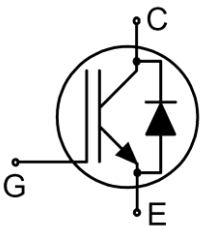
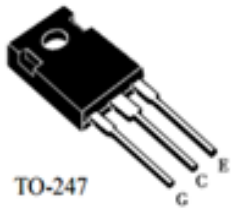
TT030U065FBA

主要参数 MAIN CHARACTERISTICS

I_C	30A
V_{CES}	650V
$V_{cesat-typ}$	1.7V

封装 **Package**





用途 APPLICATIONS

- PFC
- Power factor corrector

产品特性 FEATURES

- 低栅极电荷
- Trench FS 技术,
- RoHS 产品
- 快开关速度
- 低开关损耗
- VCE(sat)正温度系数
- Low gate charge
- Trench FS Technology,
- RoHS product
- Fast switching speed
- Low switching losses
- VCE(sat) with positive temperature coefficient

订货信息 ORDER MESSAGE

订 货 型 号 Order codes	印 记	封 装
无卤-条管 Halogen-Free-Tube	Marking	Package
TT030U065FBA-GE-BR	TT030U065FBA	TO-247

绝对最大额定值 ABSOLUTE RATINGS (Tc=25℃)

项 目 Parameter	符 号 Symbol	数 值 Value	单 位 Unit
最高集电极－发射极直流电压 Collector-Emmiter Voltage	V_{CES}	650	V
*连续集电极电流 Collector Current-continuous	I_C	60(T_C=25°C)	A
		30(T_C=100°C)	A
最大脉冲集电极极电流（注 1） Collector Current – pulse（note 1）	I_{CM}	120	A
*二极管正向测试电流 Diode RMS forward current	I_F	30 (T_C=25°C)	A
		15 (T_C=100°C)	A
二极管正向不重复峰值电流（浪涌电流） Surge non repetitive forward current tp= 10 ms sinusoidal	I_{FSM}	60	A
最高栅极发射极电压 Gate-Emmiter Voltage	V_{GES}	±20	V
瞬态栅极发射极电压 Transient Gate-emitter voltage (t_p≤10us，D＜0.010)	V_{GES}	±30	V
安全工作区 Turn-off safe area VCE≤650V，Tvj≤175℃，tp=1us	-	120	A
耗散功率 Power Dissipation	P_D T_C=25℃ P_D T_C=100℃	319 159	W
工作结温（注 2） Operating Junction Temperature Range	T_{VJ}	-40～+175	℃
存储温度 Storage Temperature	T_{STG}	-55～+150	℃
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T_L	260	℃

*连续集电极电流由最高结温限制.

*Collector current limited by maximum junction temperature.

For optimum lifetime and reliability, JSMC recommends operating conditions that do not exceed 80% of the maximum ratings stated in this datasheet

注释：

1：脉冲宽度由最高结温限制.

2：过载工况时，允许在最高结温 Tvjop=175℃下运行，最大占空比＜20%（最多持续 60s）

Notes:

1：Pulse width limited by maximum junction temperature.

2：Under overload condition, it is allowed to operate at the maximum junction temperature Tvjop=175 ℃, and the maximum duty ratio is less than 20% (lasting for 60 s at most)

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						
集电极－发射极击穿电压 Collector-Emmiter Voltage	BV_{CES}	I_C=250μA, V_{GE}=0V	650	-	-	V
零栅压下集电极漏电流 Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=650V, V_{GE}=0V,Tvj=25℃	-	-	50	uA
正向栅极体漏电流 Gate-body leakage current, forward	I_{GESF}	V_{CE}=0V, V_{GE} =20V,Tvj=25℃	-	-	200	nA
反向栅极体漏电流 Gate-body leakage current, reverse	I_{GESR}	V_{CE}=0V, V_{GE} =-20V,Tvj=25℃	-	-	-200	nA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	$V_{GE(th)}$	V_{CE} = V_{GE}, I_C=0.3mA	3.5	4.5	5.5	V
饱和压降 Collector-Emmiter saturation Voltage	V_{CESAT}	V_{GE}=15V,　I_C=30A Tvj=25℃ Tvj=150℃	 - -	 1.7 2.1	 2.1 -	V
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{ies}	V_{CE}=25V V_{GE}=0V f=1.0MHz	-	955	-	pF
输出电容 Output capacitance	C_{oes}		-	107	-	pF
反向传输电容 Reverse transfer capacitance	C_{res}		-	33	-	pF
栅极电荷总量 Total Gate Charge	Qg	V_{CC}=520V,I_c=30A,V_{GE}=15V	-	62	-	nC
栅极-反射极 Gate to emitter charge	Qge		-	9.5	-	
栅极-集电极 Gate to collector charge	Qgc		-	33	-	

