



TT050U060EBC

主要参数 MAIN CHARACTERISTICS

I _c	50A
V _{CEs}	600V
V _{cesat-typ} (V _{ge} =15V)	1.75V

用途

- DC-DC 变换器
- PFC
- 车载充电机

产品特性

- 低栅极电荷
- Trench FS 技术,
- RoHS 产品
- 内置 SiC 二极管

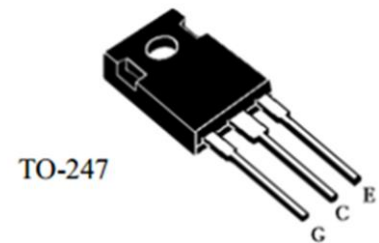
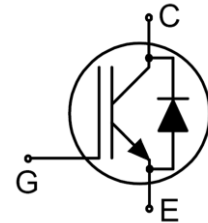
APPLICATIONS

- DC-DC Converters
- Power Factor Correction
- OBC

FEATURES

- Low gate charge
- Trench FS Technology,
- RoHS product
- Built in SiC diode

封装 Package



订货信息 ORDER MESSAGE

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		
TT050U060EBC-GE-B	TT050U060EBC-GE-BR	N/A	N/A	TT050U060EBC	TO-247



绝对最大额定值 ABSOLUTE RATINGS (Tc=25°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-Emmitter Voltage	V_{ces}	600	V
*连续集电极电流 Collector Current-continuous	I_C T=25°C	100	A
	I_C T=100°C	50	A
最大脉冲集电极极电流 (注 1) Collector Current – pulse (note 1)	I_{CM}	200	A
二极管正向测试电流 Diode RMS forward current	I_F T=25°C	50	A
	I_F T=100°C	27	A
二极管正向脉冲电流 Diode pulse current	I_{FSM}	100	A
最高栅极发射极电压 Gate-Emmitter Voltage	V_{GES}	±20	V
最高瞬态栅极发射极电压 Transient Gate-Emmitter Voltage($t_p \leq 10\mu s$)	V_{GES}	±30	V
耗散功率 Power Dissipation	P_D T _C =25°C	454	W
最高结温及存储温度 Operating and Storage Temperature Range	T _J , T _{STG}	-55~+175	°C
引线焊接温度 Soldering Temperature	T _L	260	°C

*连续集电极电流由最高结温限制

*Collector current limited by maximum junction temperature

注释:

1: 脉冲宽度由最高结温限制

Notes:

1: Pulse width 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						
集电极—发射极击穿电压 Collector-Emmitter Voltage	BV_{CES}	$I_C=250\mu A, V_{GE}=0V$	600	-	-	V
零栅压下集电极漏电流 Zero Gate Voltage Collector Current	I_{CES}	$V_{CE}=600V, V_{GE}=0V$	-	-	80	μA
正向栅极体漏电流 Gate-body leakage current, forward	I_{GESF}	$V_{CE}=0V, V_{GE}=20V$	-	-	200	nA
反向栅极体漏电流 Gate-body leakage current, reverse	I_{GESR}	$V_{CE}=0V, V_{GE}=-20V$	-	-	-200	nA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C=250\mu A$	4.0	-	6.0	V
饱和压降 Collector-Emmitter saturation Voltage	V_{CESAT}	$V_{GE}=15V, I_C=50A, T_C=25^\circ C$	-	1.75	2.2	V
		$V_{GE}=15V, I_C=50A, T_C=175^\circ C$	-	2.1	-	V
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{ies}	$V_{CE}=25V,$ $V_{GE}=0V,$ $f=1.0MHz$	-	3510	-	pF
输出电容 Output capacitance	C_{oes}		-	244	-	pF
反向传输电容 Reverse transfer capacitance	C_{res}		-	81	-	pF
栅极电荷总量 Total Gate Charge	Q_g	$V_{CC}=520V, I_C=50A, V_{GE}=15V$ $T_C=25^\circ C$	-	124	-	nC
栅极-反射极 Gate to emitter charge	Q_{ge}		-	35	-	
栅极-集电极 Gate to collector charge	Q_{gc}		-	48	-	

