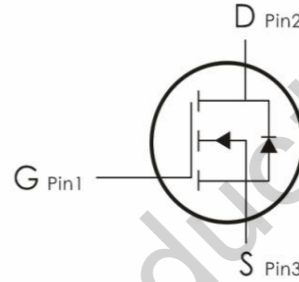
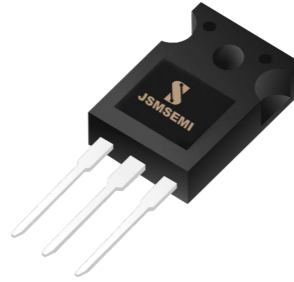


## FEATURES

- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

## APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)



Device Marking and Package Information		
Device	Package	Marking
SHY1920W	TO-247	SHY1920W

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ , unless otherwise noted			
Parameter	Symbol	Value	Unit
		TO-247	
Drain-Source Voltage ( $V_{GS} = 0\text{V}$ )	$V_{DSS}$	200	V
Continuous Drain Current $V_{GS} = 10\text{V}$ $T_C = 25^\circ\text{C}$	$I_D$	90	A
Pulsed Drain Current (note1)	$I_{DM}$	360	A
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Single Pulse Avalanche Energy (note2)	$E_{AS}$	1960.2	mJ
Avalanche Current (note1)	$I_{AS}$	19.8	A
Repetitive Avalanche Energy (note1)	$E_{AR}$	1176.1	mJ
Power Dissipation ( $T_C = 25^\circ\text{C}$ )	$P_D$	550	W
Peak Diode Recovery dv/dt (note1)	dv/dt	5.0	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~+150	$^\circ\text{C}$

Thermal Resistance			
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{thJC}$	0.89	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	60	

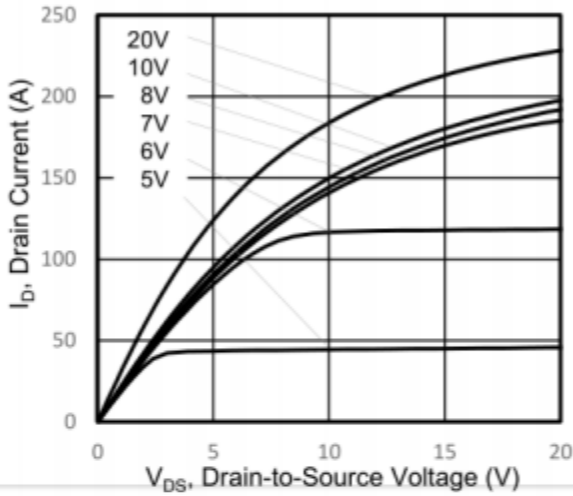
Specifications $T_J = 25^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	200	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 40V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	$\mu A$
		$V_{DS} = 32V, V_{GS} = 0V, T_J = 125^\circ\text{C}$	--	--	100	
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 20V$	--	--	$\pm 100$	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$	--	23	27	m $\Omega$
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz$	--	5784	--	pF
Output Capacitance	$C_{oss}$		--	893	--	
Reverse Transfer Capacitance	$C_{rss}$		--	561	--	
Total Gate Charge	$Q_g$	$V_{DD} = 20V, I_D = 190A, V_{GS} = 10V$	--	367	--	nC
Gate-Source Charge	$Q_{gs}$		--	33.8	--	
Gate-Drain Charge	$Q_{gd}$		--	177	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 20V, I_D = 190A, R_G = 10\Omega, V_{GS} = 10V$	--	55	--	ns
Turn-on Rise Time	$t_r$		--	165	--	
Turn-off Delay Time	$t_{d(off)}$		--	1050	--	
Turn-off Fall Time	$t_f$		--	367	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	90	A
Pulsed Diode Forward Current	$I_{SM}$		--	--	360	
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = 95A, V_{GS} = 0V$	--	--	1.4	V
Reverse Recovery Time	$t_{rr}$	$V_{GS} = 0V, I_S = 190A, di_F/dt = 100A/\mu s$	--	360	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	5.61	--	$\mu C$

