



JCS9N90T

主要参数 MAIN CHARACTERISTICS

I_D	9 A
V_{DS}	900 V
$R_{DS(on)-Max}$ ($V_{GS}=10V$)	1.35 Ω
Q_g	43 nC

用途

- 高频开关电源
- 电子镇流器
- LED 电源

APPLICATIONS

- High efficiency switch mode power supplies
- Electronic lamp ballasts based on half bridge
- LED power supplies

产品特性

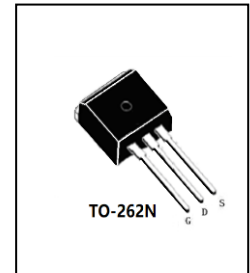
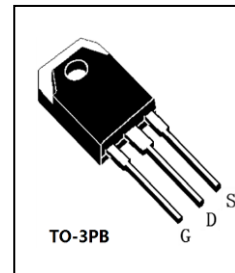
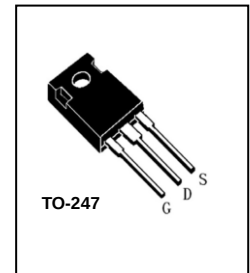
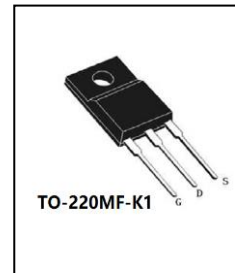
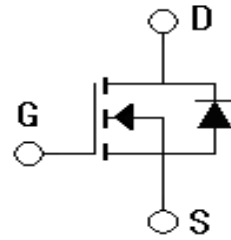
- 低栅极电荷
- 低 C_{RSS} (典型值 13pF)
- 开关速度快
- 产品全部经过雪崩测试
- 高抗 dv/dt 能力
- RoHS 产品

FEATURES

- Low gate charge
- Low C_{RSS} (typical 13pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- RoHS product

订货信息 ORDER MESSAGE

封装 Package



订 货 型 号 Order codes				印 记 Marking	封 装 Package
有卤-条管 Halogen-Tube	无卤-条管 Halogen-Free-Tube	有卤-编带 Halogen-Reel	无卤-编带 Halogen-Free-Reel		
JCS9N90FT-F1-B	JCS9N90FT-F1-BR	N/A	N/A	JCS9N90FT	TO-220MF-K1
JCS9N90WT-GE-B	JCS9N90WT-GE-BR	N/A	N/A	JCS9N90WT	TO-247
JCS9N90ABT-GD-B	JCS9N90ABT-GD-BR	N/A	N/A	JCS9N90ABT	TO-3PB
JCS9N90BT-BP-B	JCS9N90BT-BP-BR	N/A	N/A	JCS9N90BT	TO-262N

绝对最大额定值 ABSOLUTE RATINGS ($T_c=25^{\circ}\text{C}$)

项 目 Parameter	符 号 Symbol	数 值 Value			单 位 Unit
		JCS9N90FT	JCS9N90BT	JCS9N90WT/ABT	
最高漏极-源极直流电压 Drain-Source Voltage	V_{DSS}	900			V
连续漏极电流 Drain Current -continuous	I_{D} $T=25^{\circ}\text{C}$ $T=100^{\circ}\text{C}$	9			A
		6.0*			A
最大脉冲漏极电流 (注1) Drain Current - pulse (note 1)	I_{DM}	36			A
最高栅源电压 Gate-Source Voltage	V_{GSS}	± 30			V
单脉冲雪崩能量 (注2) Single Pulsed Avalanche Energy (note 2)	E_{AS}	858			mJ
雪崩电流 (注1) Avalanche Current (note 1)	I_{AR}	9			A
重复雪崩能量 (注1) Repetitive Avalanche Current (note 1)	E_{AR}	27.7			mJ
二极管反向恢复最大电压变化速率 (注3) Peak Diode Recovery dv/dt (note 3)	dv/dt	4.1			V/ns
耗散功率 Power Dissipation	P_{D} $T_c=25^{\circ}\text{C}$ -Derate above 25°C	45	123.2	186.5	W
		0.36	0.986	1.492	W/ $^{\circ}\text{C}$
最高结温及存储温度 Operating and Storage Temperature Range	$T_{\text{J}}, T_{\text{STG}}$	$-55 \sim +150$			$^{\circ}\text{C}$
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T_{L}	300			$^{\circ}\text{C}$

