	μC
Reverse recovery current	I_{RRM}		-	30	-	A



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

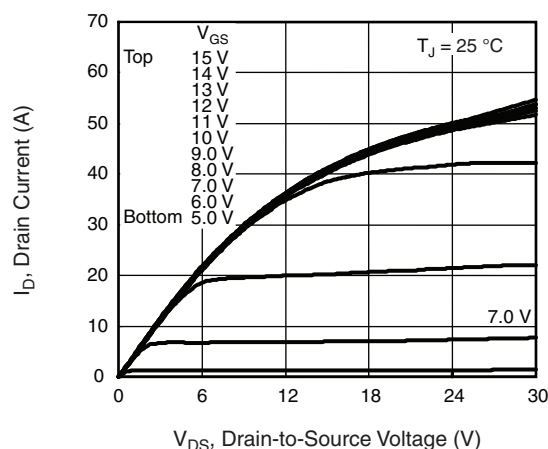


Fig. 1 - Typical Output Characteristics, $T_C = 25^\circ\text{C}$

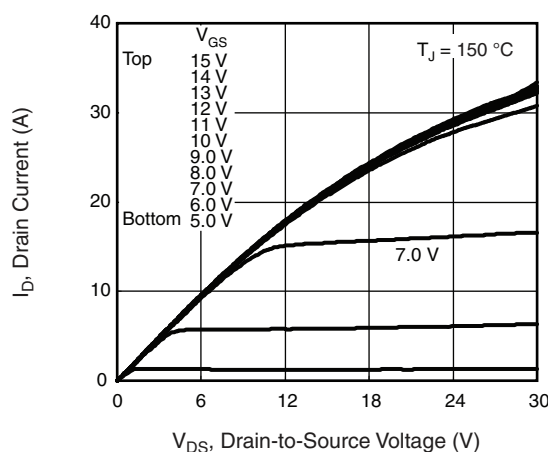


Fig. 2 - Typical Output Characteristics, $T_C = 150^\circ\text{C}$

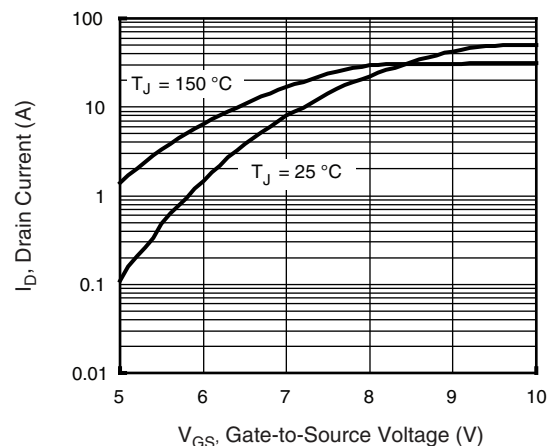


Fig. 3 - Typical Transfer Characteristics