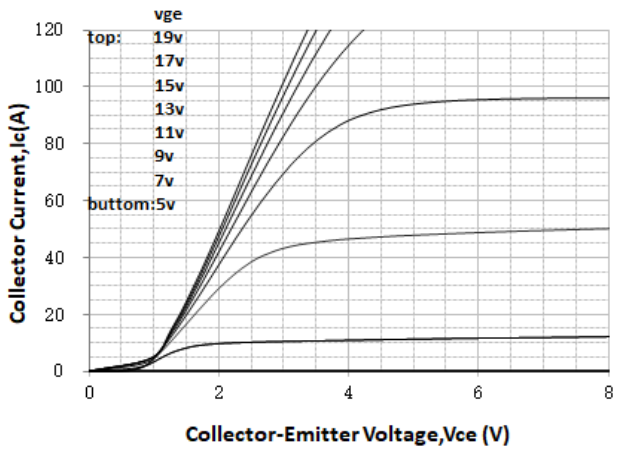
电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching 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
开启延迟时间 Turn-On delay time	t_d(on)	V_{CC}=400V,I_C=30A,R_G=10Ω V_{GE}=15 V Tvj=25℃	-	10	-	ns
上升时间 Turn-On rise time	t_r		-	44	-	ns
关断延迟时间 Turn-Off delay time	t_d(off)		-	90	-	ns
下降时间 Turn-Off Fall time	t_f		-	70	-	ns
开通损耗 Turn-On energy	Eon		-	0.45	-	mJ
关断损耗 Turn-off energy	Eoff		-	0.55	-	mJ
总开关损耗 Total switching energy	Etot		-	1.0	-	mJ
开启延迟时间 Turn-On delay time	t_d(on)	V_{CC}=400V,I_C=30A,R_G=10Ω V_{GE}=15 V Tvj =150℃	-	10	-	ns
上升时间 Turn-On rise time	t_r		-	44	-	ns
关断延迟时间 Turn-Off delay time	t_d(off)		-	114	-	ns
下降时间 Turn-Off Fall time	t_f		-	130	-	ns
开通损耗 Turn-On energy	Eon		-	0.52	-	mJ
关断损耗 Turn-off energy	Eoff		-	0.79	-	mJ
总开关损耗 Total switching energy	Etot		-	1.31	-	mJ
反并联二极管特性及最大额定值 Anti-Parallel Diode Characteristics and Maximum Ratings						
正向压降 Diode Forward Voltage	V_F	I_F=15A，Tvj =25℃	-	1.8	2.2	V
反向恢复时间 Reverse recovery time	trr	VGE=0V, VR=400V , IF=15A dIF/dt=200A/μs Tvj =25℃	-	213	-	ns
反向恢复电荷 Diode Reverse recovery charge	Qrr		-	312	-	nC
反向恢复电流 Diode Reverse recovery Current	Irrm		-	2.5	-	A
反向恢复时间 Diode Reverse recovery time	trr	VGE=0V, VR=400V, IF=15A dIF/dt=200A/μs Tvj =150℃	-	285	-	ns
反向恢复电荷 Diode Reverse recovery charge	Qrr		-	1090	-	nC
反向恢复电流 Diode Reverse recovery Current	Irrm		-	5.4	-	A