项 目 Parameter	符 号 Symbol	MAX	单 位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case IGBT	$R_{th(j-c)}$	0.33	$^\circ C/W$
结到管壳的热阻 Thermal Resistance, Junction to Case diode	$R_{th(j-c)}$	0.74	$^\circ C/W$
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	40	$^\circ C/W$



电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching Characteristics

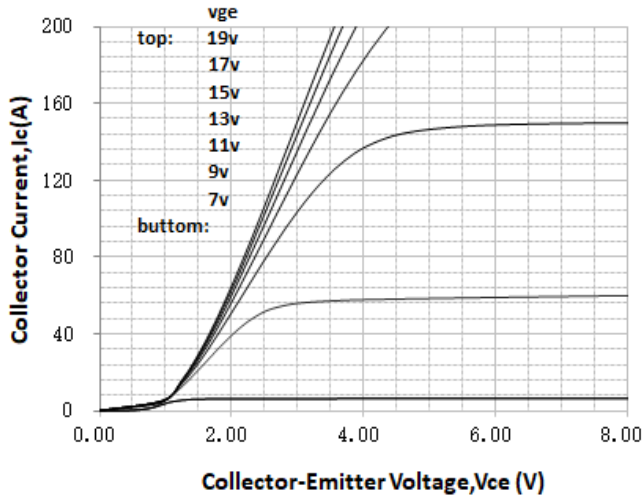
项 目 Parameter	符 号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
开启延迟时间 Turn-On delay time	$t_d(\text{on})$	$V_{CC}=400V, I_c=25A, R_G=12\Omega$ $V_{GE}=15V, T_C=25^\circ\text{C}$	-	32	-	ns
上升时间 Turn-On rise time	t_r		-	44	-	ns
关断延迟时间 Turn-Off delay time	$t_d(\text{off})$		-	144	-	ns
下降时间 Turn-Off Fall time	t_f		-	60	-	ns
开通损耗 Turn-On energy	Eon		-	0.4	-	mJ
关断损耗 Turn-off energy	Eoff		-	0.17	-	mJ
总开关损耗 Total switching energy	Etot		-	0.57	-	mJ
开启延迟时间 Turn-On delay time	$t_d(\text{on})$	$V_{CC}=400V, I_c=6A, R_G=12\Omega$ $V_{GE}=15V, T_C=25^\circ\text{C}$	-	22	-	ns
上升时间 Turn-On rise time	t_r		-	18	-	ns
关断延迟时间 Turn-Off delay time	$t_d(\text{off})$		-	156	-	ns
下降时间 Turn-Off Fall time	t_f		-	94	-	ns
开通损耗 Turn-On energy	Eon		-	0.07	-	mJ
关断损耗 Turn-off energy	Eoff		-	0.06	-	mJ
总开关损耗 Total switching energy	Etot		-	0.13	-	mJ
开启延迟时间 Turn-On delay time	$t_d(\text{on})$	$V_{CC}=400V, I_c=25A, R_G=12\Omega$ $V_{GE}=15V, T_C=150^\circ\text{C}$	-	32	-	ns
上升时间 Turn-On rise time	t_r		-	48	-	ns
关断延迟时间 Turn-Off delay time	$t_d(\text{off})$		-	166	-	ns
下降时间 Turn-Off Fall time	t_f		-	72	-	ns
开通损耗 Turn-On energy	Eon		-	0.41	-	mJ
关断损耗 Turn-off energy	Eoff		-	0.23	-	mJ
总开关损耗 Total switching energy	Etot		-	0.64	-	mJ
开启延迟时间 Turn-On delay time	$t_d(\text{on})$	$V_{CC}=400V, I_c=6A, R_G=12\Omega$ $V_{GE}=15V, T_C=150^\circ\text{C}$	-	22	-	ns
上升时间 Turn-On rise time	t_r		-	16	-	ns
关断延迟时间 Turn-Off delay time	$t_d(\text{off})$		-	190	-	ns
下降时间 Turn-Off Fall time	t_f		-	114	-	ns
开通损耗 Turn-On energy	Eon		-	0.07	-	mJ
关断损耗 Turn-off energy	Eoff		-	0.09	-	mJ
总开关损耗 Total switching energy	Etot		-	0.16	-	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 Drain-Source Diode Forward Voltage	V_F	$V_{GE}=0V, I_F=20A, T_C=25^\circ\text{C}$	-	1.35	1.6	V
		$V_{GE}=0V, I_F=20A, T_C=125^\circ\text{C}$	-	1.45	-	V
		$V_{GE}=0V, I_F=20A, T_C=175^\circ\text{C}$	-	1.6	-	V
反向恢复电荷 Diode Reverse recovery charge	Q_{rr}	$V_{GE}=0V, V_R=400V, I_F=25A$ $dl_F/dt=200A/\mu s$ $T_C=25^\circ\text{C}$	-	0.04	-	nC



