

IRF540N

主要参数 MAIN CHARACTERISTICS

I_D	35A
V_{DS}	100V
$R_{dson} (V_{GS}=10V)$	45m Ω

用途

- 负载开关
- 脉宽调制
- 电源管理

APPLICATIONS

- Load Switch
- PWM Application
- Power Management

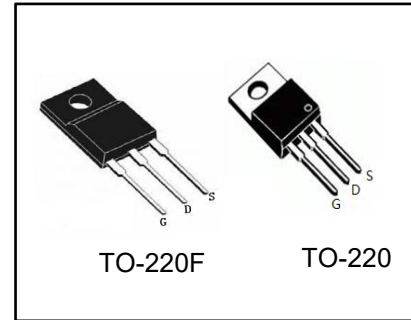
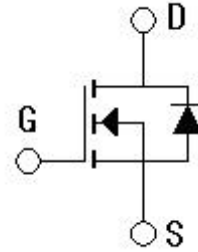
产品特性

- 先进沟槽技术
- 符合环保标准
- 产品无卤素
- 湿敏等级3级

FEATURES

- Advanced Trench Technology
- RoHS and Reach Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 3

封装 Package



产品中有毒有害物质或元素的名称及含量

部件名称	有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
(含量要求)	≤0.1%	≤0.1%	≤0.01%	≤0.1%	≤0.1%	≤0.1%
引线框	○	○	○	○	○	○
塑封树脂	○	○	○	○	○	○
管芯	○	○	○	○	○	○
内引线	○	○	○	○	○	○
焊料	×	○	○	○	○	○
说明	○: 表示该元素的含量在 SJ/T11363-2006 标准的限量要求以下。 ×: 表示该元素的含量超出 SJ/T11363-2006 标准的限量要求。 目前产品的焊料中含有铅 (Pb) 成分, 但属于欧盟 RoHS 指令豁免范围。					

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
最高漏极-源极直流电压 Drain-Source Voltage	V_{DS}	100	V
连续漏极电流 Drain Current-continuous	I_D $T=25^{\circ}\text{C}$ $T=100^{\circ}\text{C}$	35 23	A
最大脉冲漏极电流 Drain Current – pulse ^{Note 1}	I_{DM}	140	A
最高栅源电压 Gate-Source Voltage	V_{GS}	± 25	V
单脉冲雪崩能量 Single Pulsed Avalanche Energy ^{Note 2}	E_{AS}	750	mJ
重复雪崩能量 Avalanche Energy, Repetitive ^{Note 3}	E_{AR}	4	mJ
重复雪崩电流 Avalanche Current, Repetitive ^{Note 3}	I_{AR}	33	A
二极管电压变化率 Peak Diode Recovery dv/dt ($V_{ds}=0\sim 480\text{V}$, $I_{SD}\leq I_D$)	dv/dt	6	V/ns
耗散功率 Power Dissipation	P_D $T_c=25^{\circ}\text{C}$	40 130	W
最高结温及存储温度 Operating and Storage Temperature Range	T_J , T_{STG}	$-55\sim +150$	$^{\circ}\text{C}$

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}	$I_D=250\mu A, V_{GS}=0V, T_J=25^\circ C$	100	-	-	V
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V, T_C=25^\circ C$	-	-	10	μA
正向栅极体漏电流 Gate-body leakage current, forward	I_{GSSF}	$V_{DS}=0V, V_{GS}=25V$	-	-	100	nA
反向栅极体漏电流 Gate-body leakage current, reverse	I_{GSSR}	$V_{DS}=0V, V_{GS}=-25V$	-	-	-100	nA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=18A$	-	35	45	m Ω
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{iss}	$V_{DS}=25V,$ $V_{GS}=0V,$ $f=1MHz$	-	1520	-	pF
输出电容 Output capacitance	C_{oss}		-	344	-	pF
反向传输电容 Reverse transfer capacitance	C_{rss}		-	98	-	pF