*漏极电流由最高结温限制

*Drain current limited by maximum junction temperature





电特性 ELECTRICAL CHARACTERISTICS

项 目 Parameter	符 号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
关态特性 Off –Characteristics						
漏—源击穿电压 Drain-Source Voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	900	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu A$, referenced to $25^\circ C$	-	0.98	-	V/ $^\circ C$
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=900V, V_{GS}=0V, T_C=25^\circ C$	-	-	1	μA
		$V_{DS}=720V, T_C=125^\circ C$	-	-	10	μA
正向栅极体漏电流 Gate-body leakage current, forward	I_{GSSF}	$V_{DS}=0V, V_{GS}=30V$	-	-	100	nA
反向栅极体漏电流 Gate-body leakage current, reverse	I_{GSSR}	$V_{DS}=0V, V_{GS}=-30V$	-	-	-100	nA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D=250\mu A$	3.0	-	5.0	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=4.5A, 25^\circ C$	-	1.18	1.35	Ω
		$V_{GS}=10V, I_D=4.5A, 100^\circ C$	-	2.07	2.50	Ω
		$V_{GS}=10V, I_D=4.5A, 150^\circ C$	-	3.07	3.60	Ω
正向跨导 Forward Transconductance	g_{fs}	$V_{DS}=40V, I_D=4.5A$ (note 4)	-	9.5	-	S
动态特性 Dynamic Characteristics						
栅极电阻 Gate resistance	R_g	F=1.0MHz open drain	0.5	-	3.0	Ω
输入电容 Input capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$	1200	2150	2830	pF
输出电容 Output capacitance	C_{oss}		100	189	246	pF
反向传输电容 Reverse transfer capacitance	C_{rss}		5	13	17	pF





电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	$t_d(\text{on})$	$V_{DD}=450V, I_D=9A, R_G=25\Omega$ (note 4, 5)	-	53	121	ns
上升时间 Turn-On rise time	t_r		-	116	235	ns
延迟时间 Turn-Off delay time	$t_d(\text{off})$		-	97	199	ns
下降时间 Turn-Off Fall time	t_f		-	69	171	ns
栅极电荷总量 Total Gate Charge	Q_g	$V_{DS} = 720V$, $I_D=9A$ $V_{GS} = 10V$ (note 4, 5)	-	43	56	nC
栅-源电荷 Gate-Source charge	Q_{gs}		-	15	40	nC
栅-漏电荷 Gate-Drain charge	Q_{gd}		-	21	50	nC
漏-源二极管特性及最大额定值 Drain-Source Diode Characteristics and Maximum Ratings						
正向最大连续电流 Maximum Continuous Drain -Source Diode Forward Current	I_S		-	-	9	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}		-	-	36	A
正向压降 Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, \quad I_S=9A$	-	-	1.4	V
反向恢复时间 Reverse recovery time	t_{rr}	$V_{GS}=0V, \quad I_S=9A$ $di_F/dt=100A/\mu s$ (note 4)	-	539	1200	ns
反向恢复电荷 Reverse recovery charge	Q_{rr}		-	6.41	15	μC

热特性 THERMAL CHARACTERISTIC

项 目 Parameter	符 号 Symbol	最大 Max			单 位 Unit
		JCS9N90FT	JCS9N90BT	JCS9N90WT/ABT	
结到管壳的热阻 Thermal Resistance, Junction to Case	$R_{th(j-c)}$	2.756	1.01	0.67	$^{\circ}C/W$
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	62.5	50	40	$^{\circ}C/W$

注释:

- 1: 脉冲宽度由最高结温限制
- 2: $L=20mH, I_{AS}=9A, V_{DD}=50V, R_G=25\Omega$, 起始结温 $T_J=25^{\circ}C$
- 3: $I_{SD} \leq 9A, di/dt \leq 200A/\mu s, V_{DD} \leq BV_{DSS}$, 起始结温 $T_J=25^{\circ}C$
- 4: 脉冲测试: 脉冲宽度 $\leq 300\mu s$, 占空比 $\leq 2\%$
- 5: 基本与工作温度无关

Notes:

