



TT100U065FQ

主要参数 MAIN CHARACTERISTICS

I _c	100A
V _{CE}	650V
V _{CEsat-typ}	1.7V

用途

- UPS
- 储能
- 光伏

APPLICATIONS

- Uninterruptible power supply
- Energy storage
- Photovoltaic

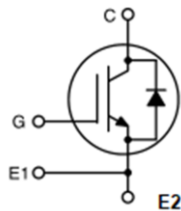
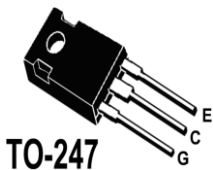
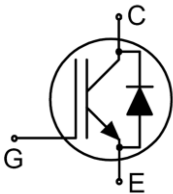
产品特性

- 低栅极电荷
- Trench FS 技术
- RoHS 产品
- 快开关速度
- 低开关损耗

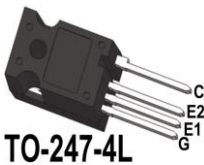
FEATURES

- Low gate charge
- Trench FS technology
- RoHS product
- Fast switching speed
- Low switching losses

封装 Package



E1: Kelvin Emitter
E2: Power Emitter



订货信息 ORDER MESSAGE

订货型号 Order codes	印 记 Marking	封 装 Package
无卤-条管 Halogen-Free-Tube		
TT100U065FQ-GE-BR	TT100U065FQ	TO-247
TT100U065FQ-GH-BR	TT100U065FQ	TO-247-4L



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
最高集电极—发射极直流电压 Collector-emitter voltage	V_{CE}	650	V
*连续集电极电流 Collector current-continuous	I_C	150($T_C=25^{\circ}\text{C}$)	A
		100($T_C=100^{\circ}\text{C}$)	A
最大脉冲集电极极电流 (注 1) Collector current – pulse (note 1)	I_{CM}	300	A
*二极管正向测试电流 Diode RMS forward current	I_F	100 ($T_C=25^{\circ}\text{C}$)	A
		100($T_C=100^{\circ}\text{C}$)	A
二极管正向不重复峰值电流 (浪涌电流) Surge non repetitive forward current $t_p=10\text{ ms}$ sinusoidal	I_{FSM}	300	A
最高栅极发射极电压 Gate-emitter voltage	V_{GE}	± 20	V
瞬态栅极发射极电压 Transient gate-emitter voltage ($t_p \leq 10\mu\text{s}$, $D < 0.010$)	V_{GE}	± 30	V
安全工作区 Turn-off safe area $V_{CE} \leq 650\text{V}$, $T_{vj} \leq 175^{\circ}\text{C}$, $t_p=1\mu\text{s}$	-	300	A
耗散功率 Power dissipation	P_D $T_C=25^{\circ}\text{C}$	454	W
	P_D $T_C=100^{\circ}\text{C}$	227	
工作结温 (注 2) Operating junction temperature range	T_{vj}	$-40 \sim +175$	$^{\circ}\text{C}$
存储温度 Storage temperature	T_{STG}	$-55 \sim +150$	$^{\circ}\text{C}$
引线最高焊接温度 Maximum lead temperature for soldering purposes	T_L	260	$^{\circ}\text{C}$

*连续集电极电流由最高结温限制。

*Collector current limited by maximum junction temperature.,and $T_C=25^{\circ}\text{C}$ limited by bondwire.

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

注释:

Notes:

1: 脉冲宽度由最高结温限制。

1: Pulse width limited by maximum junction temperature.