电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	$t_{d(on)}$	$V_{DD}=50V, I_D=35A, R_G=25\Omega$ $V_{GS}=10V$	-	18	-	ns
上升时间 Turn-On rise time	t_r		-	475	-	ns
延迟时间 Turn-Off delay time	$t_{d(off)}$		-	69	-	ns
下降时间 Turn-Off Fall time	t_f		-	122	-	ns
栅极电荷总量 Total Gate Charge	Q_g	$V_{DS}=80V,$ $I_D=35A$ $V_{GS}=10V$	-	37	-	nC
栅-源电荷 Gate-Source charge	Q_{gs}		-	7	-	nC
栅-漏电荷 Gate-Drain charge	Q_{gd}		-	18	-	nC
栅极电阻 Gate Resistance	R_g	$f=1MHz$	-	0.56	-	Ω
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		-	35	-	A
正向压降 Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=35A$	-	0.89	1.2	V
反向恢复时间 Reverse Recovery Time	T_{RR}	$V_{GS}=0V, I_S=35A, di_F/dt$ $=100A/\mu s$	-	85	-	ns
反向恢复电荷 Reverse Recovery Charge	Q_{RR}		-	250	-	μC

热特性 THERMAL CHARACTERISTIC

项 目 Parameter	符号 Symbol	值 Value	单位 Unit
结到管壳的热阻 Thermal Resistance, TO-220 Junction to Case TO-220F	$R_{th(j-c)}$	0.96 3.12	$^{\circ}C/W$
结到环境的热阻 Thermal Resistance, Junction-to-Ambient	$R_{th(j-A)}$	62.5	$^{\circ}C/W$

NOTES:

1. Drain current is limited by maximum junction temperature.
2. Repetitive rating : pulse width limited by junction temperature.
3. $L=0.6mH, I_{AS}=35A, V_{DD}=50V, R_G=25\Omega$, Starting at $T_J=25^{\circ}C$

特征曲线 ELECTRICAL CHARACTERISTICS

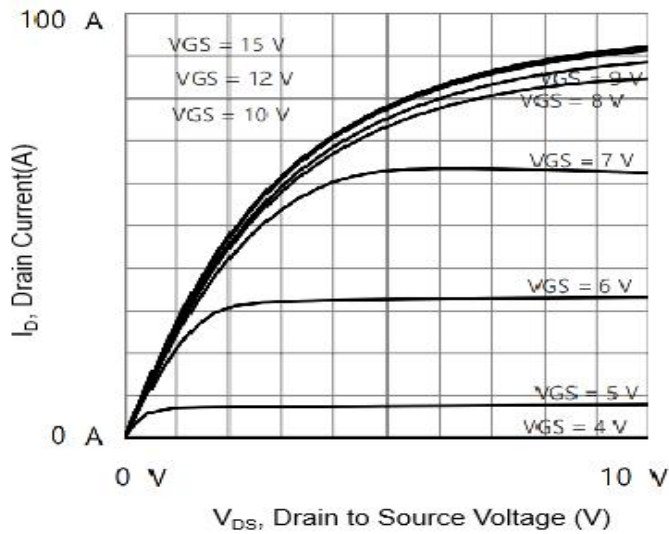
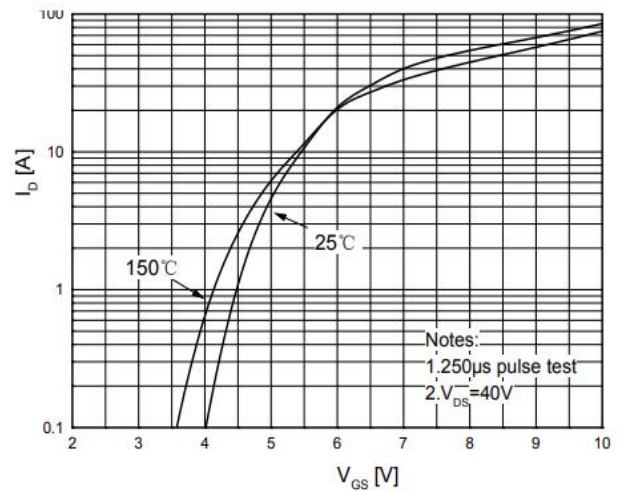
Fig1. Output characteristics $T_J = 25^\circ\text{C}$ 

