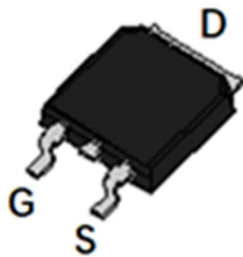
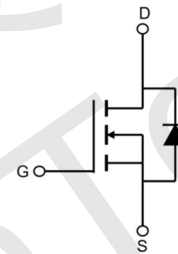


**JMTK90N02A****Description****JMT N-channel MOSFET****Features**

- 20V, 90A
 $R_{DS(ON)} < 4.0m\Omega @ V_{GS} = 4.5V$
 $R_{DS(ON)} < 6.0m\Omega @ V_{GS} = 2.5V$
- Lead free and Green Device Available
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

Application

- Load Switch
- PWM Application
- Power management

*100% UIS TESTED!**100% ΔV_{ds} TESTED!***TO-252-4R(DPAK) top view****Marking and pin Assignment****Schematic Diagram****Package Marking and Ordering Information**

Device Marking	Device	OUTLINE	Device Package	Reel Size	Reel (PCS)	Per Carton (PCS)
JMTK90N02A	JMTK90N02A	TAPING	TO-252-4R	13inch	2500	25000

Absolute Maximum Ratings ($T_C=25^{\circ}C$ unless otherwise specified)

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

**JMTK90N02A****Electrical Characteristics** ($T_J=25^{\circ}\text{C}$ 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	1.0	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} =10V, 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} =10V, I _D =30A, 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} =10V, I _D =30A, 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℃, I _F =30A,	-	23	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt =100A/μs	-	10	-	nC

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

2. EAS condition: $T_J=25^{\circ}\text{C}$, $V_{DD}=15V$, $V_G=4.5V$, $R_G=25\Omega$, $L=0.5mH$, $I_{AS}=21A$ 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$



JMTK90N02A

Typical Performance Characteristics

Figure 1: Output Characteristics

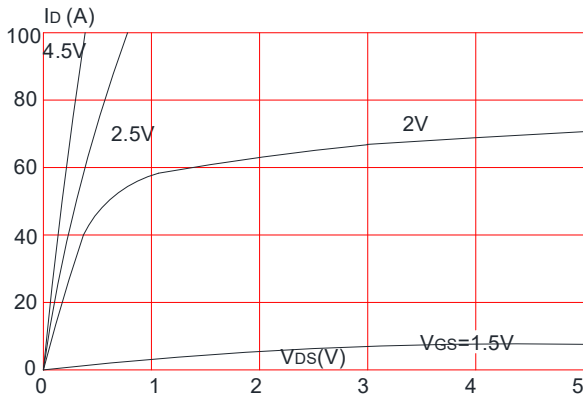


Figure 2: Typical Transfer Characteristics

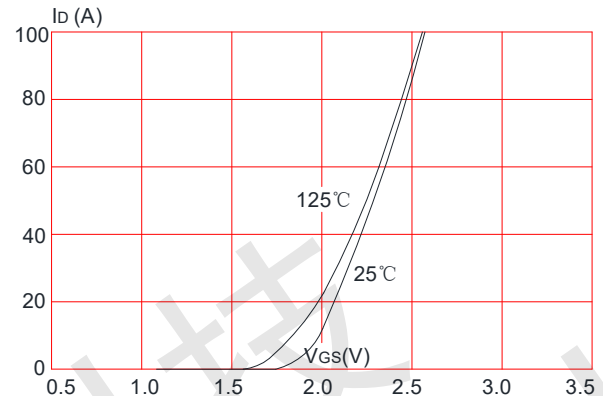


Figure 3: On-resistance vs. Drain Current
 $R_{DS(ON)}$ (mΩ)