2: 过载工况时, 允许在最高结温 $T_{vjop}=175^{\circ}\text{C}$ 下运行, 最大占空比 $<20\%$ (最多持续 60s)2: Under overload condition, it is allowed to operate at the maximum junction temperature $T_{vjop}=175^{\circ}\text{C}$, 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-emitter voltage	BV_{CES}	$I_C=1mA, V_{GE}=0V$	650	-	-	V
零栅压下集电极漏电流 Zero gate voltage collector current	I_{CES}	$V_{CE}=650V, V_{GE}=0V, T_{vj}=25^{\circ}C$	-	-	100	μA
正向栅极体漏电流 Gate-body leakage current,forward	I_{GESF}	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$	-	-	200	nA
反向栅极体漏电流 Gate-body leakage current,reverse	I_{GESR}	$V_{CE}=0V, V_{GE}=-20V, T_{vj}=25^{\circ}C$	-	-	-200	nA
通态特性 On-Characteristics						
阈值电压 Gate threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C=1.0mA$	4.0		6.5	V
饱和压降 Collector-emitter saturation voltage	V_{CESAT}	$V_{GE}=15V, I_C=100A$ $T_{vj}=25^{\circ}C$ $T_{vj}=150^{\circ}C$	- -	1.7 2.2	2.1 -	V
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{ies}	$V_{CE}=25V$ $V_{GE}=0V$ $f=1.0MHz$	-	5886	-	pF
输出电容 Output capacitance	C_{oes}		-	419	-	pF
反向传输电容 Reverse transfer capacitance	C_{res}		-	88	-	pF
栅极电荷总量 Total gate charge	Q_g	$V_{CC}=520V, I_c=100A, V_{GE}=15V$	-	320	-	nC
栅极-发射极 Gate to emitter charge	Q_{ge}		-	60	-	
栅极-集电极 Gate to collector charge	Q_{gc}		-	173	-	





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	$t_{d(on)}$	$V_{CC}=400V, I_c=100A, R_G=10\Omega$ $V_{GE}=15V$ $T_{vj}=25^\circ C$	-	60	-	ns
上升时间 Turn-on rise time	t_r		-	166	-	ns
关断延迟时间 Turn-off delay time	$t_{d(off)}$		-	290	-	ns
下降时间 Turn-off fall time	t_f		-	90	-	ns
开通损耗 Turn-on energy	E_{on}		-	5.0	-	mJ
关断损耗 Turn-off energy	E_{off}		-	2.6	-	mJ
总开关损耗 Total switching energy	E_{tot}		-	7.6	-	mJ
开启延迟时间 Turn-on delay time	$t_{d(on)}$	$V_{CC}=400V, I_c=100A, R_G=10\Omega$ $V_{GE}=15V$ $T_{vj}=150^\circ C$	-	58	-	ns
上升时间 Turn-on rise time	t_r		-	166	-	ns
关断延迟时间 Turn-off delay time	$t_{d(off)}$		-	316	-	ns
下降时间 Turn-off fall time	t_f		-	108	-	ns
开通损耗 Turn-on energy	E_{on}		-	5.3	-	mJ
关断损耗 Turn-off energy	E_{off}		-	3.0	-	mJ
总开关损耗 Total switching energy	E_{tot}		-	8.3	-	mJ