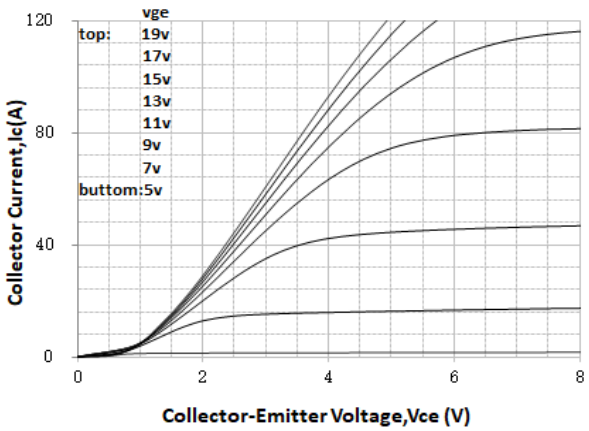
项　　目 Parameter	符　号 Symbol	MAX	单 位 Unit
结到管壳的热阻 Junction to Case IGBT	$R_{th(j-c)}$	0.47	℃/W
结到管壳的热阻 Junction to Case Diode	$R_{th(j-c)}$	2.0	℃/W
结到环境的热阻 Junction to Ambient	$R_{th(j-A)}$	40	℃/W

特征曲线 ELECTRICAL CHARACTERISTICS (curves)