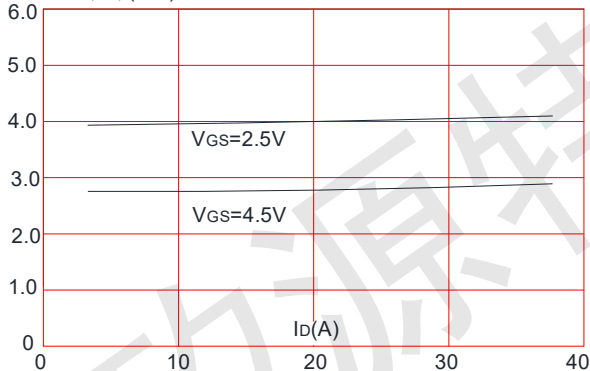


Figure 4: Body Diode Characteristics

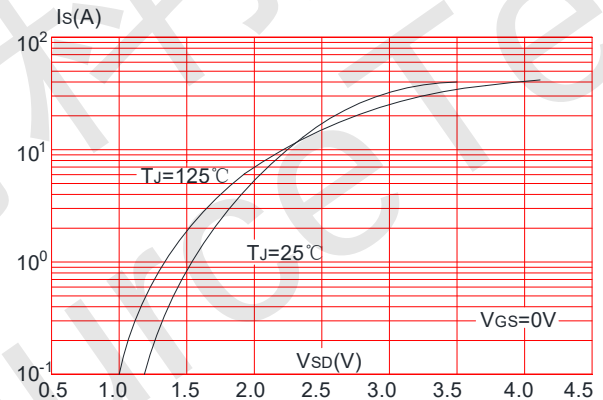


Figure 5: Gate Charge Characteristics

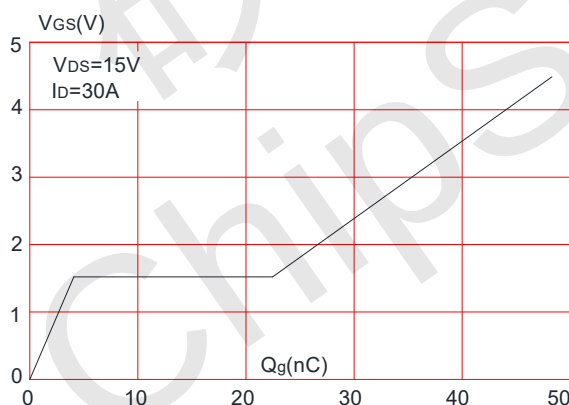
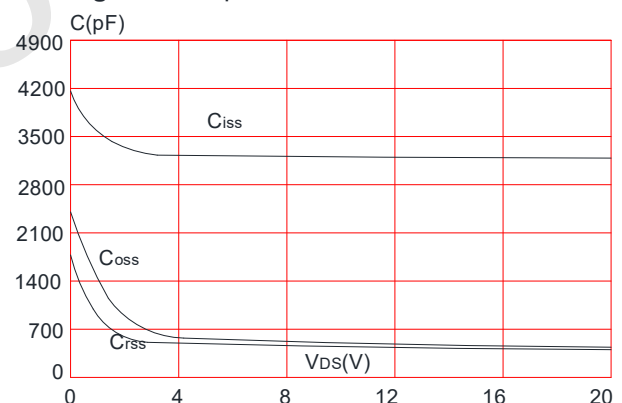


Figure 6: Capacitance Characteristics





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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