反并联二极管特性及最大额定值 Anti-Parallel Diode Characteristics and Maximum Ratings

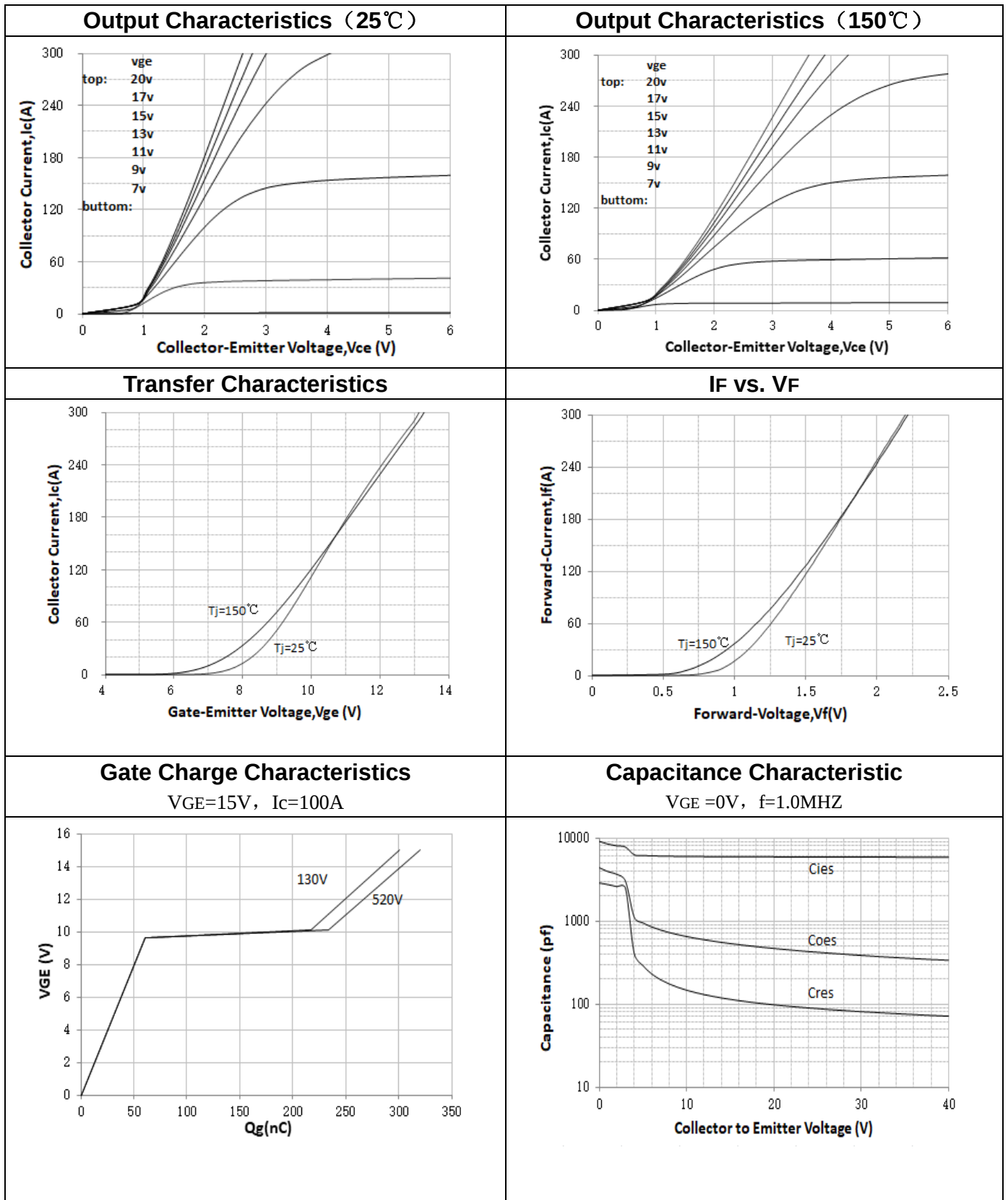
正向压降 Diode forward voltage	V_F	$I_F=100A, T_{vj}=25^\circ C$ $T_{vj}=150^\circ C$	-	1.55 1.5	2.0 -	V
反向恢复时间 Reverse recovery time	t_{rr}	$V_R=400V, I_F=80A$ $dI_F/dt=200A/\mu s$ $T_{vj}=25^\circ C$	-	88	-	ns
反向恢复电荷 Diode reverse recovery charge	Q_{rr}		-	454	-	nC
反向恢复电流 Diode reverse recovery current	I_{rrm}		-	9.8	-	A
反向恢复时间 Diode reverse recovery time	t_{rr}	$V_R=400V, I_F=80A$ $dI_F/dt=200A/\mu s$ $T_{vj}=150^\circ C$	-	189	-	ns
反向恢复电荷 Diode reverse recovery charge	Q_{rr}		-	1.5	-	uC
反向恢复电流 Diode reverse recovery current	I_{rrm}		-	15.6	-	A