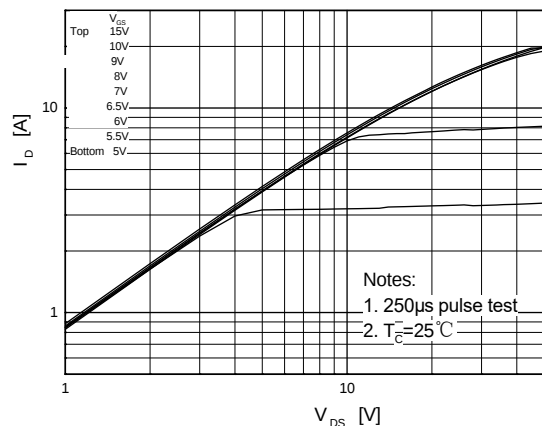
- 1: Pulse width limited by maximum junction temperature
- 2: $L=20mH, I_{AS}=9A, V_{DD}=50V, R_G=25\Omega$, Starting $T_J=25^{\circ}C$
- 3: $I_{SD} \leq 9A, di/dt \leq 200A/\mu s, V_{DD} \leq BV_{DSS}$, Starting $T_J=25^{\circ}C$
- 4: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycles $\leq 2\%$
- 5: Essentially independent of operating temperature



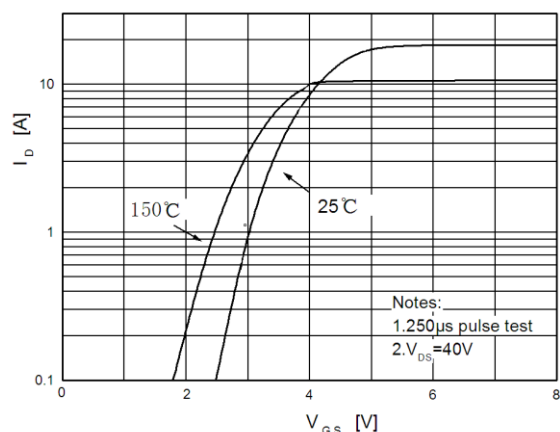


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

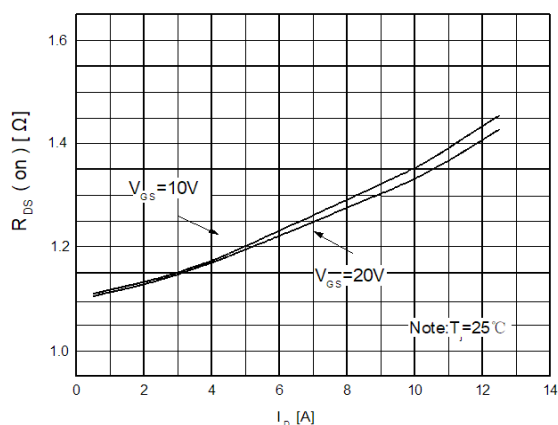
On-Region Characteristics



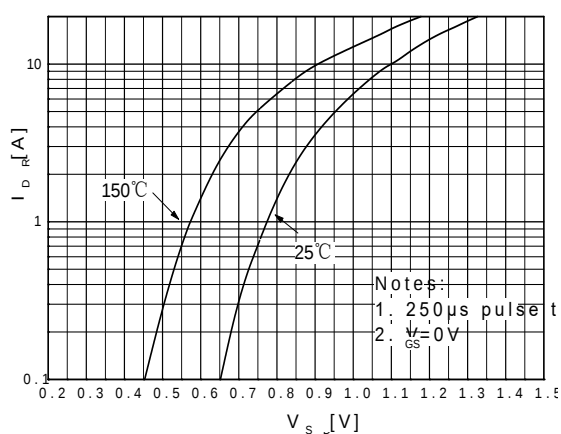
Transfer Characteristics



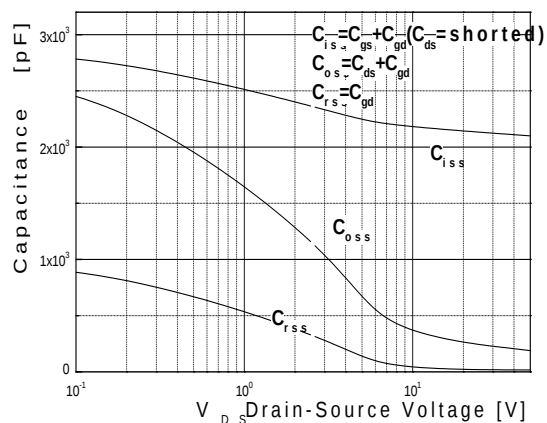
On-Resistance Variation vs. Drain Current and Gate Voltage