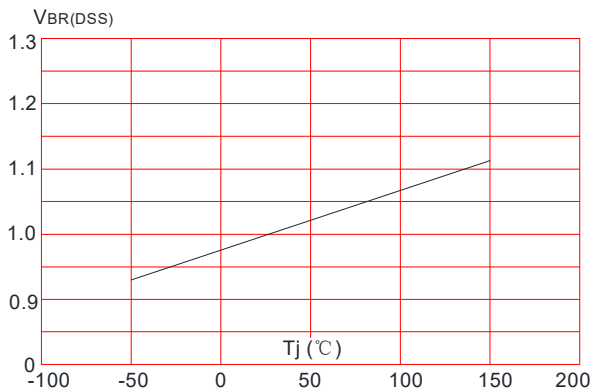


Figure 8: Normalized on Resistance vs. Junction Temperature

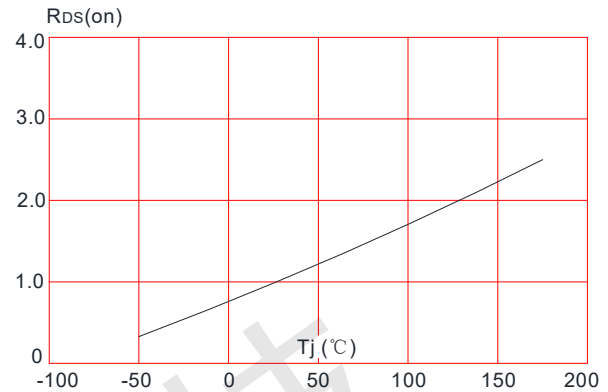


Figure 9: Maximum Safe Operating Area

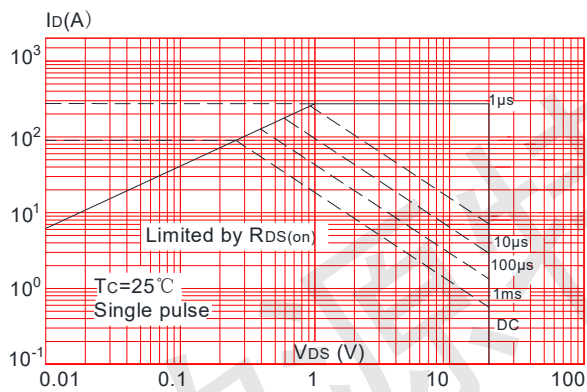


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

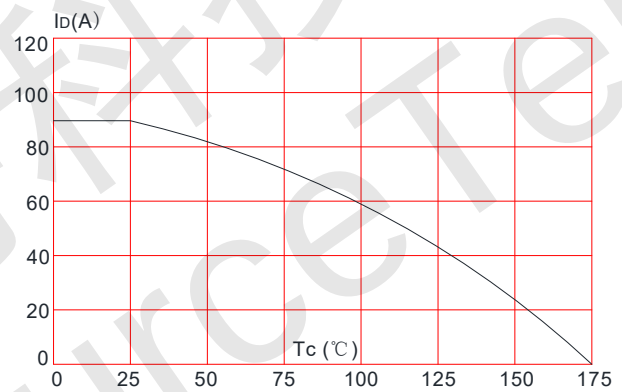
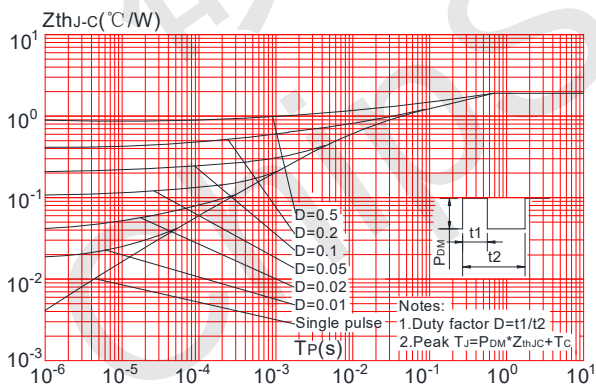


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case





JMTK90N02A

Test Circuit

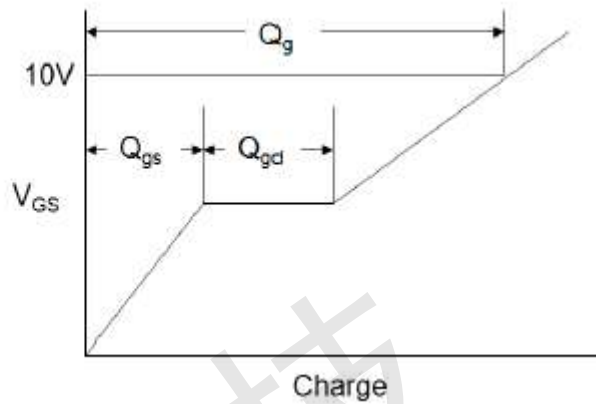
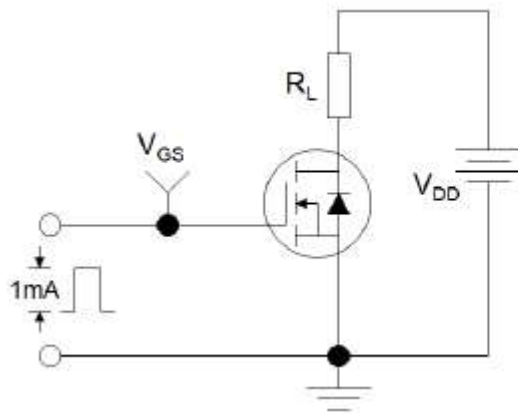


Figure1:Gate Charge Test Circuit & Waveform

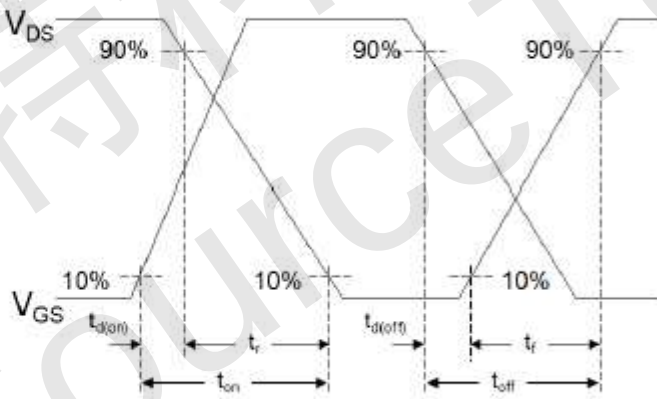
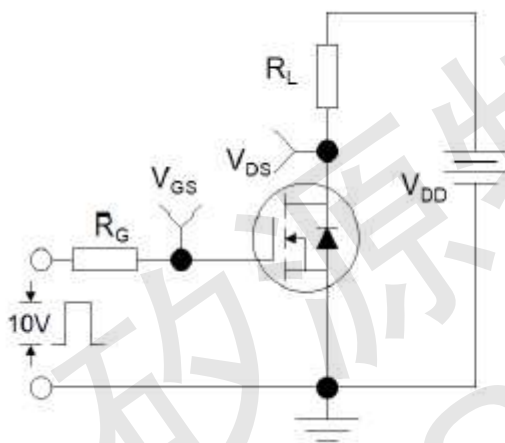