**Notes**

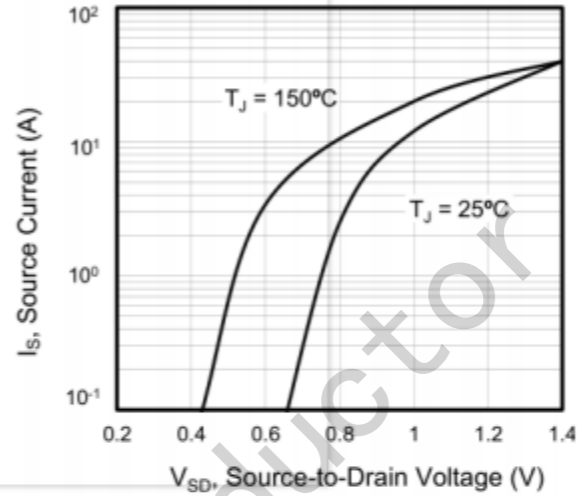
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $L = 10mH, V_{DD} = 50V, R_G = 25\Omega, \text{Starting } T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse width  $\leq 300\mu s, \text{Duty Cycle} \leq 1\%$

**Typical Characteristics**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

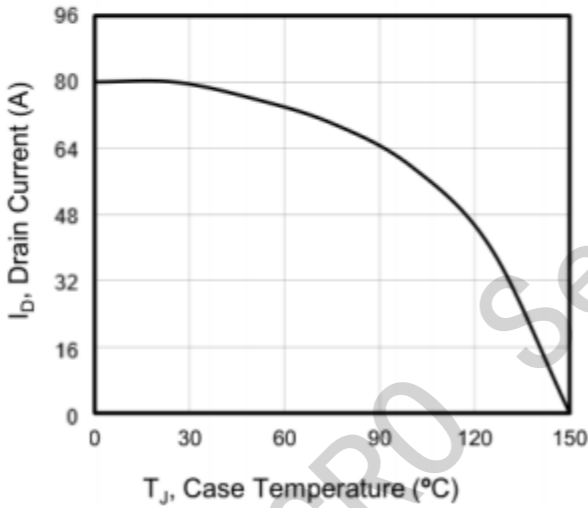
**Figure 1. Output Characteristics ( $T_J = 25^\circ\text{C}$ )**



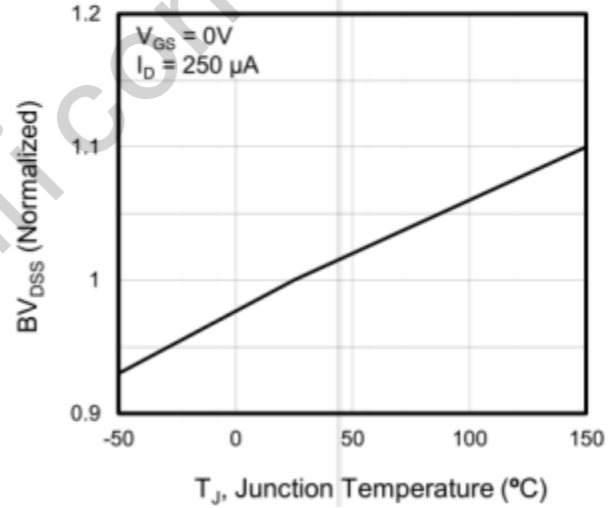
**Figure 2. Body Diode Forward Voltage**



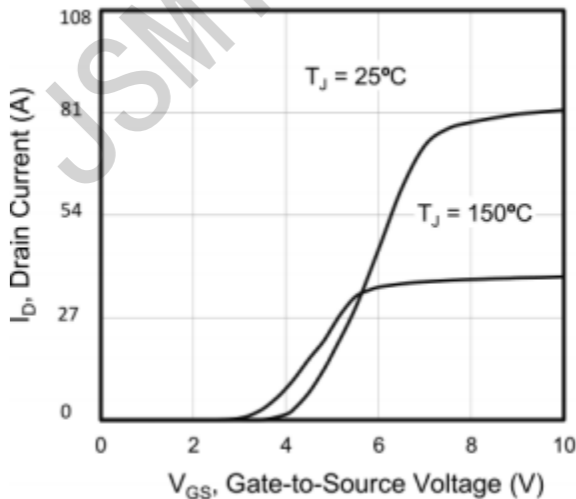
**Figure 3. Drain Current vs. Temperature**



