JST90N20T2

20V N-Channel Mosfet

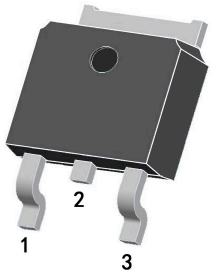
FEATURES

- RDS(ON) < 4mΩ @ VGS = 4.5V
- RDS(ON) < 6mΩ @ VGS = 2.5V

APPLICATIONS

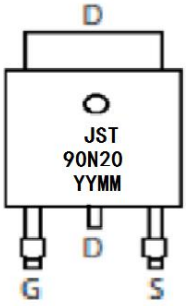
- Load Switch
- PWM Application
- Power management

TO-252



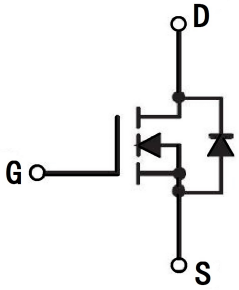
1: G
2: D
3: S

MARKING



YYMM:Date Code(year&month)

N-CHANNEL MOSFET



Maximum ratings (T_C=25℃ unless otherwise noted)

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		20	V
V_{GSS}	Gate-Source Voltage		±12	V
I_D	Continuous Drain Current	T_C = 25℃	90	A
		T_C = 100℃	59	A
I_{DM}	Pulsed Drain Current note1		360	A
E_{AS}	Single Pulsed Avalanche Energy note2		110	mJ
P_D	Power Dissipation	T_C = 25℃	81	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		1.85	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +175	℃

Electrical Characteristics (T_J=25℃ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =20V, V_{GS} = 0V	-	-	1	μA
I_{GSS}	Gate to Body Leakage Current	V_{GS} = ±12V, V_{DS} = 0V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D = 250μA	0.4	0.7	1.1	V
$R_{DS(on)}$	Static Drain-Source On-Resistance note3	V_{GS} =4.5V, I_D =30A	-	2.8	4	mΩ
		V_{GS} =2.5V, I_D =20A		4	6	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} =15V, V_{GS} = 0V, f = 1.0MHz	-	3200	-	pF
C_{oss}	Output Capacitance		-	460	-	pF
C_{rss}	Reverse Transfer Capacitance		-	445	-	pF
Q_g	Total Gate Charge	V_{DS}=15V, I_D =17A, V_{GS} =4.5V	-	48	-	nC
Q_{gs}	Gate-Source Charge		-	3.6	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	19	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS} =15V, I_D=17A, R_G= 1.8Ω, V_{GS} =4.5V	-	9.7	-	ns
t_r	Turn-On Rise Time		-	37	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	63	-	ns
t_f	Turn-Off Fall Time		-	52	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	90	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	360	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_{SD}=30A, T_J = 25℃	-	-	1.2	V
t_{rr}	Reverse Recovery Time	T_J= 25°C, I_F =30A, di/dt =100A/μs	-	23	-	ns
Q_{rr}	Reverse Recovery Charge		-	10	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: T_J=25℃, V_{DD}=15V, V_G=4.5V, R_G=25Ω, L=0.5mH, I_{AS}=21A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Typical Characteristics