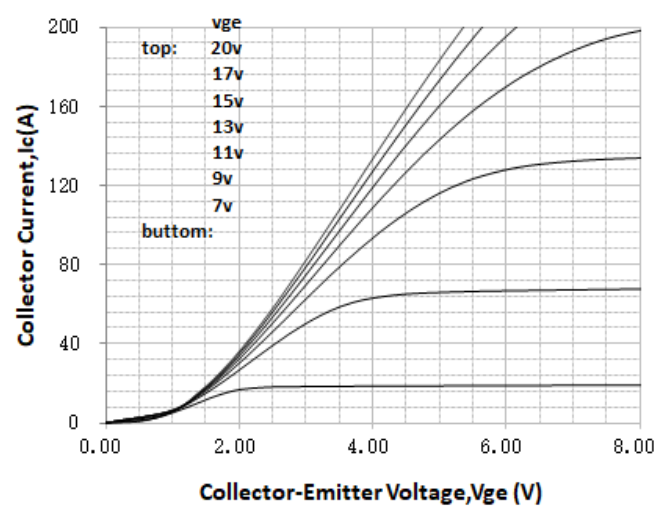


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

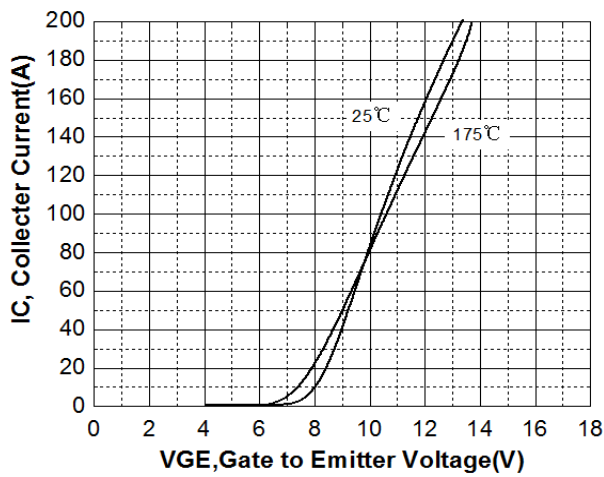
Output Characteristics (25°C)



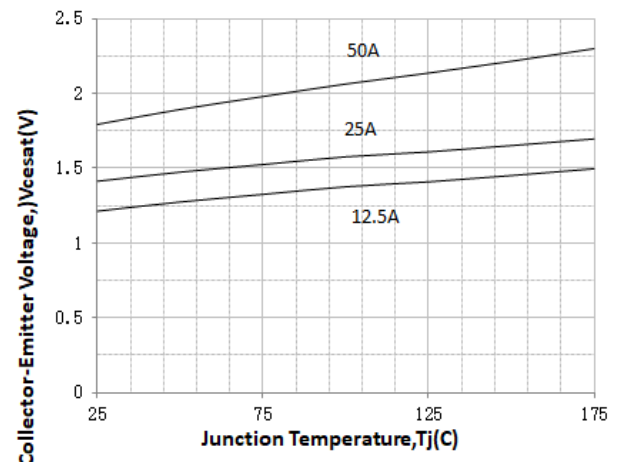
Output Characteristics (175°C)