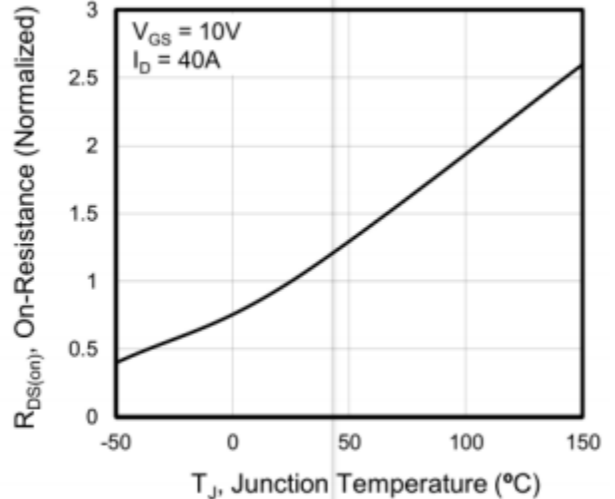
**Figure 4.  $BV_{DSS}$  Variation vs. Temperature**



**Figure 5. Transfer Characteristics**



**Figure 6. On-Resistance vs. Temperature**



Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

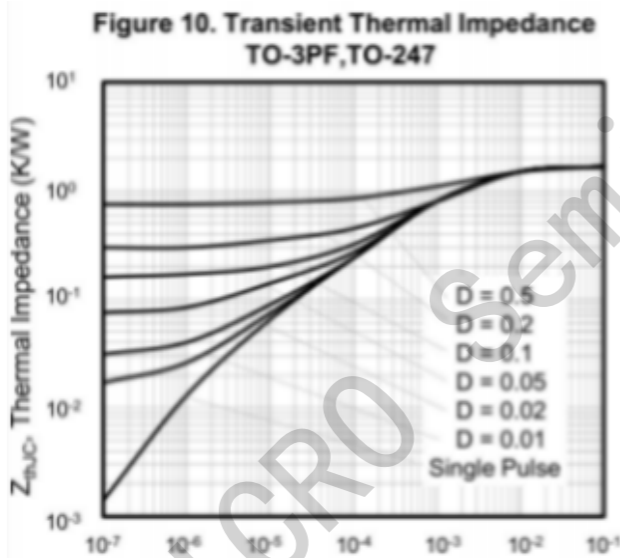
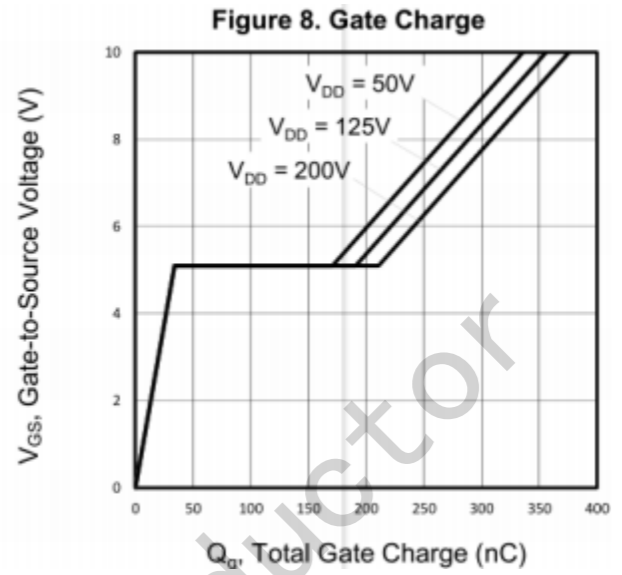