Figure1: Output Characteristics

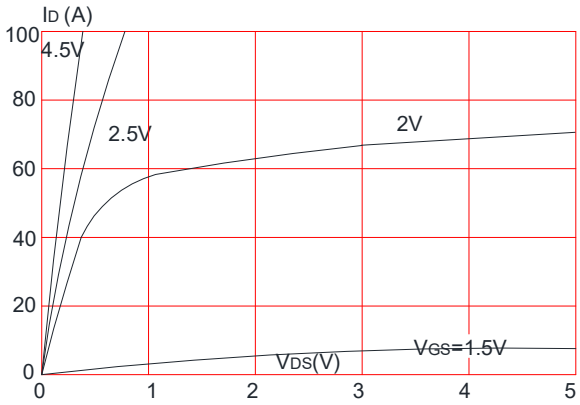


Figure 2: Typical Transfer Characteristics

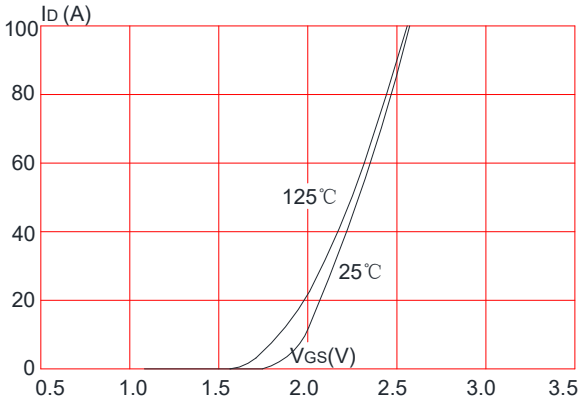


Figure 3: On-resistance vs. Drain Current

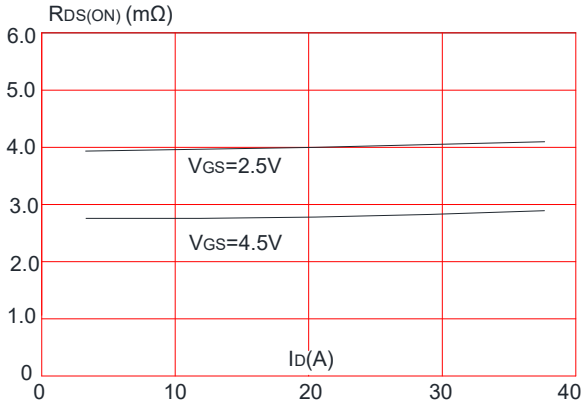


Figure 4: Body Diode Characteristics

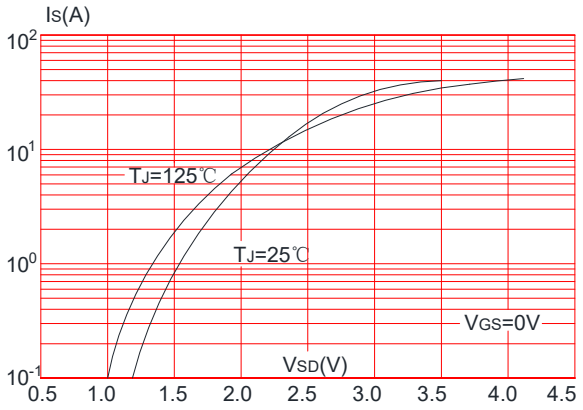


Figure 5: Gate Charge Characteristics

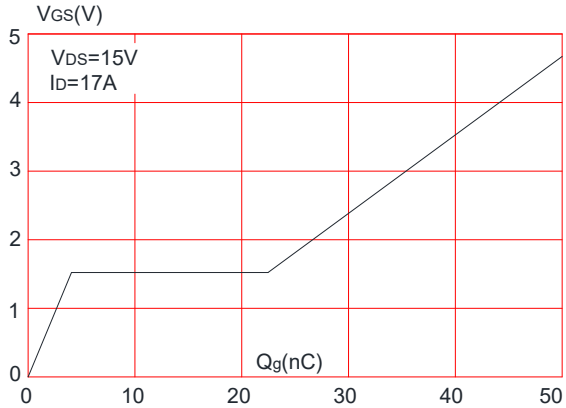


Figure 6: Capacitance Characteristics