Fig2. Transfer Characteristics

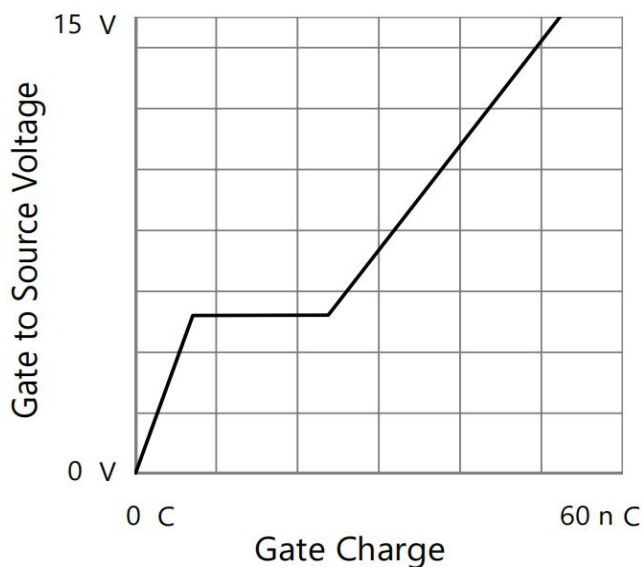


Fig3. Gate charge characteristics

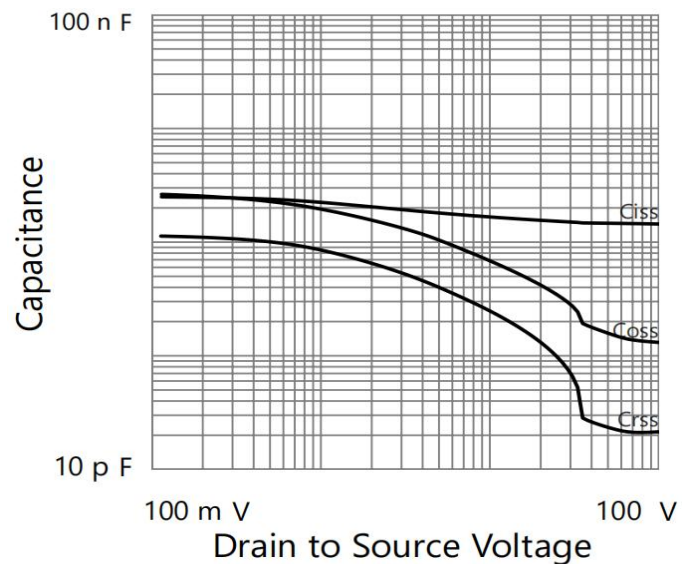
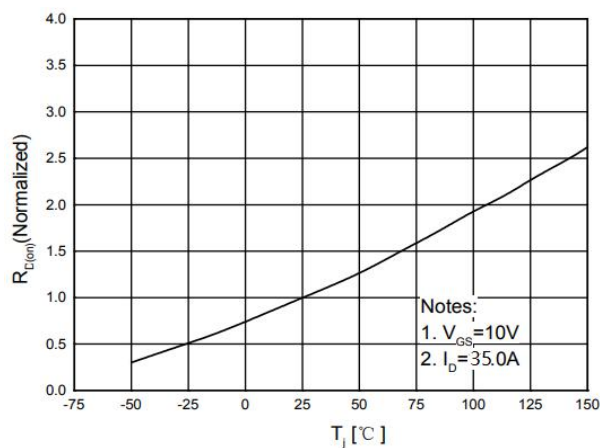
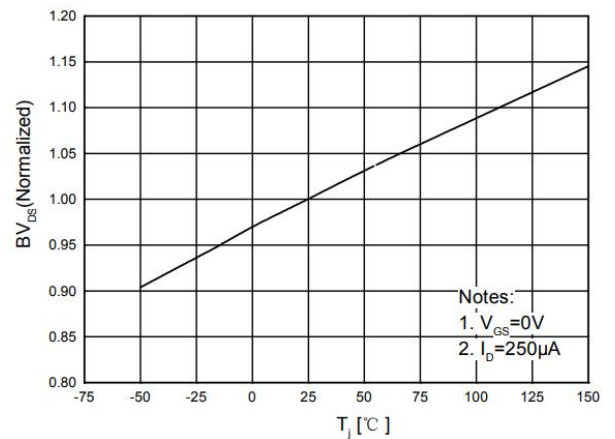