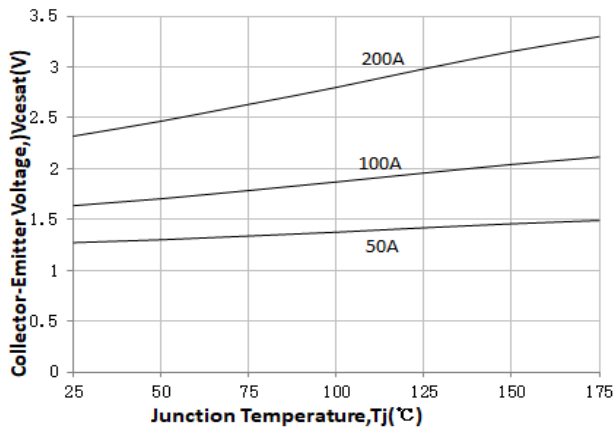
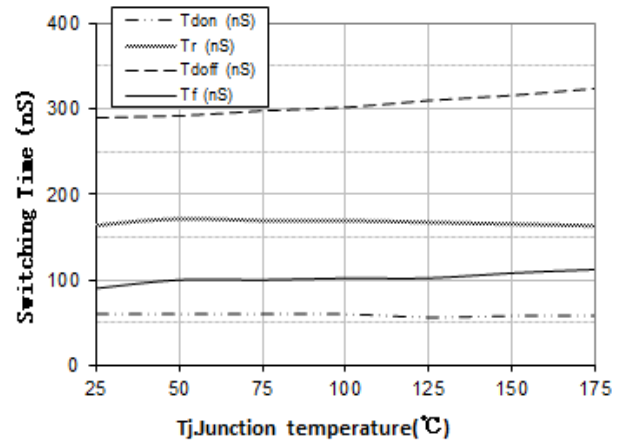
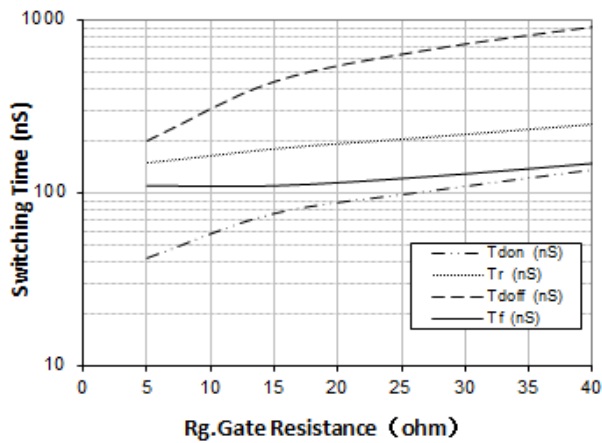
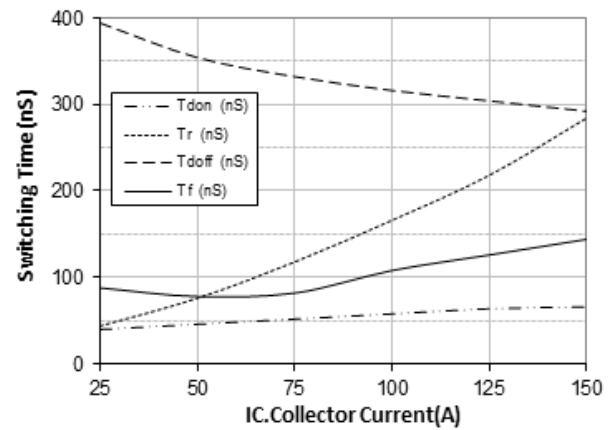
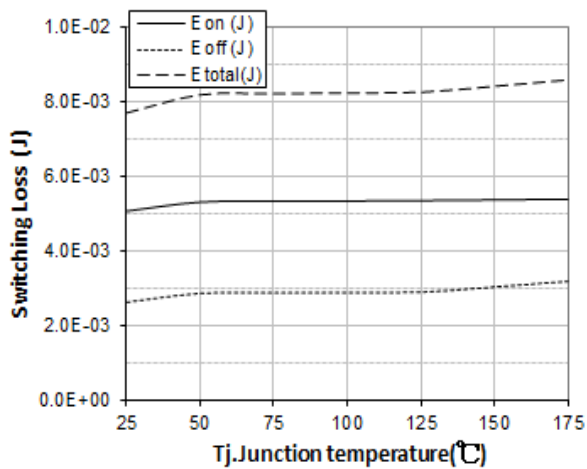
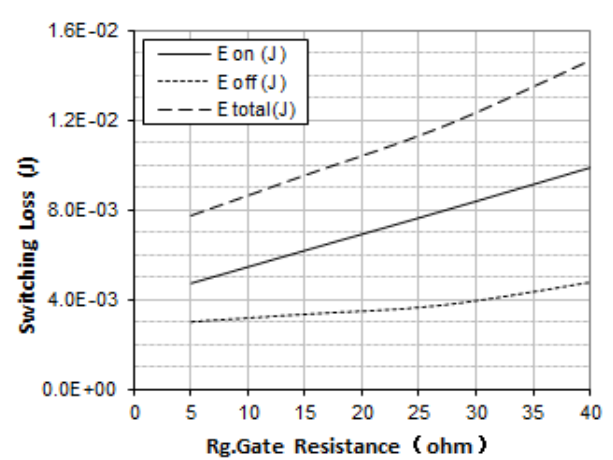
项 目 Parameter	符 号 Symbol	MAX	单 位 Unit
结到管壳的热阻 Junction to case IGBT	$R_{th(j-c)}$	0.33	$^\circ C/W$
结到管壳的热阻 Junction to case Diode	$R_{th(j-c)}$	0.5	$^\circ C/W$
结到环境的热阻 Junction to ambient	$R_{th(j-a)}$	40	$^\circ C/W$