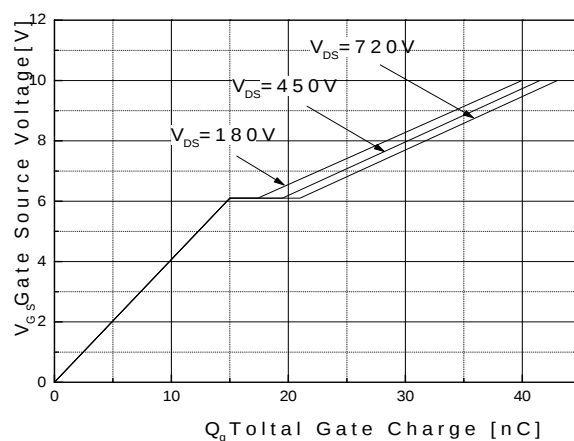
Body Diode Forward Voltage Variation vs. Source Current and Temperature



Capacitance Characteristics

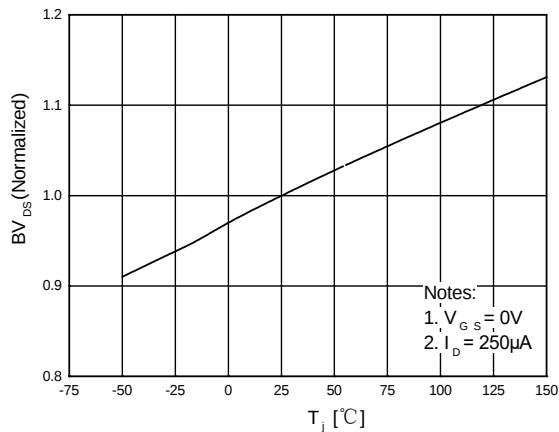
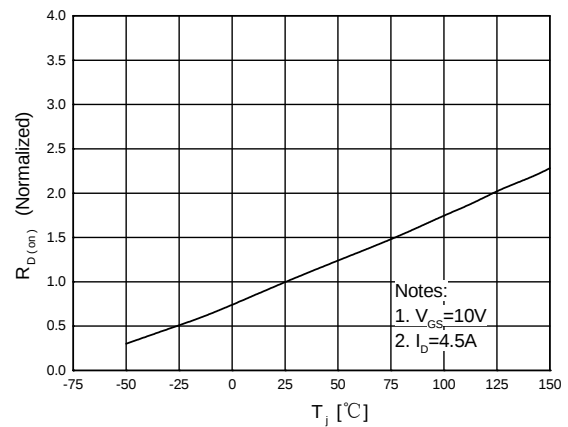
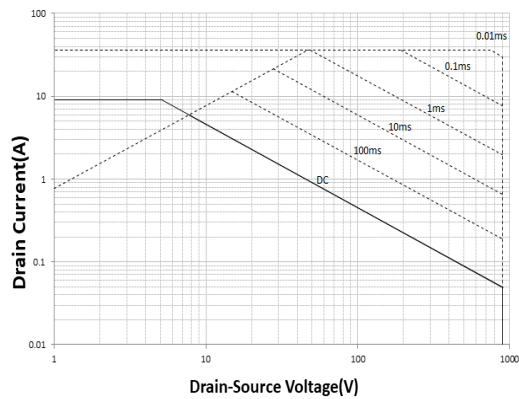
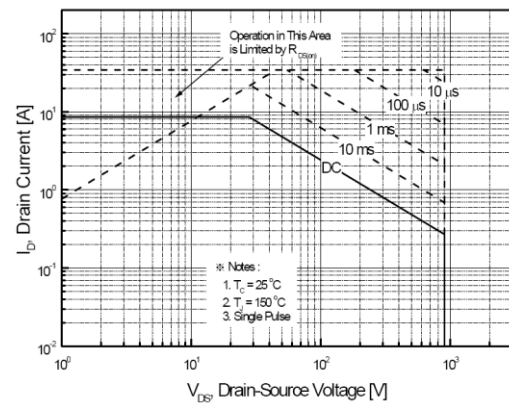
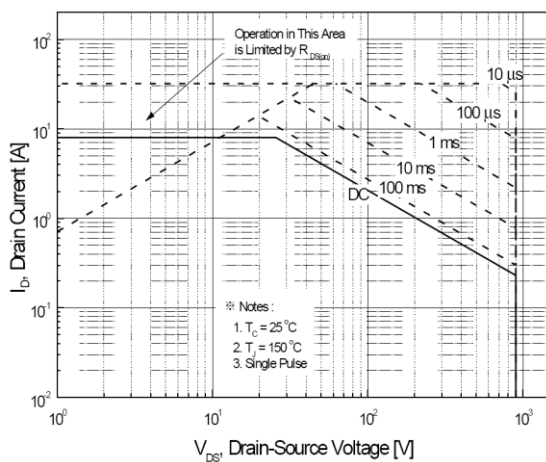
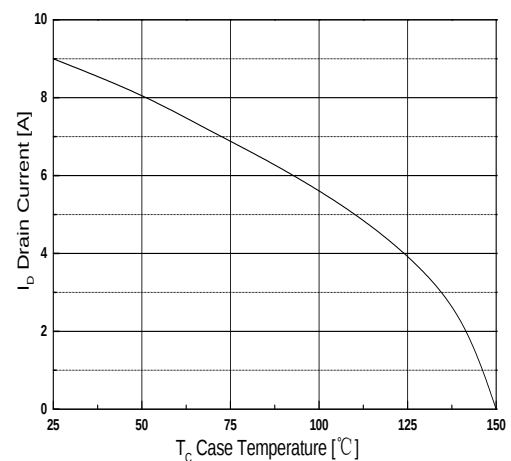