Transfer Characteristics

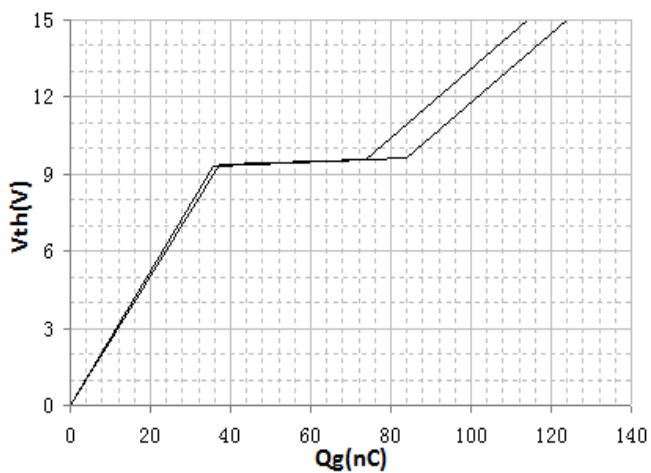


Vcesat vs. Tj

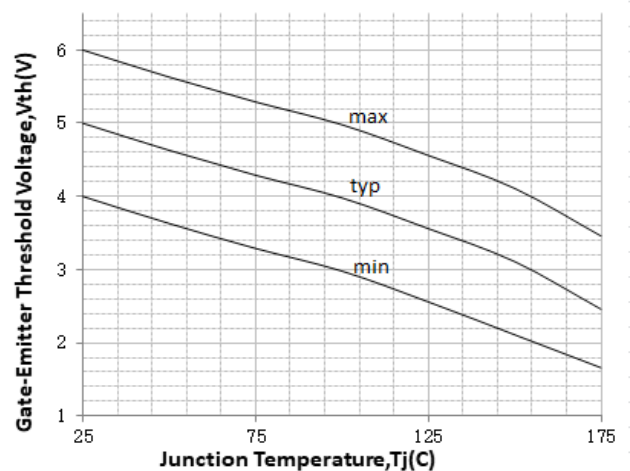


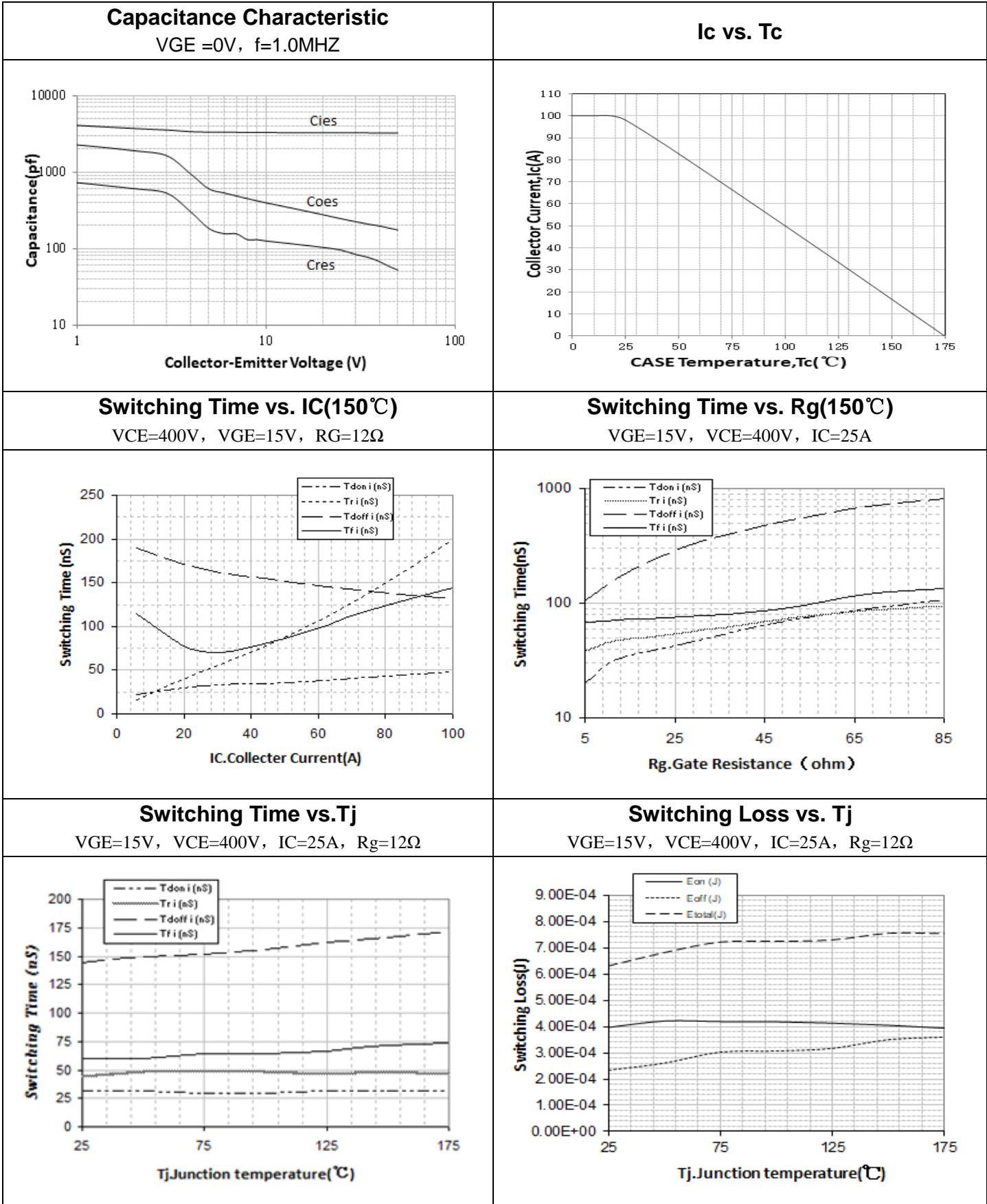
Gate Charge Characteristics

