



ATT060U060EI

主要参数 MAIN CHARACTERISTICS

I _c	60 A
V _{CES}	600V
V _{cesat-typ} (V _{ge} =15V)	1.9V

用途

- PFC
- 车载充电器

APPLICATIONS

- Power Factor Correction
- OBC

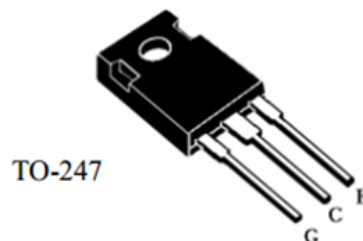
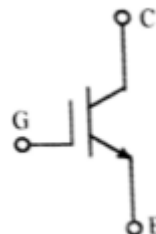
产品特性

- 低栅极电荷
- Trench FS 技术,
- RoHS 产品
- 无内置二极管

FEATURES

- Low gate charge
- Trench FS Technology,
- RoHS product
- No built-in 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		
ATT060U060EI-GE-B	ATT060U060EI-GE-BR	N/A	N/A	ATT060U060EI	TO-247

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-Emmitter Voltage	V_{ces}	600	V
*连续集电极电流 Collector Current-continuous	I_c $T=25^\circ\text{C}$	120	A
	I_c $T=100^\circ\text{C}$	60	A
最大脉冲集电极极电流 (注 1) Collector Current – pulse (note 1)	I_{CM}	200	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($t_p \leq 10\mu\text{s}$)	V_{GES}	± 30	V
安全工作区 Turn-off safe area	-	200	A
耗散功率 Power Dissipation	P_D $T_c=25^\circ\text{C}$	454	W
最高结温及存储温度 Operating and Storage Temperature Range	T_J, T_{STG}	$-55 \sim +175$	$^\circ\text{C}$
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T_L	300	$^\circ\text{C}$

*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}	$V_{CE}=600V, V_{GE}=0V$	-	-	40	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}	$V_{GE}=15V, I_C=60A, T_C=25^\circ C$	-	1.9	2.5	V
		$V_{GE}=15V, I_C=60A, T_C=175^\circ C$	-	2.2	-	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	$V_{CC}=480V, I_C=60A, V_{GE}=15V, T_C=25^\circ C$	-	132	-	nC
栅极-反射极 Gate to emitter charge	Q_{ge}		-	33	-	
栅极-集电极 Gate to collector charge	Q_{gc}		-	55	-	

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

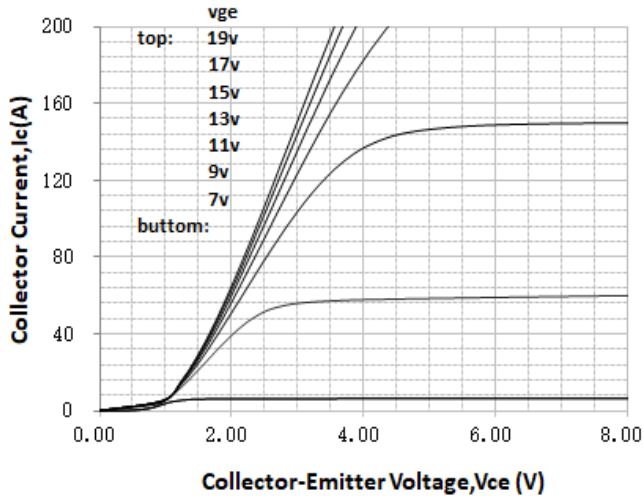
开关特性 Switching Characteristics

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	$t_{d(on)}$	$V_{CC}=400V, I_c=60A, R_G=10\Omega$ $V_{GE}=15V, T_C=25^\circ C$	-	36	-	ns
上升时间 Turn-On rise time	t_r		-	96	-	ns
关断延迟时间 Turn-Off delay time	$t_{d(off)}$		-	101	-	ns
下降时间 Turn-Off Fall time	t_f		-	55	-	ns
开通损耗 Turn-On energy	Eon		-	1.65	-	mJ
关断损耗 Turn-off energy	Eoff		-	1.1	-	mJ
总开关损耗 Total switching energy	Etot		-	2.75	-	mJ
开启延迟时间 Turn-On delay time	$t_{d(on)}$	$V_{CC}=400V, I_c=60A, R_G=10\Omega$ $V_{GE}=15V, T_C=175^\circ C$	-	33	-	ns
上升时间 Turn-On rise time	t_r		-	108	-	ns
关断延迟时间 Turn-Off delay time	$t_{d(off)}$		-	130	-	ns
下降时间 Turn-Off Fall time	t_f		-	105	-	ns
开通损耗 Turn-On energy	Eon		-	1.9	-	mJ
关断损耗 Turn-off energy	Eoff		-	1.5	-	mJ
总开关损耗 Total switching energy	Etot		-	3.4	-	mJ