Fig4. Capacitance Characteristics

Fig5. $R_{DS(ON)}$ vs junction temperatureFig6. BV_{DS} vs junction temperature

特征曲线 ELECTRICAL CHARACTERISTICS

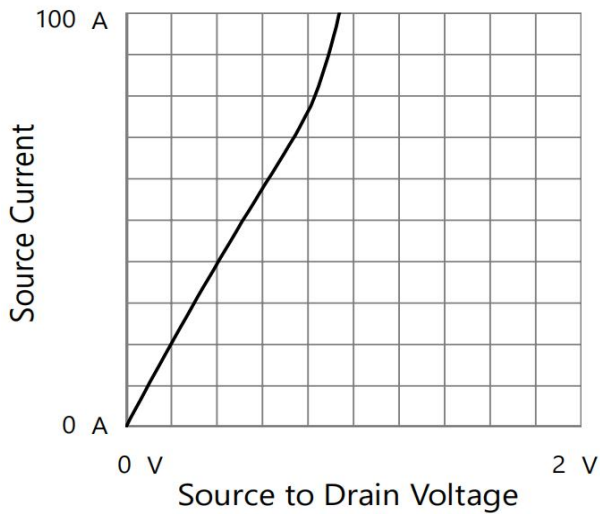


Fig 7 . Forward characteristics of reverse diode

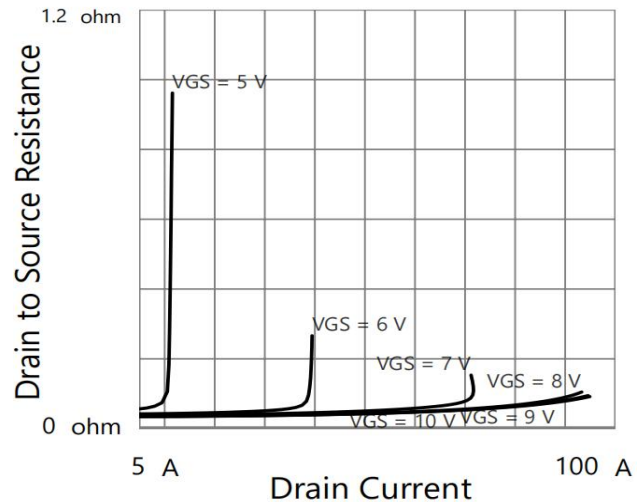
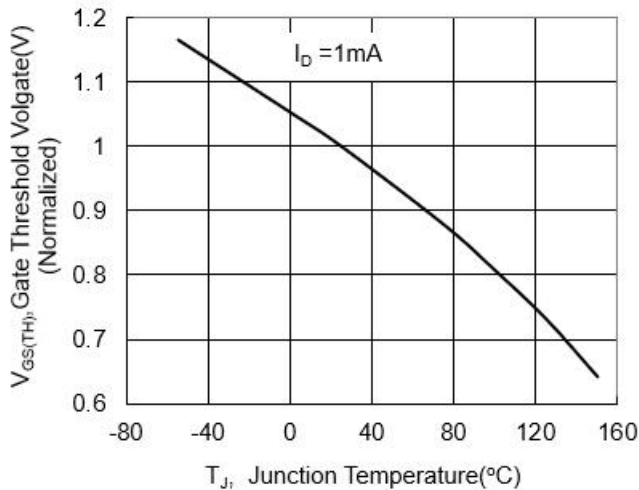
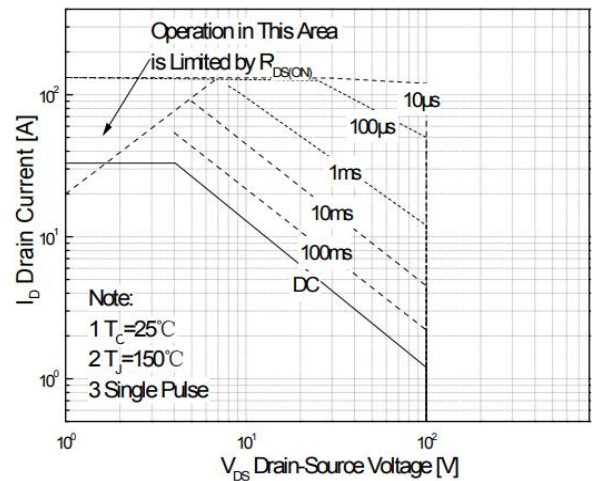
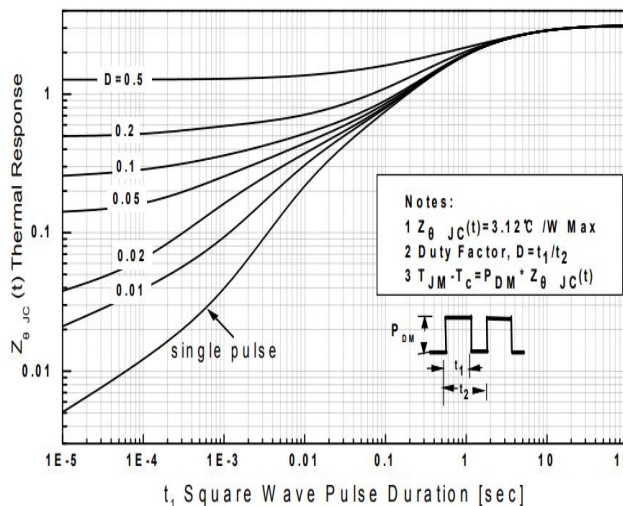
Fig 8. Drain-source on-state resistance
 $T_J = 25^\circ\text{C}$ Fig 9 . $V_{GS(TH)}$ vs junction temperatureFig 10. Safe operating area $T_C = 25^\circ\text{C}$ 