$V_{ge}=15V$, $V_{cc}=520V$, $I_c=50A$



VTH vs. Tj

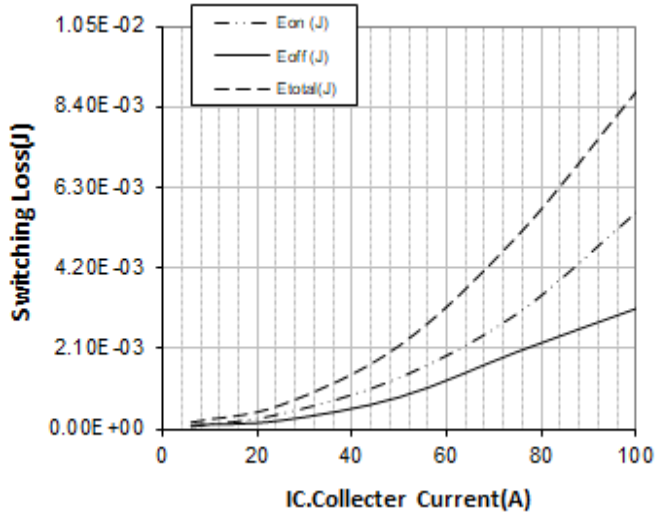






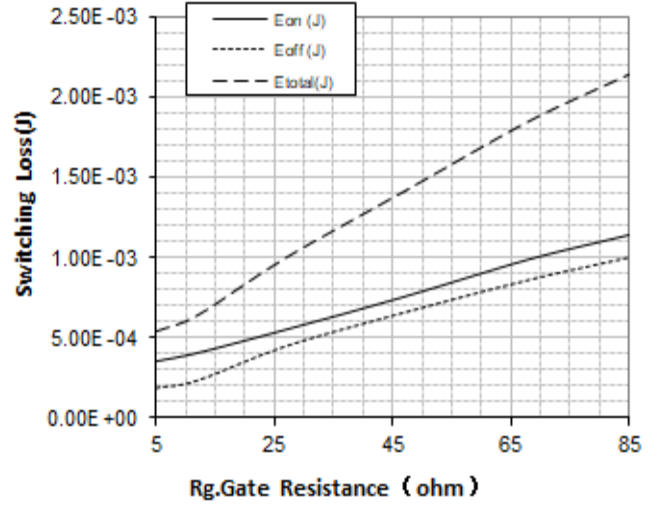
Switching Loss vs. IC(150°C)