Figure A: Gate Charge Test Circuit and Waveform

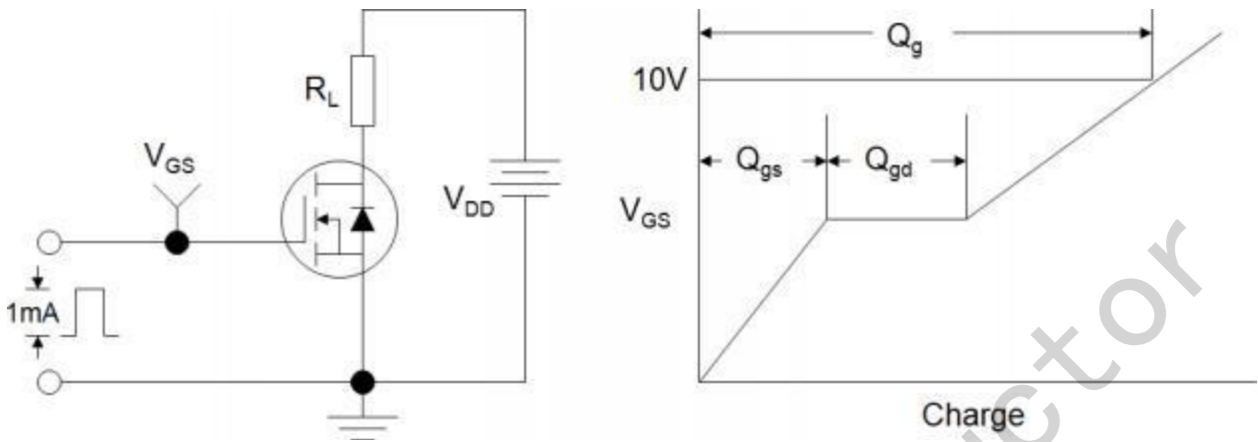


Figure B : Resistive Switching Test Circuit and Waveform

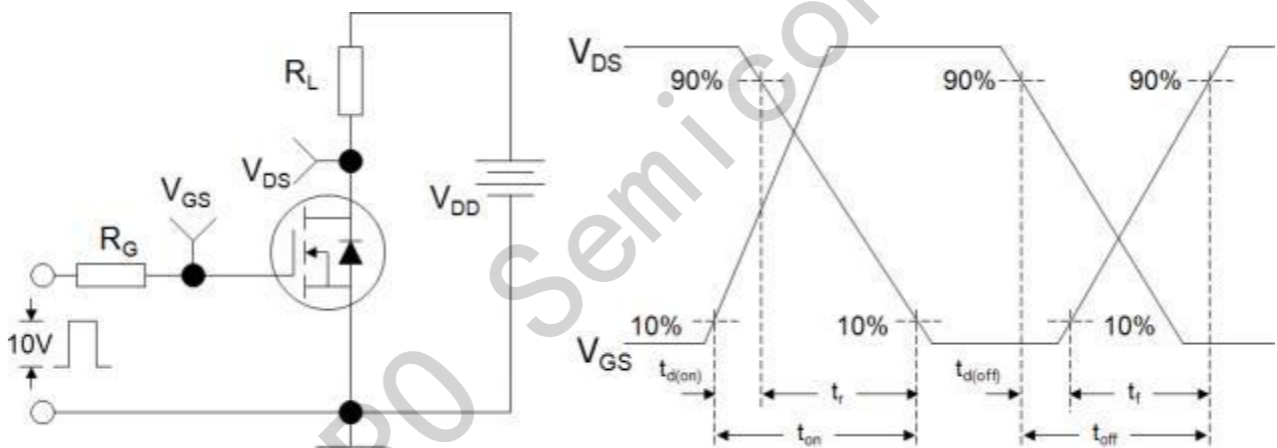
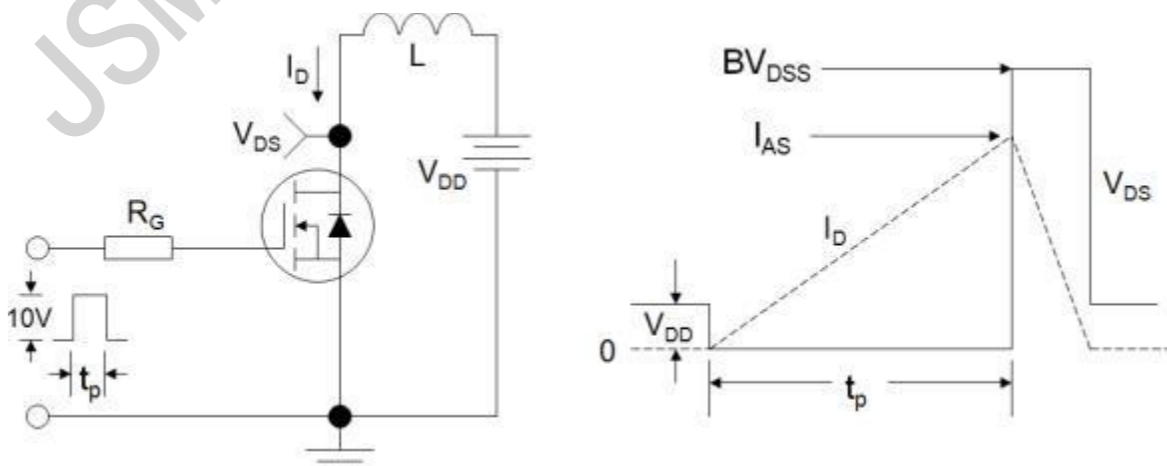
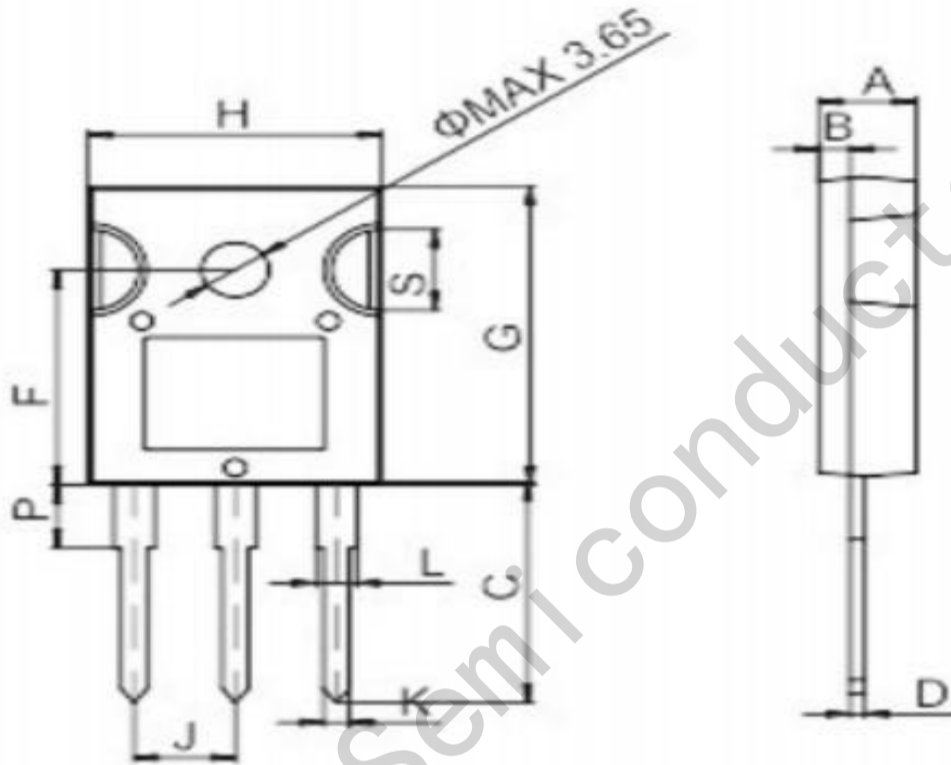


Figure C : Unclamped Inductive Switching Test Circuit and Waveform



**TO-247**



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.9		5.4	0.193		0.213
B	1.6		2.0	0.063		0.079
C	14.35		15.4	0.565		0.606
D	0.5		0.8	0.020		0.031
F	14.4		15.1	0.567		0.594
G	19.7		20.6	0.775		0.811
H	15.4		16.2	0.606		0.638
J	5.3		5.6	0.209		0.220
K	1.3		1.5	0.051		0.059
L	2.8		3.3	0.110		0.130
P	3.7		4.2	0.146		0.165
S	5.35		5.65	0.211		0.222

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