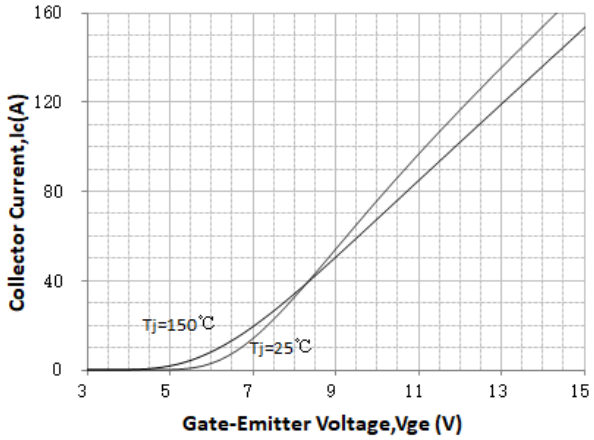
Output Characteristics（25℃）



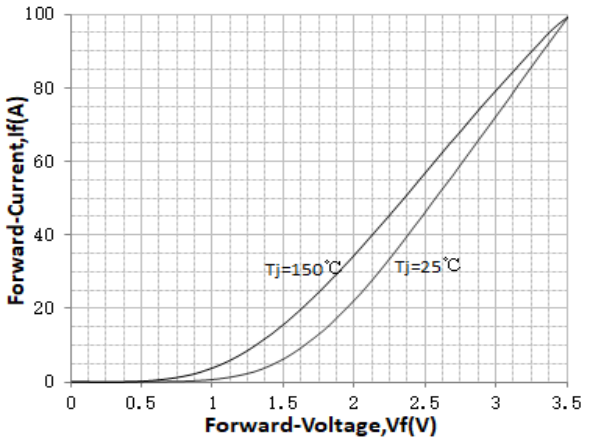
Output Characteristics（150℃）



Transfer Characteristics

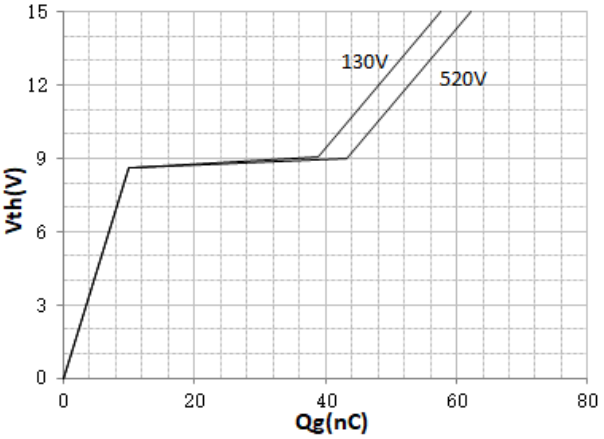


IF vs. VF



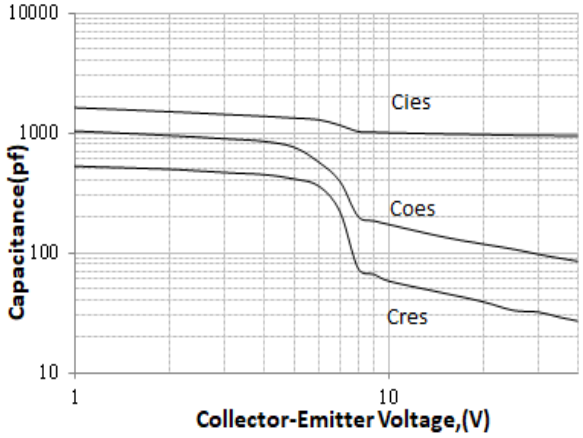
Gate Charge Characteristics

Vge=15V，Ic=30A



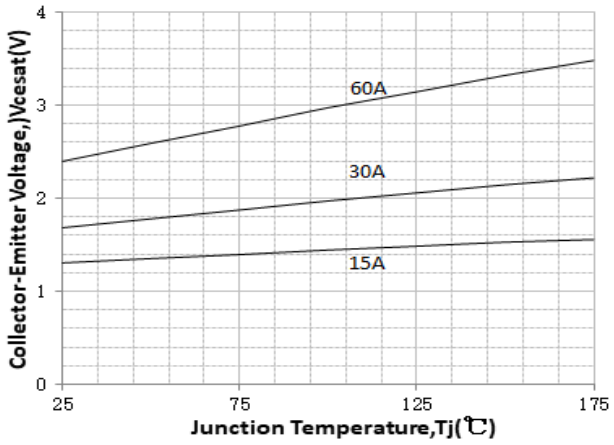
Capacitance Characteristic

Vge =0V，f=1.0MHZ



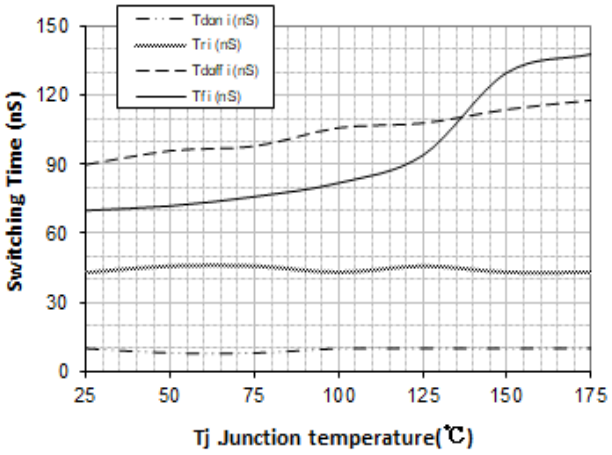
Vcesat vs. Tj

Vge=15V， Ic=15A、30A、60A