VGE=15V, VCE=400V, Rg=12Ω

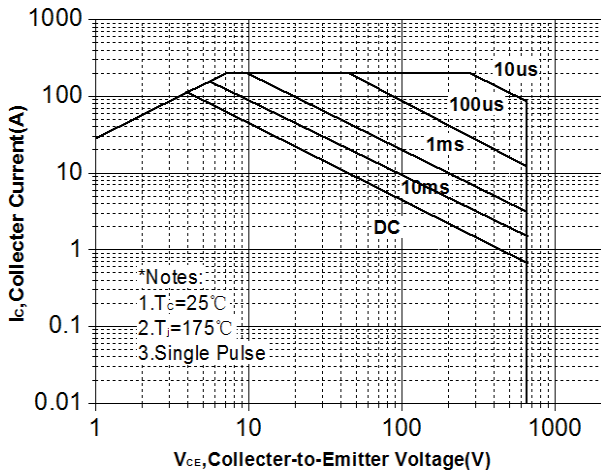


Switching Loss vs. Rg(25°C)

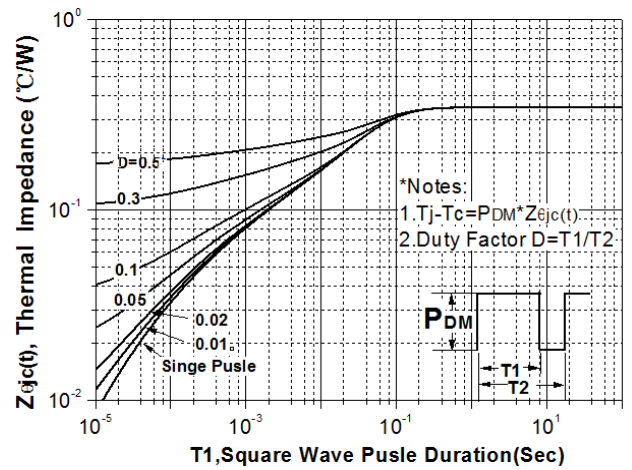
VGE=15V, VCE=400V, IC=25A



Forward Bias SOA



Normalized Maximum Transient Thermal Impedance for IGBT(RJC)

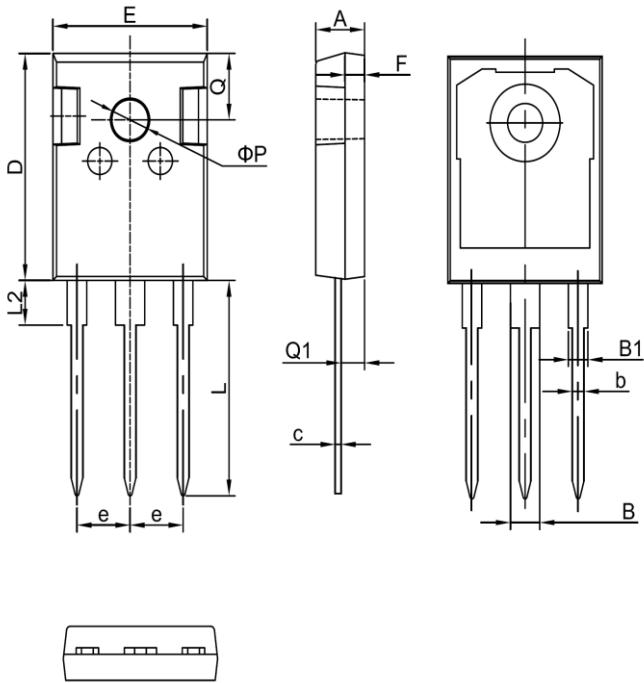




外形尺寸 PACKAGE MECHANICAL DATA

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



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