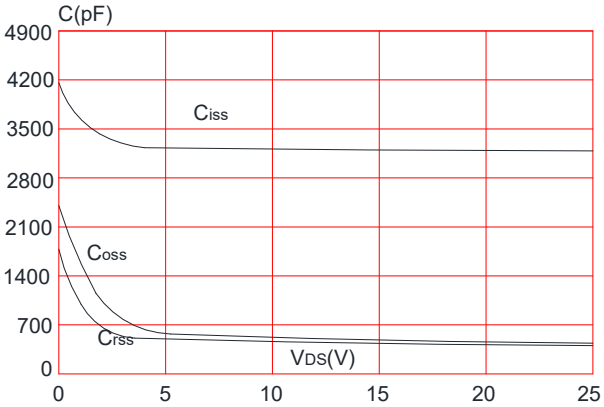


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

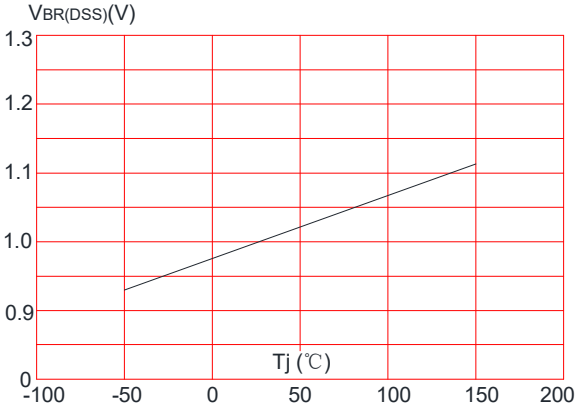


Figure 8: Normalized on Resistance vs. Junction Temperature

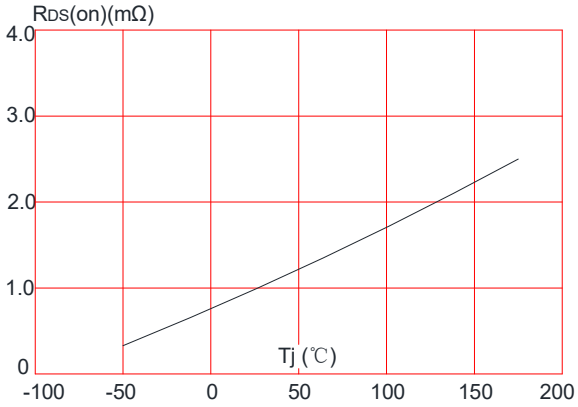


Figure 9: Maximum Safe Operating Area

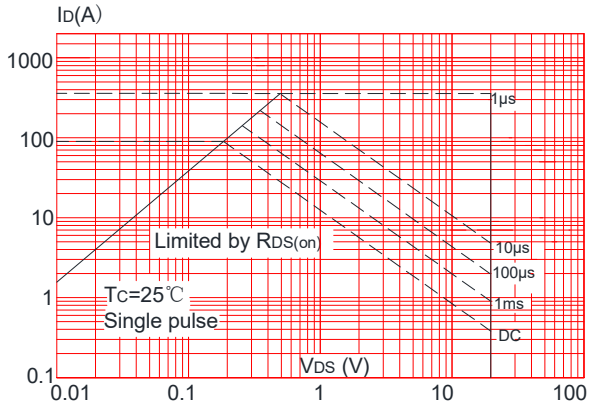


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

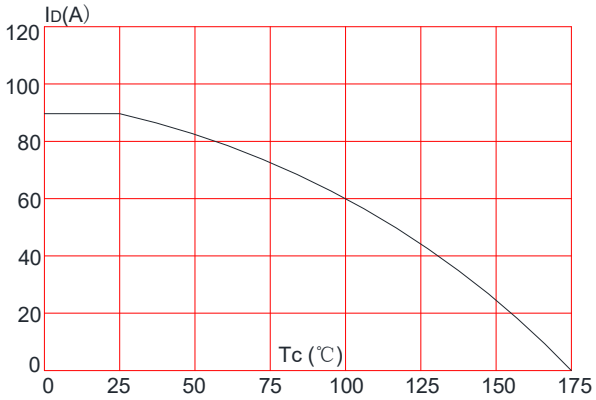
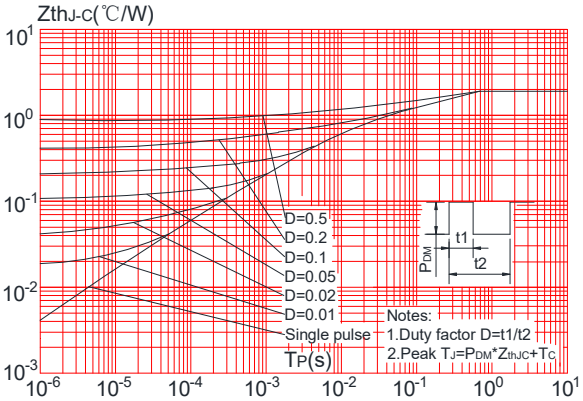