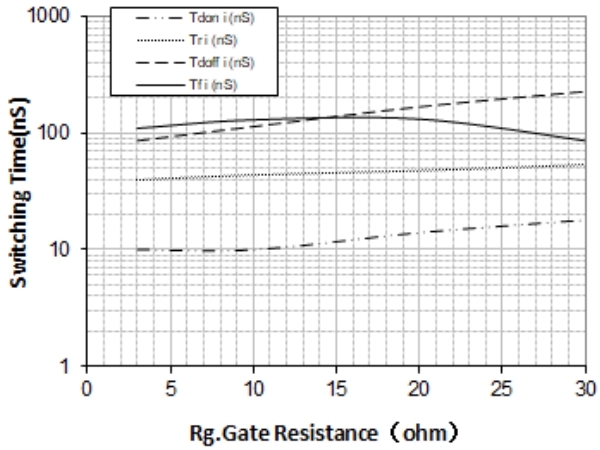
Switching Time vs.Tj

Vge=15V，Vce=400V，Ic=30A，Rg=10Ω



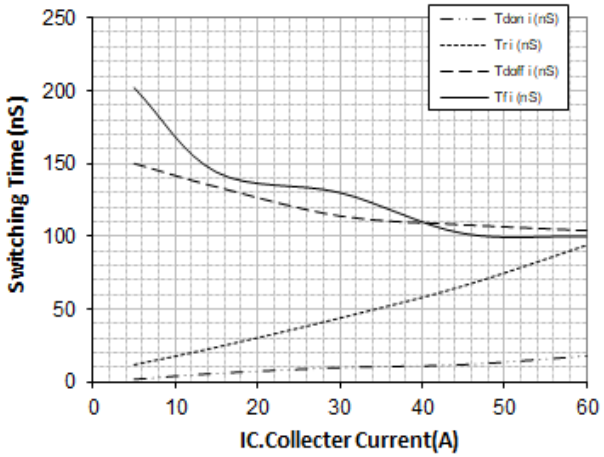
Switching Time vs. Rg(150℃)

Vge=15V，Vce=400V， Ic=30A



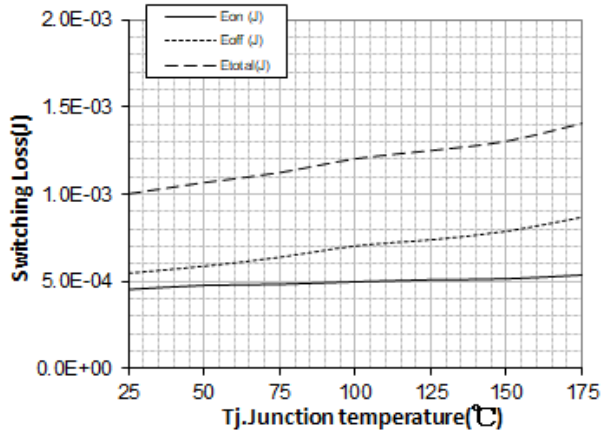
Switching Time vs. Ic(150℃)

Vce=400V，Vge=15V， Rg=10Ω



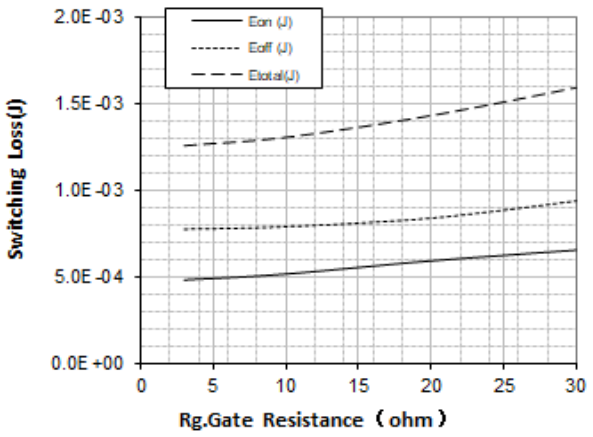
Switching Loss vs. Tj

Vge=15V，Vce=400V，Ic=30A，Rg=10Ω



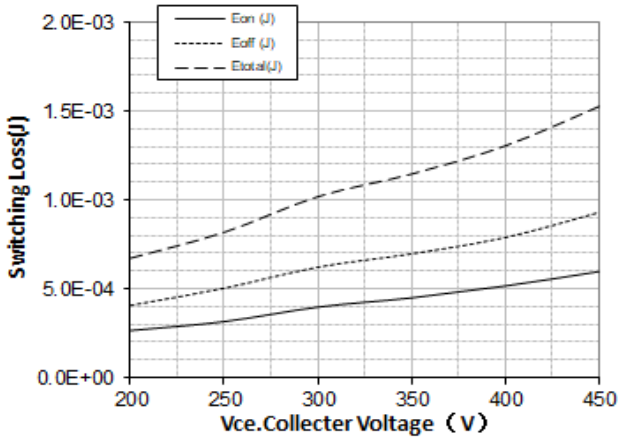
Switching Loss vs. Rg(150℃)