Gate Charge Characteristics



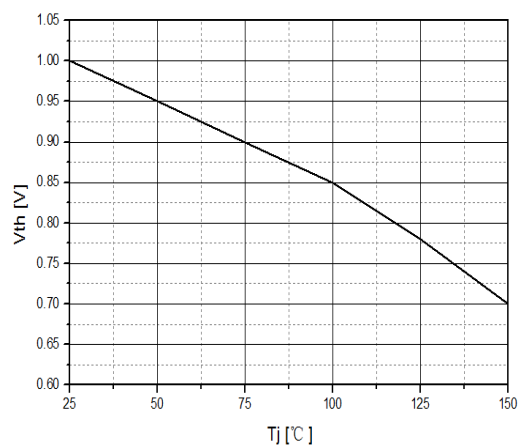
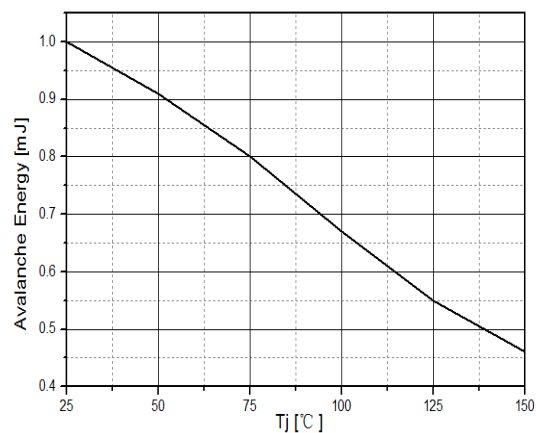
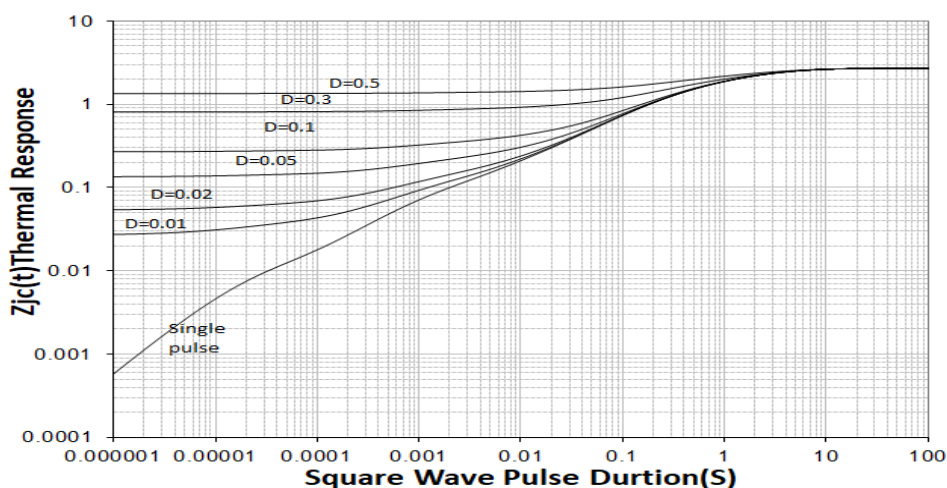
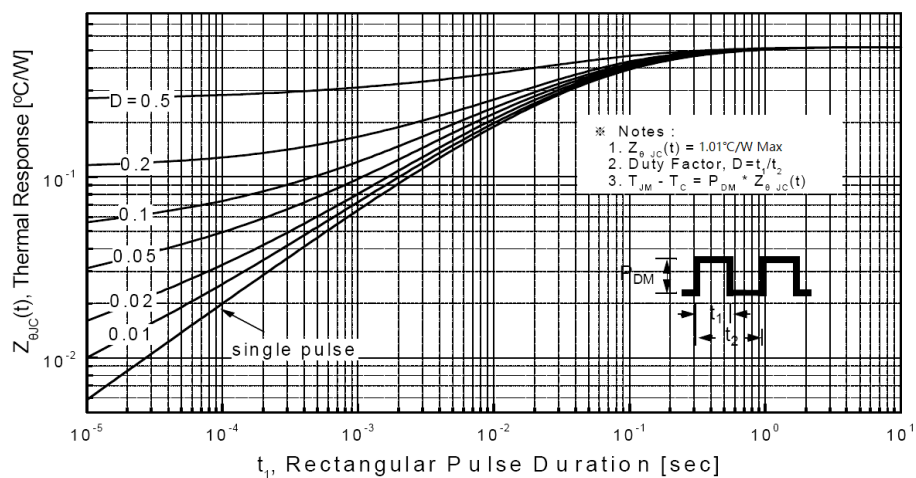