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



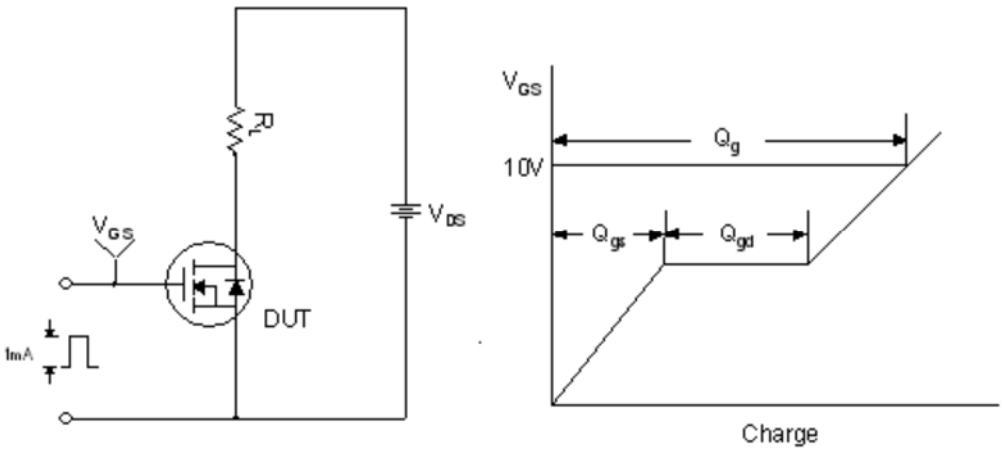


Figure 1. Gate Charge Test Circuit & Waveform

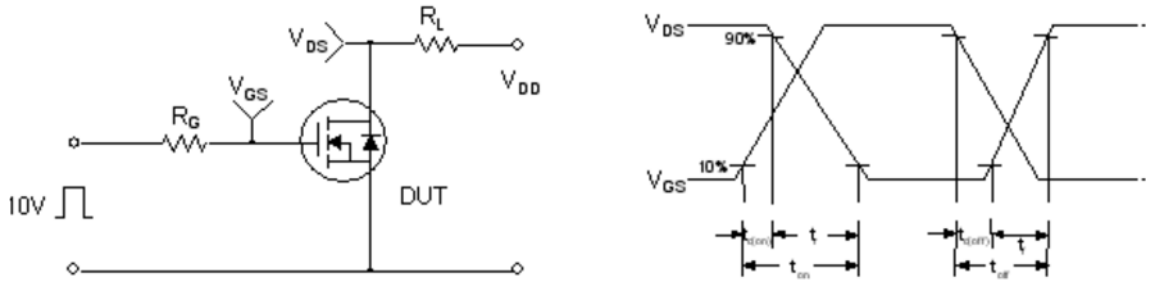


Figure 2. Resistive Switching Test Circuit & Waveforms

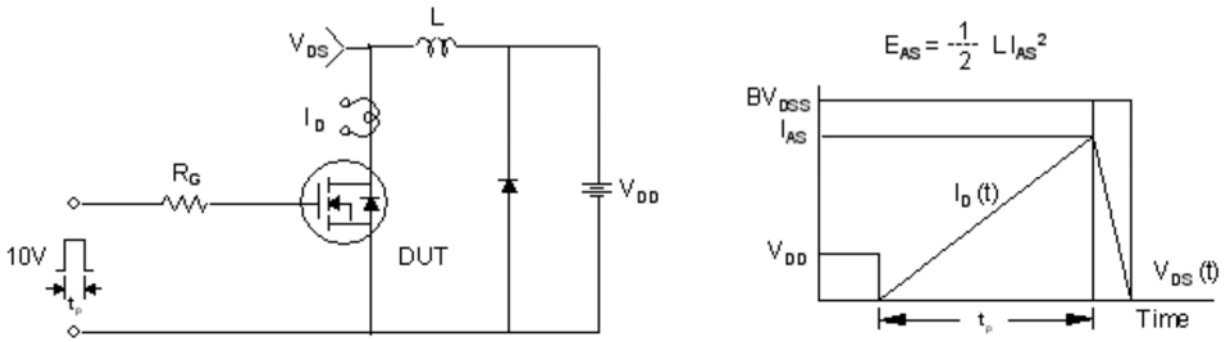