Vge=15V，Vce=400V，Ic=30A

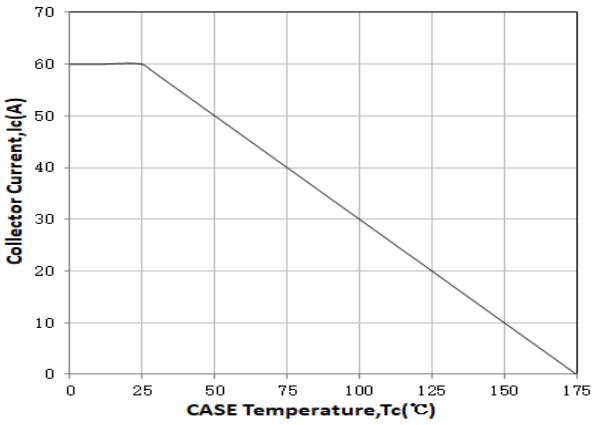


Switching Loss vs. VCE(150℃)

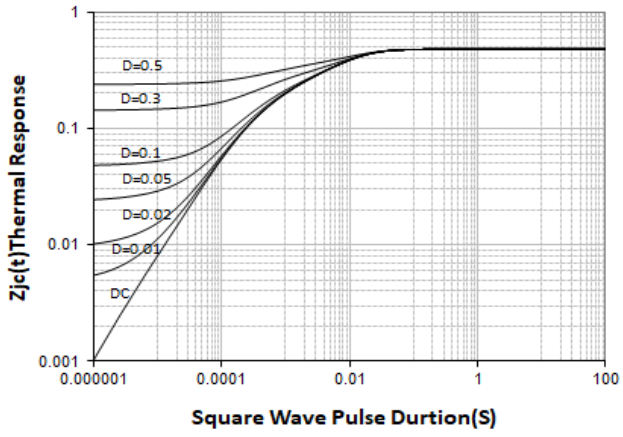
Vge=15V，Ic=30A，Rg=10Ω



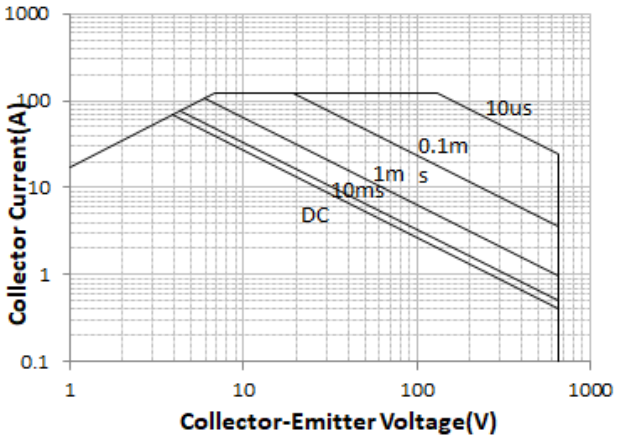
Colletcor current vs.case temperature



Transient Thermal Impedance for IGBT



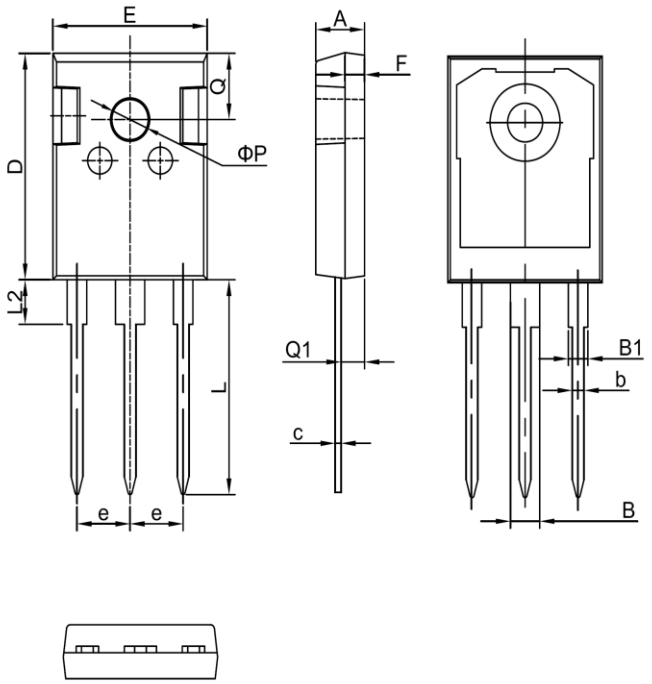
Forward Bias Safe Operating Area



外形尺寸 **PACKAGE MECHANICAL DATA**

TO-247

单位 Unit：mm

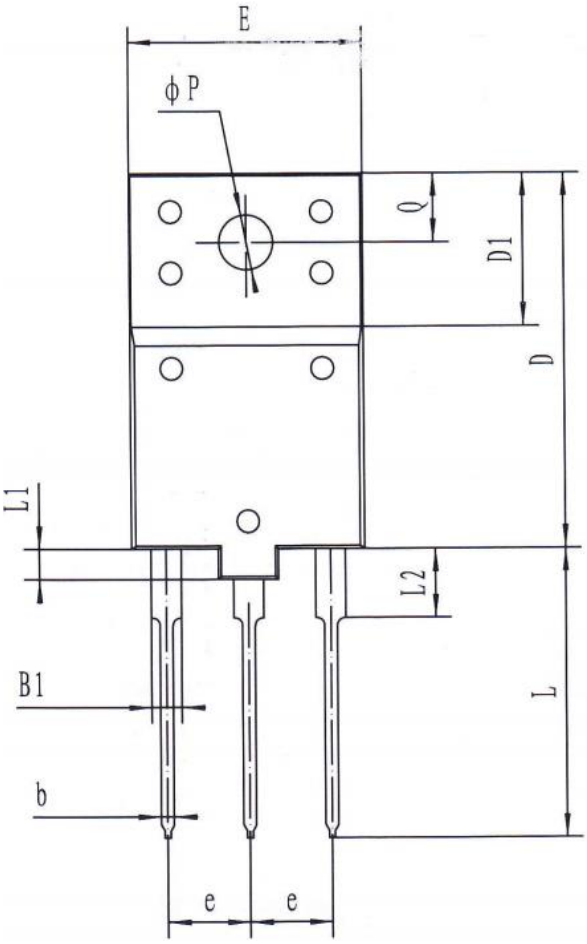


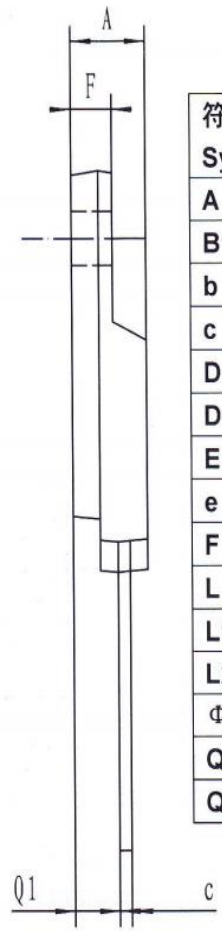
符号 symbol	MIN	MAX
A	4.90	5.10
B	2.95	3.35
B1	1.95	2.35
b	1.15	1.35
c	0.50	0.70
D	20.90	21.10
E	15.70	15.90
e	5.34	5.54
F	1.90	2.10
L	19.40	20.40
L2	4.03	4.23
Q	6.00	6.40
Q1	2.30	2.50
P	3.50	3.70

外形尺寸 PACKAGE MECHANICAL DATA

TO-3PH

单位 Unit：mm





符 号 Symbol	Min	Max
A	5.2	5.8
B1	1.8	2.2
b	0.75	1.05
c	0.8	1.1
D	24.0	25.0
D1	9.8	10.2
E	15.0	16.0
e	5.45（typ）	
F	2.7	3.3
L	18.5	19.5
L1	1.8	2.2
L2	4.3	4.7
ΦP	3.4	3.8
Q	4.3	4.7
Q1	3.1	3.5

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3. Please do not exceed the absolute maximum ratings of the device when circuit designing.
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联系方式

吉林华微电子股份有限公司

公司地址：吉林省吉林市深圳街 99 号

邮编：132013

总机：86-432-64678411

传真：86-432-64665812

网址：www.hwdz.com.cn

CONTACT

JILIN SINO-MICROELECTRONICS CO., LTD.

ADD: No.99 Shenzhen Street, Jilin City, Jilin Province, China.

Post Code: 132013

Tel： 86-432-64678411

Fax：86-432-64665812

Web Site：www.hwdz.com.cn