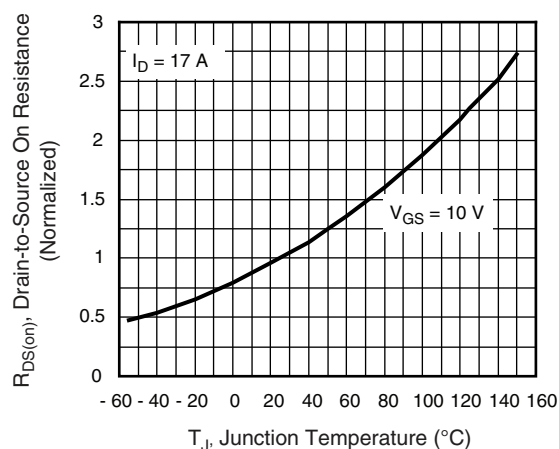


Fig. 4 - Normalized On-Resistance vs. Temperature

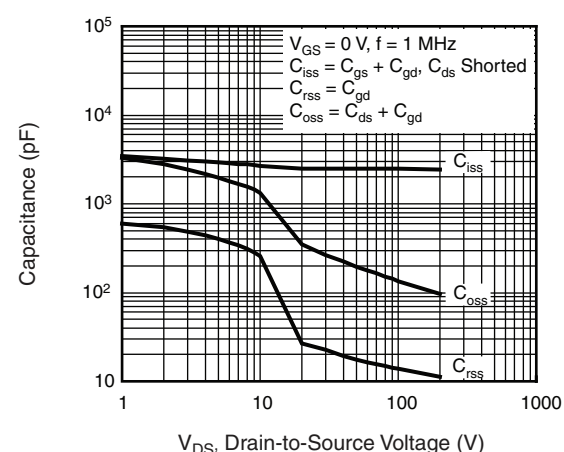


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

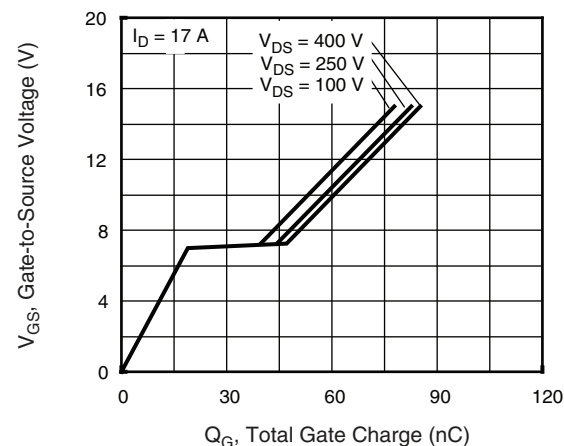
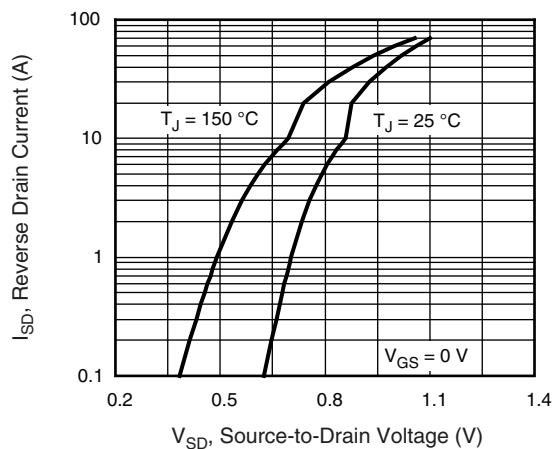
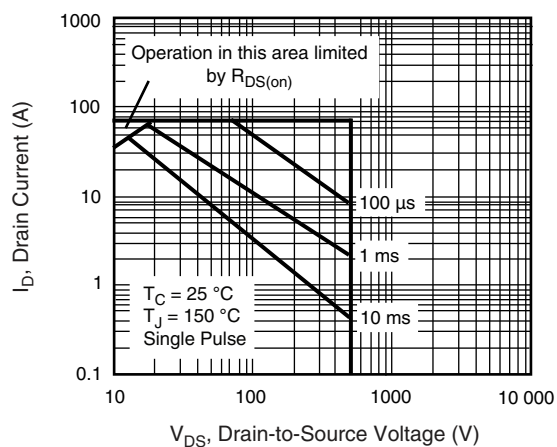
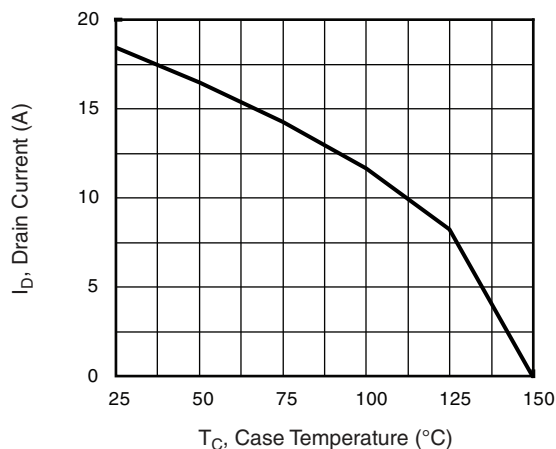
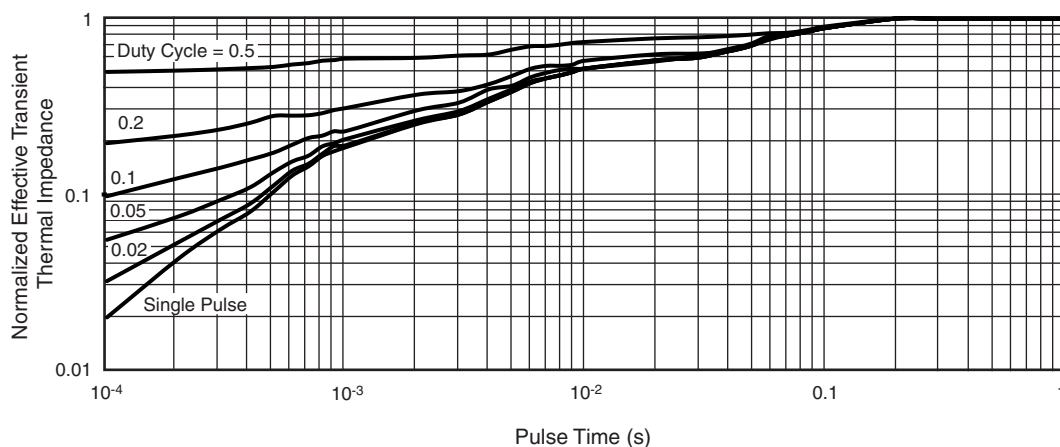