Figure 3. Unclamped Inductive Switching Test Circuit & Waveforms

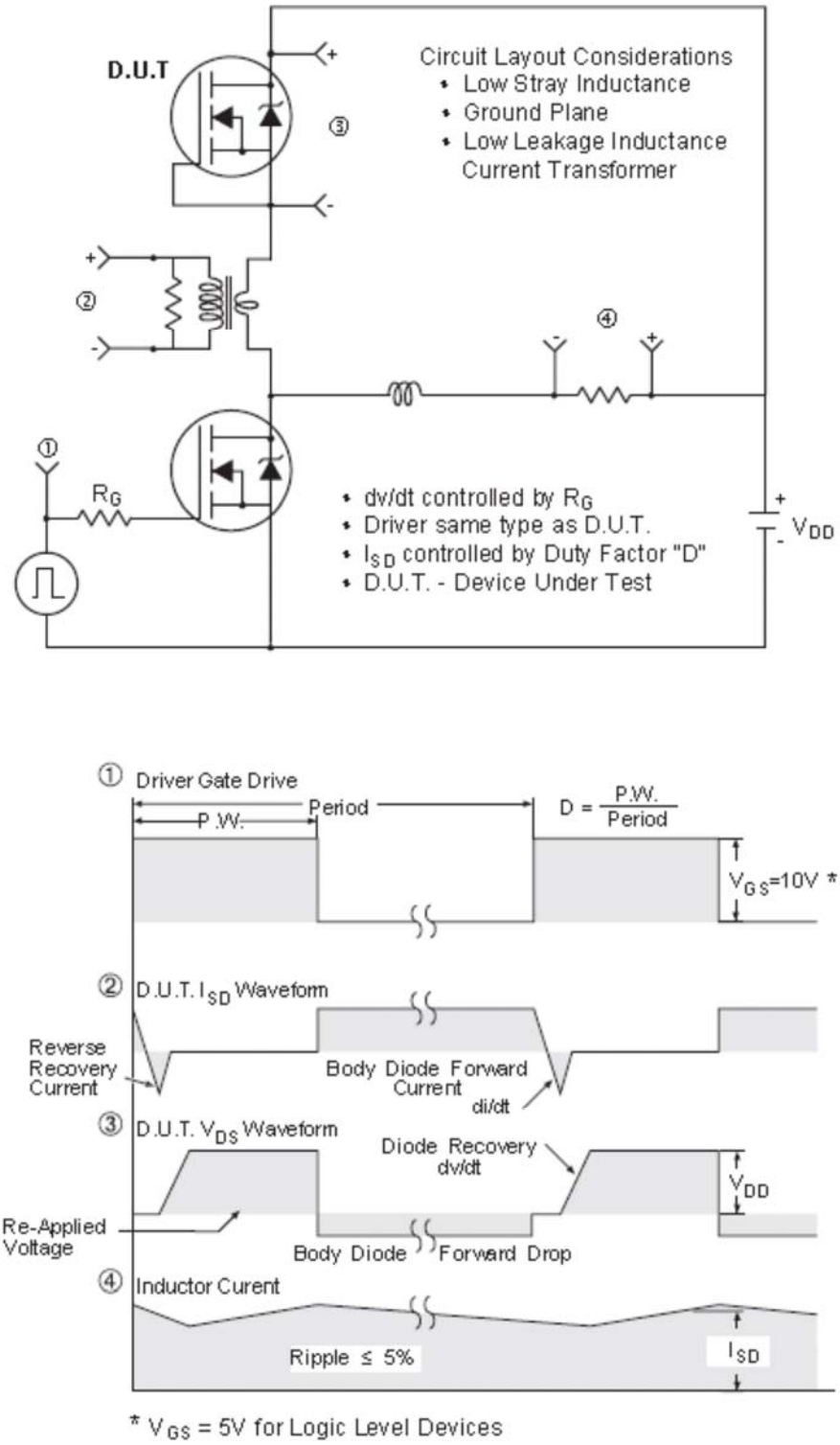
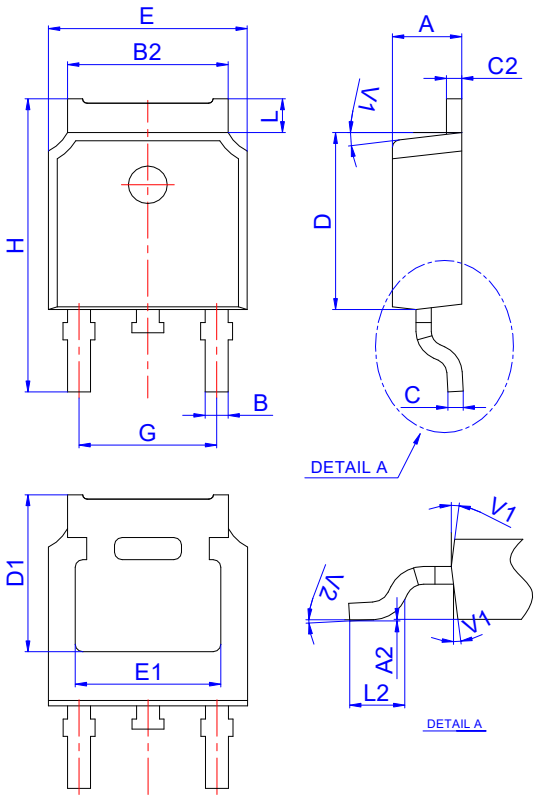


Figure 4. Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)

TO-252 PACKAGE OUTLINE DRAWING



Symbols	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°