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

Breakdown Voltage Variation
vs. TemperatureOn-Resistance Variation
vs. TemperatureMaximum Safe Operating Area
JCS9N90FTMaximum Safe Operating Area
JCS9N90BTMaximum Safe Operating Area
JCS9N90WT/ABTMaximum Drain Current
vs. Case Temperature

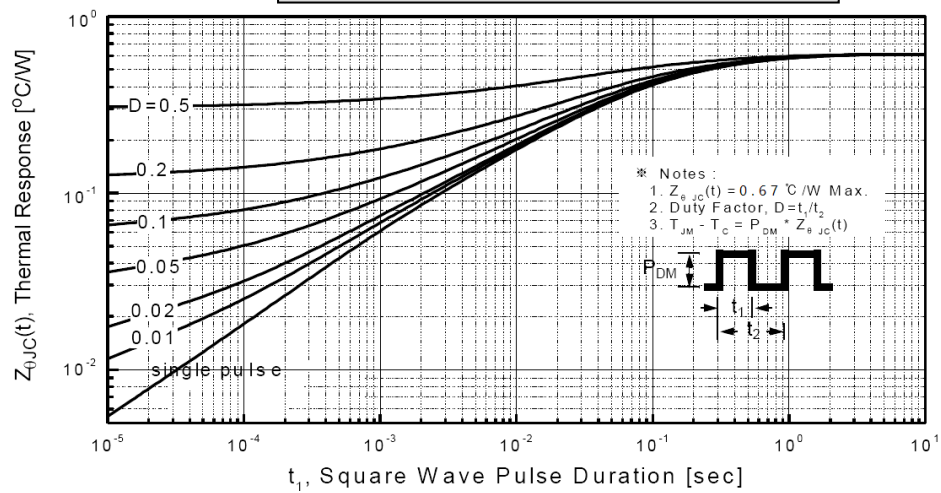


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

Gate Threshold Voltage Variation
vs. TemperatureSingle Pulsed Avalanche Energy
Variation vs. TemperatureTransient Thermal Response Curve
JCS9N90FTTransient Thermal Response Curve
JCS9N90BT