Figure 2: Resistive Switching Test Circuit & Waveforms

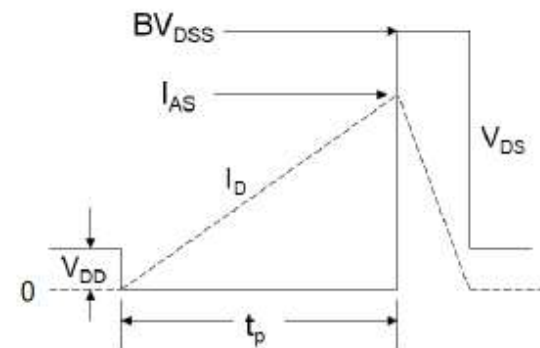
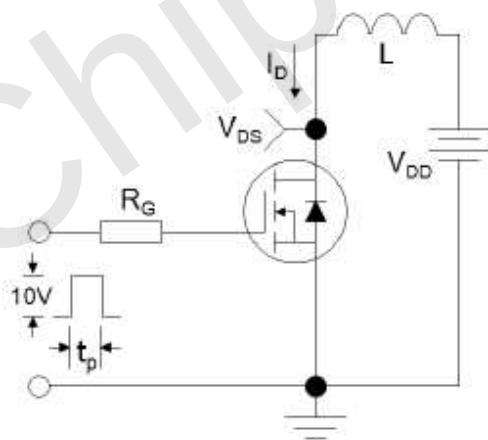
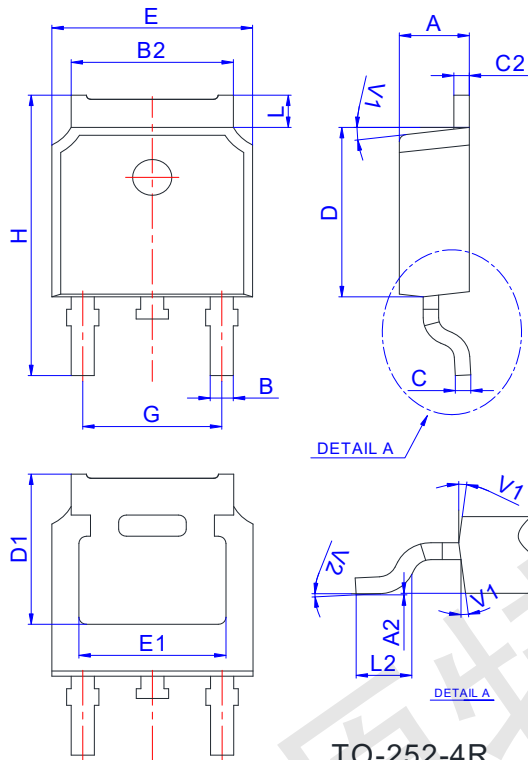
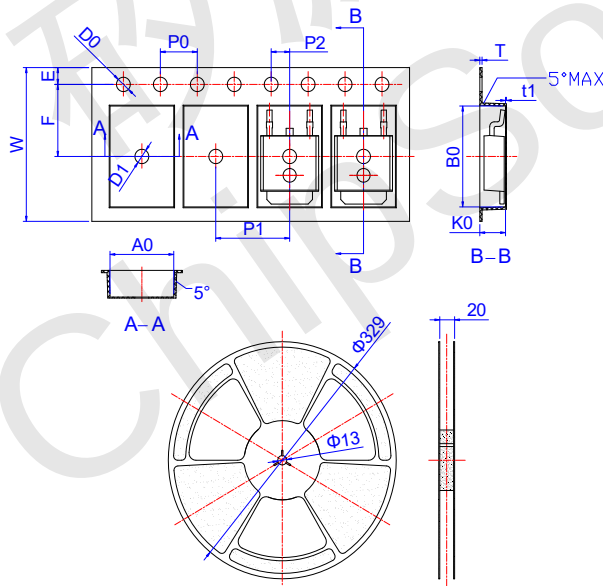


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

**JMTK90N02A****Package Mechanical Data-TO-252-4R**

TO-252-4R

Ref.	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°

Reel Specification-TO-252-4R

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583