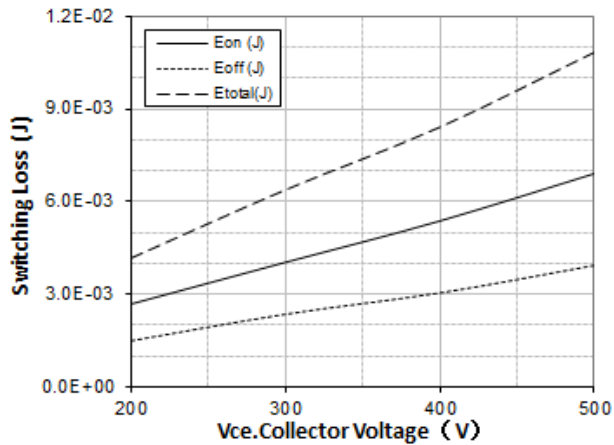
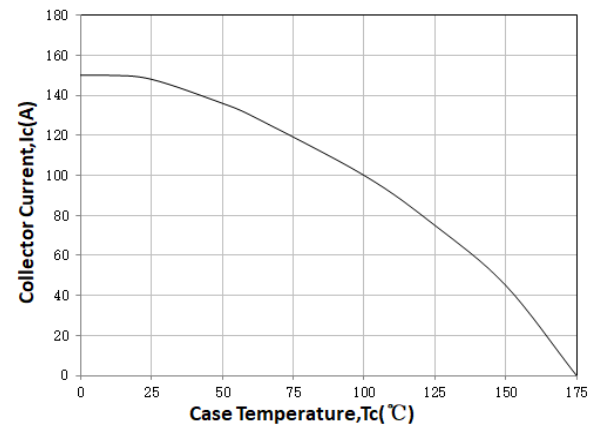
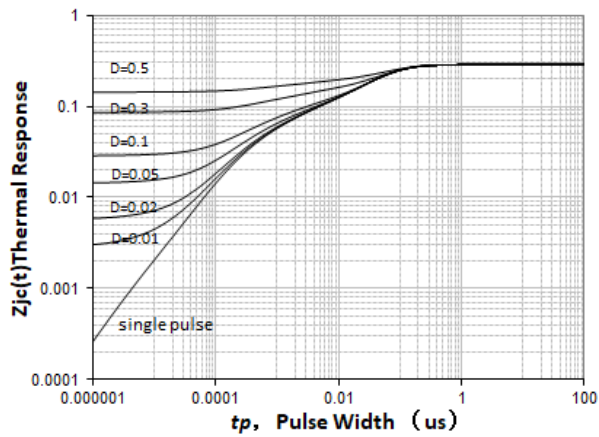
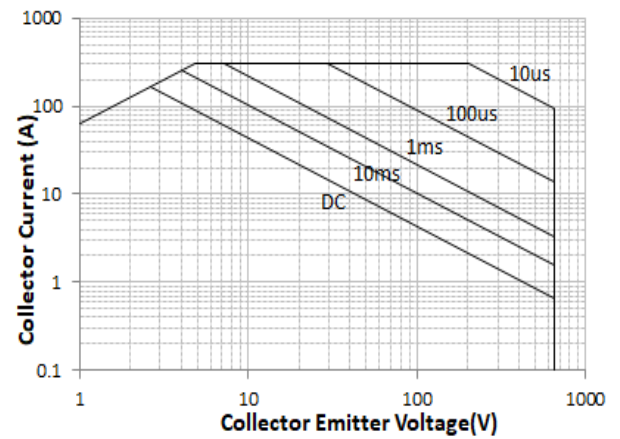




特征曲线 ELECTRICAL CHARACTERISTICS (curves)



**V_{CE}SAT vs. T_j**V_{GE}=15V, I_C=50A、100A、200A**Switching Time vs. T_j**V_{GE}=15V, V_{CE}=400V, I_C=100A, R_G=10Ω**Switching Time vs. R_G(150°C)**V_{GE}=15V, V_{CE}=400V, I_C=100A**Switching Time vs. I_C(150°C)**V_{CE}=400V, V_{GE}=15V, R_G=10Ω**Switching Loss vs. T_j**V_{GE}=15V, V_{CE}=400V, I_C=100A, R_G=10Ω**Switching Loss vs. R_G(150°C)**V_{GE}=15V, V_{CE}=400V, I_C=100A