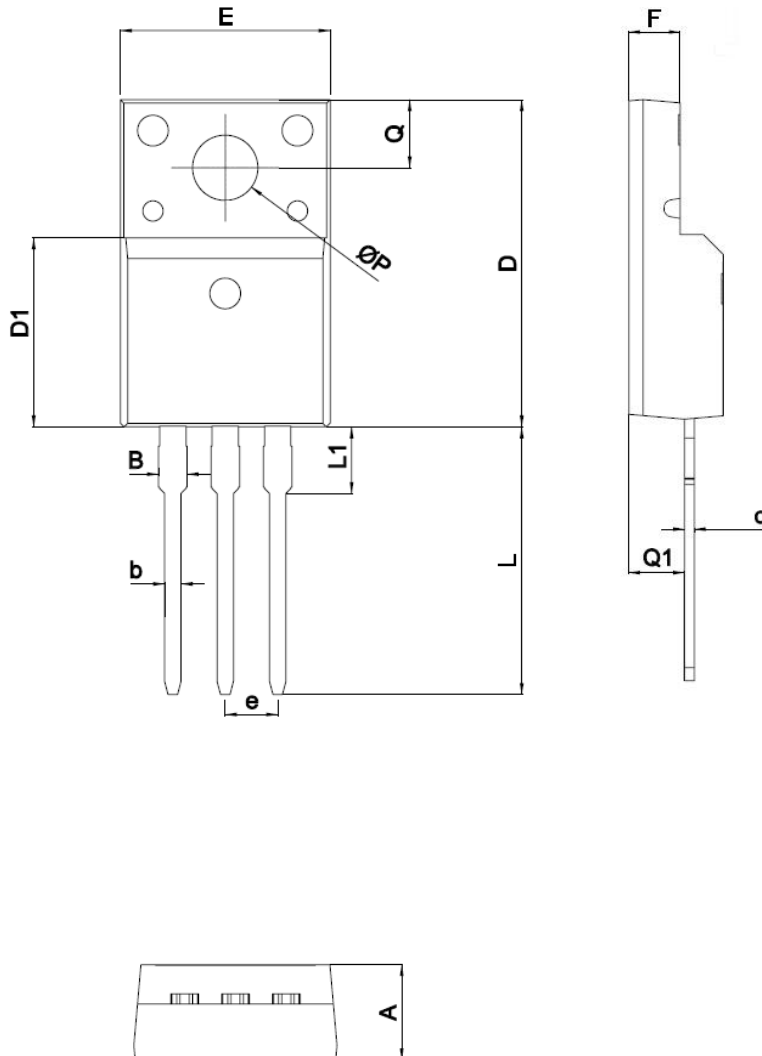
Transient Thermal Response Curve
JCS9N90 WT/ABT





TO-220MF-K1

单位 Unit: mm



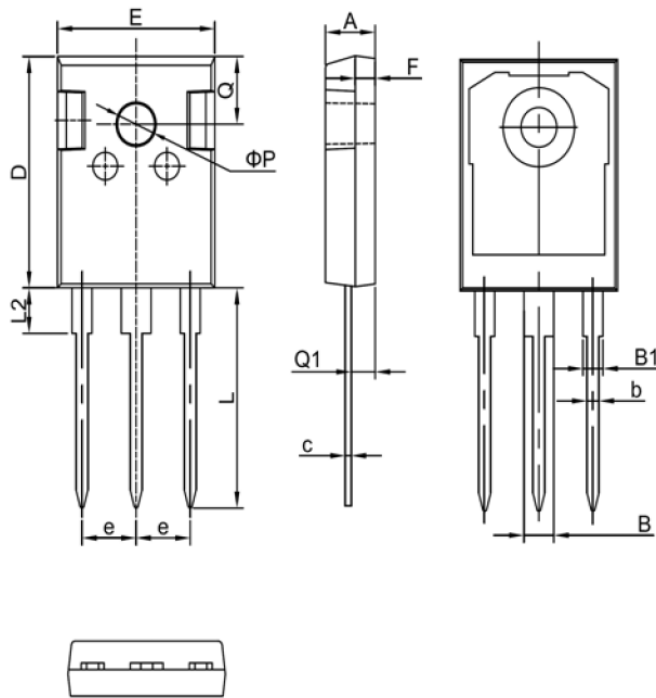
SYMBOL	mm	
	MIN	MAX
A	4.5	4.9
B		1.47
b	0.7	0.9
c	0.45	0.60
D	15.67	16.07
D1	9.04	9.20
e	2.54TYPE	
E	9.96	10.36
F	2.34	2.74
L	12.58	13.38
L1	3.13	3.33
Q	3.2	3.4
Q1	2.56	2.96
ΦP	3.08	3.28