Fig 11. Transient thermal impedance (TO-220F)

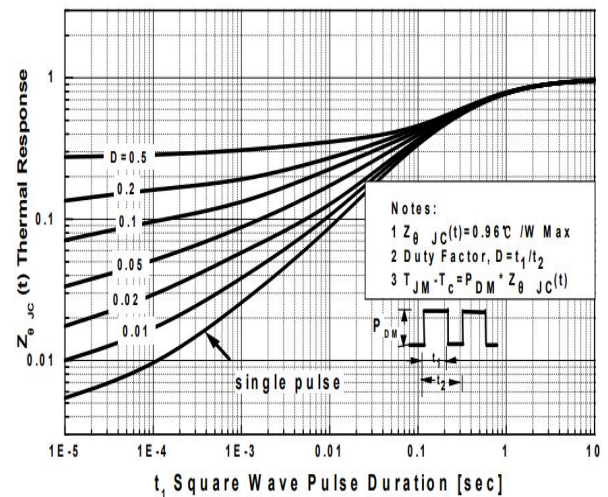
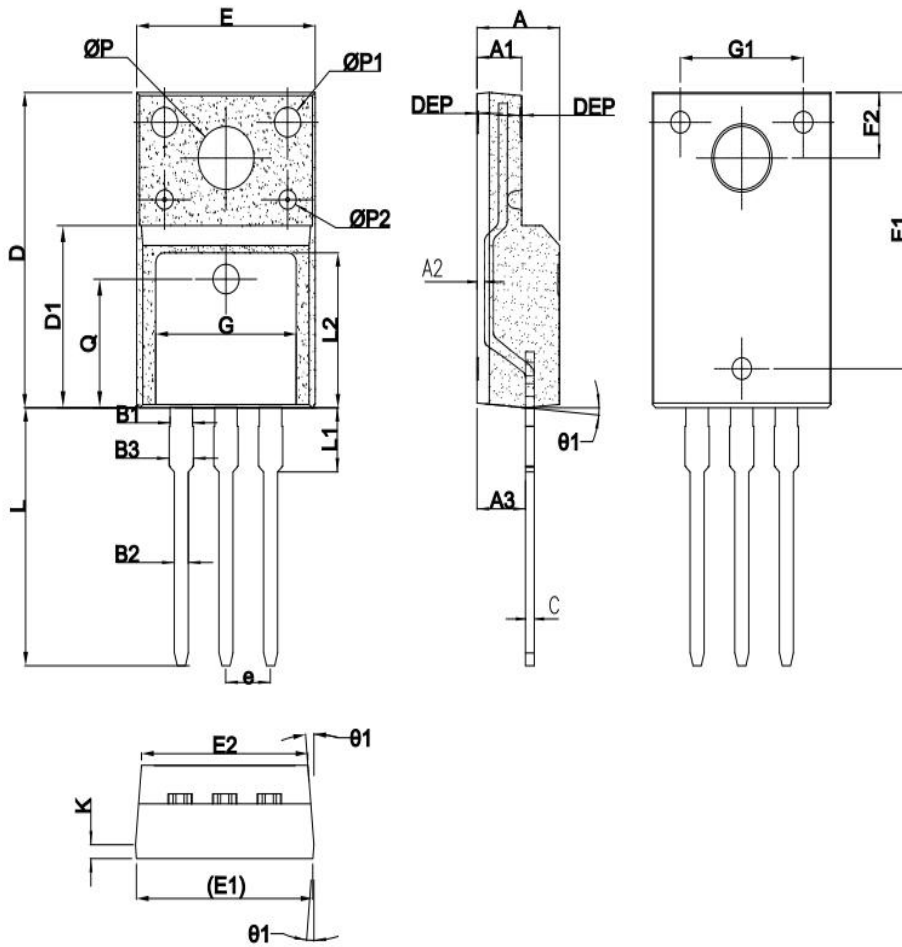