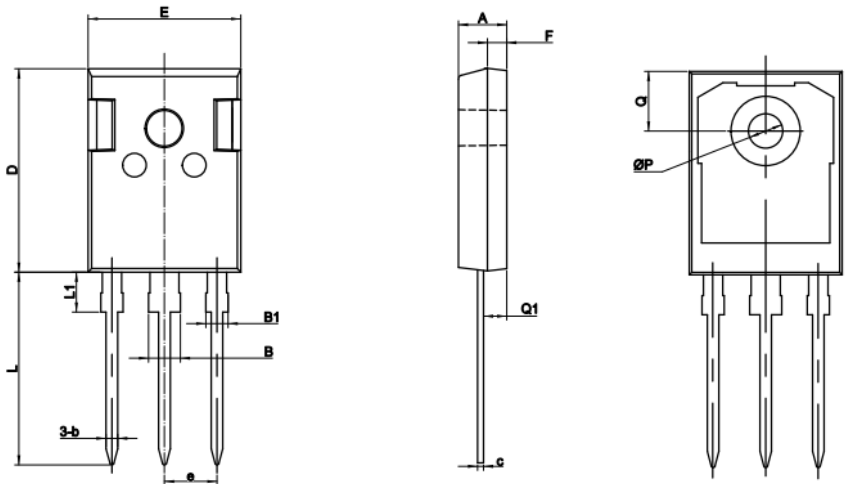
**Switching Loss vs. $V_{CE}(150^{\circ}\text{C})$** $V_{GE}=15\text{V}$, $I_C=100\text{A}$, $R_G=10\Omega$ **Collector current vs. Case temperature** $V_{GE} \geq 15\text{V}$, $T_{vj} \leq 175^{\circ}\text{C}$ **Transient Thermal Impedance for IGBT****Forward Bias Safe Operating Area**



外形尺寸 PACKAGE MECHANICAL DATA

TO-247

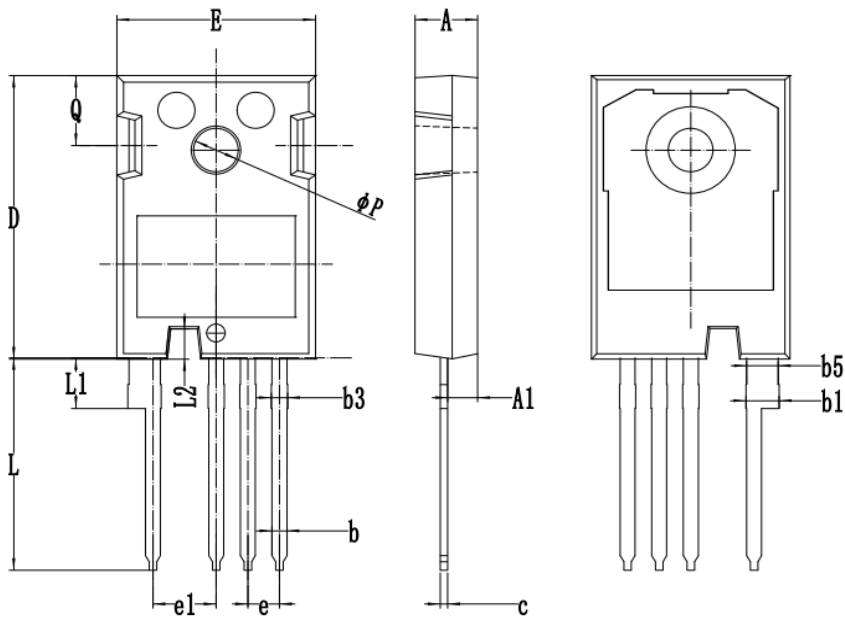
单位 Unit: mm



符号 symbol	mm	
	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
L1	4.03	4.23
Q	6.00	6.40
Q1	2.30	2.50
P	3.50	3.70

TO-247-4L

单位 Unit: mm



SYMBOL	mm	
	MIN	MAX
A	4.73	5.31
A1	2.24	2.59
b	1.02	1.38
b1	2.34	2.99
b3	1.02	1.65
b5	2.34	2.74
c	0.5	0.73
D	23.2	23.7
E	15.65	16.23
e	2.49	2.59
e1	5.03	5.13
L	17.21	17.92
L1	3.87	4.47
L2	2.2	2.75
ΦP	3.41	3.75
Q	5.39	6.1

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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