TO-247

单位 Unit: mm



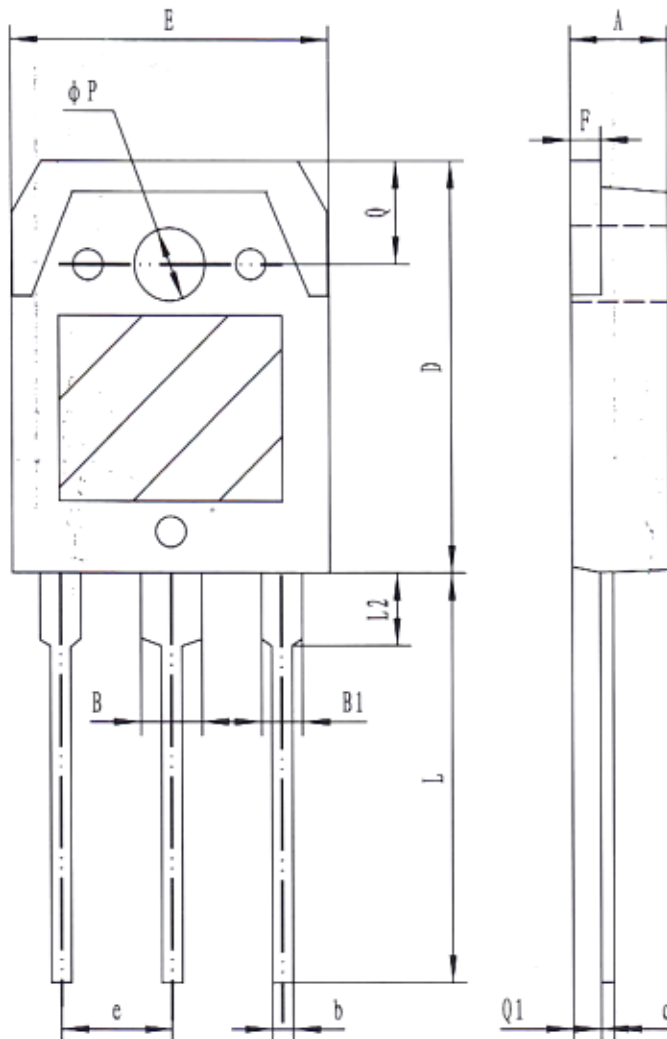
符号 symbol	MIN	MAX
A	4.90	5.10
B	2.95	3.35
B1	1.95	2.35
b	1.15	1.35
c	0.50	0.70
D	20.90	21.10
E	15.70	15.90
e	5.34	5.54
F	1.90	2.10
L	19.40	20.40
L2	4.03	4.23
Q	6.00	6.40
Q1	2.30	2.50
P	3.50	3.70





TO-3PB

单位 Unit : mm



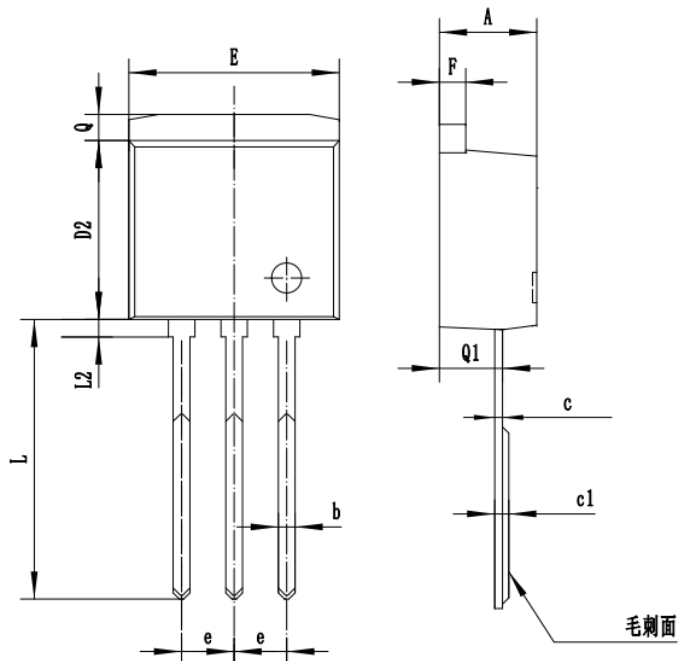
符号 symbol	MIN	MAX
A	4.60	5.00
B	2.90	3.20
B1	1.90	2.20
b	0.90	1.10
c	0.50	0.70
D	19.40	20.40
E	15.40	15.80
e	5.45(TYP)	
F	1.40	1.60
L	19.50	20.50
L2	3.30	3.70
Q	4.90	5.10
Q1	1.30	1.50
P	3.10	3.50





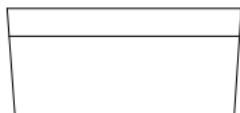
TO-262N

单位 Unit: mm



符号 symbol	MIN	MAX
A	4.40	4.90
b	0.70	0.95
c	0.30	0.60
c1	0.33	0.63
D2	8.20	9.20
E	9.60	10.50
e	2.39	2.69
F	1.20	1.35
L	13.11	14.61
L2		0.85
Q	1.10	1.40
Q1	2.65	2.85

单位: mm





注意事项

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4. 本说明书如有版本变更不另外告知。

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2. We strongly recommend customers check carefully on the trademark when buying our product, if there is any question, please don't be hesitate to contact us.
3. Please do not exceed the absolute maximum ratings of the device when circuit designing.
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