Fig 12. Transient thermal impedance (TO-220)

外形尺寸 PACKAGE MECHANICAL DATA

TO-220F

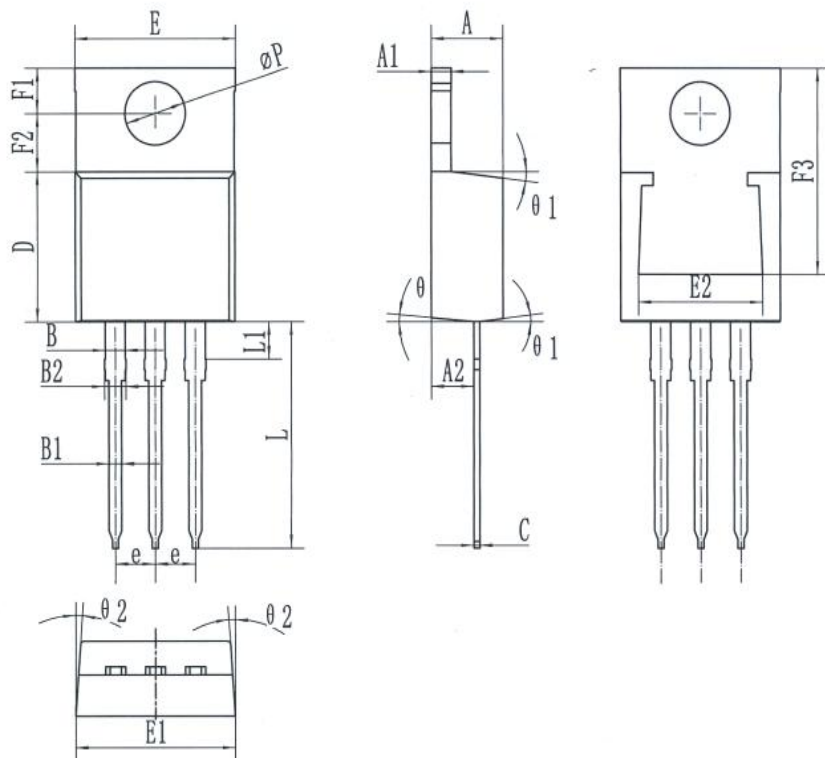


COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
*A	4.50	4.70	4.90
*A1	2.34	2.54	2.74
*A2	0.38	0.43	0.48
*A3	2.66	2.76	2.86
B1	1.23	1.28	1.33
*B2	0.75	0.80	0.85
*B3	1.28	—	1.43
*C	0.45	0.50	0.60
*D	15.67	15.87	16.07
*D1	9.04	9.12	9.20
*e	2.49	2.54	2.59
*E	10.00	10.16	10.32
E1	9.94	10.04	10.14
E2	9.36	9.46	9.56
F1	13.80	13.90	14.00
*F2	3.20	3.30	3.40
G	7.80	8.00	8.20
G1	6.90	7.00	7.10
K	0.65	0.70	0.75
*L	12.78	12.98	13.18
*L1	3.13	3.23	3.33
L2	7.70	7.80	7.90
Q	6.5REF		
* $\varnothing P$	3.08	—	3.48
$\varnothing P1$	1.40	1.50	1.60
$\varnothing P2$	0.95	1.00	1.05
* $\theta 1$	3°	5°	7°
DEP	0.05	0.10	0.15

带*为检验尺寸

TO-220



COMMON DIMENSIONS

SYMBOL	MM		
	MIN	NOM	MAX
A	4.47	4.57	4.67
A1	1.22	1.27	1.32
A2	2.57	2.67	2.77
B	1.22	1.27	1.32
B1	0.71	0.81	0.91
B2	1.27	1.37	1.42
C	0.33	0.38	0.43
D	8.80	9.00	9.20
E	10.00	10.20	10.40
E1	9.96	10.16	10.26
E2	7.70	7.90	8.10
e	2.54 BSC		
F1	2.64	2.74	2.84
F2	3.40	3.50	3.60
F3	12.20	12.40	12.60
L	13.36	13.56	13.76
L1	2.03	2.23	2.43
$\varnothing P$	3.75	3.85	3.95
θ	3°	5°	7°
$\theta 1$	5°	7°	9°
$\theta 2$	2°	4°	6°