Fig. 6 - Typical Gate Charge vs. Gate-to-Source Voltage


Fig. 7 - Typical Source-Drain Diode Forward Voltage

Fig. 8 - Maximum Safe Operating Area

Fig. 9 - Maximum Drain Current vs. Case Temperature

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

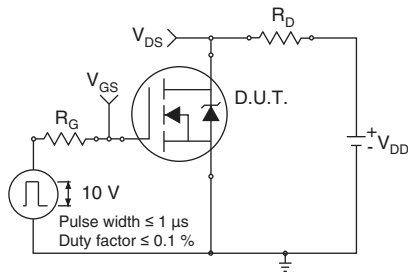
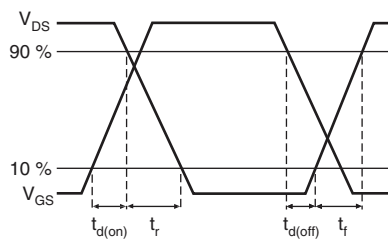
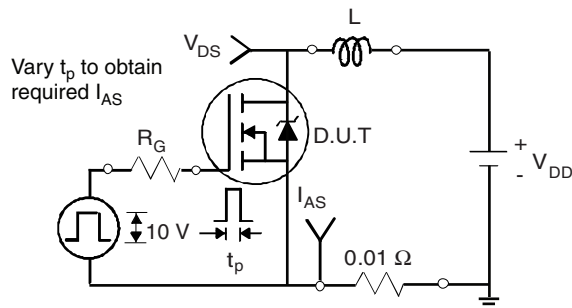
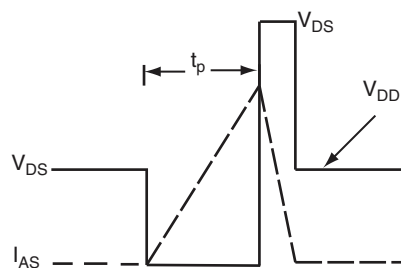
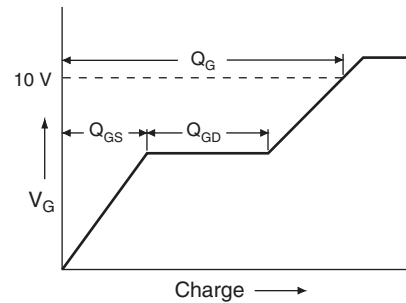
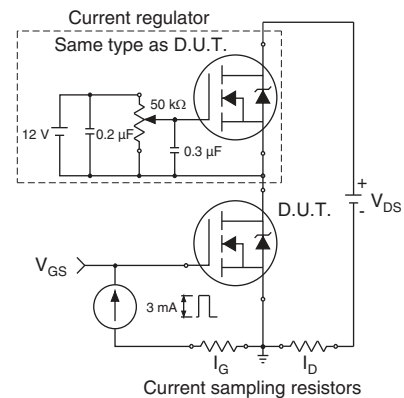

Fig. 11 - Switching Time Test Circuit

Fig. 12 - Switching Time Waveforms

Fig. 13 - Unclamped Inductive Test Circuit

Fig. 14 - Unclamped Inductive Waveforms

Fig. 15 - Basic Gate Charge Waveform

Fig. 16 - Gate Charge Test Circuit



Fig. 17 - For N-Channel

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