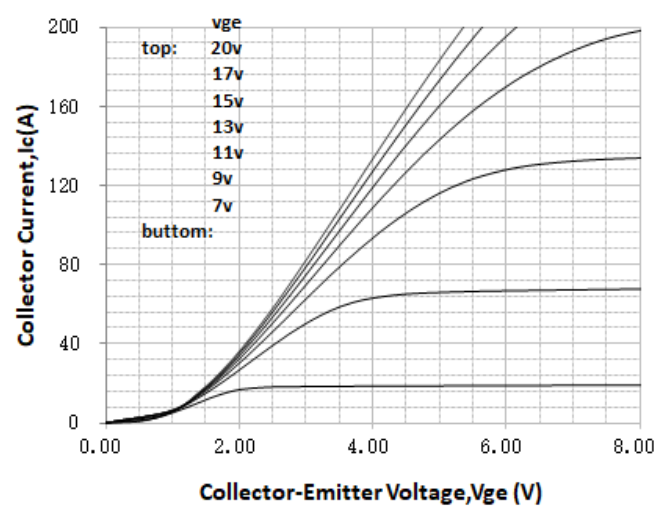


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

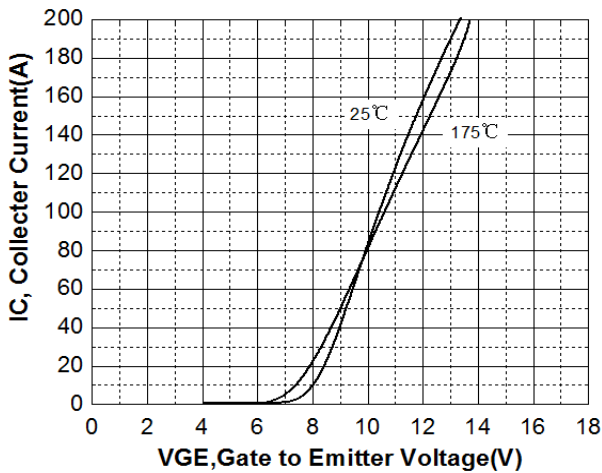
Output Characteristics (25°C)



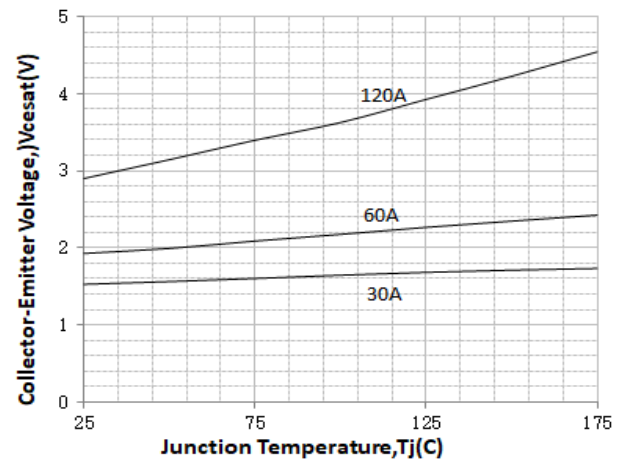
Output Characteristics (175°C)



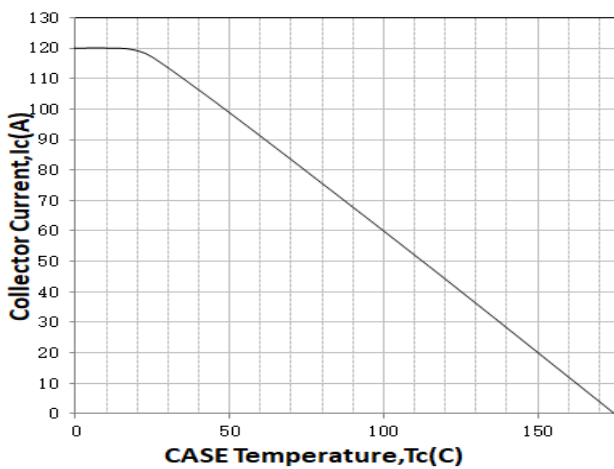
Transfer Characteristics



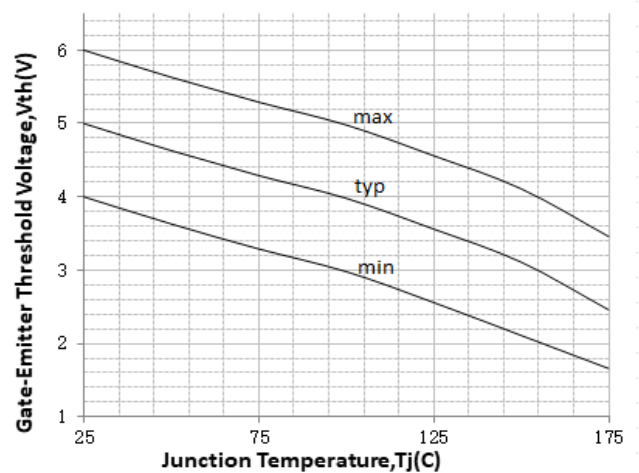
Vcesat vs. Tj



Collector current vs.case temperature



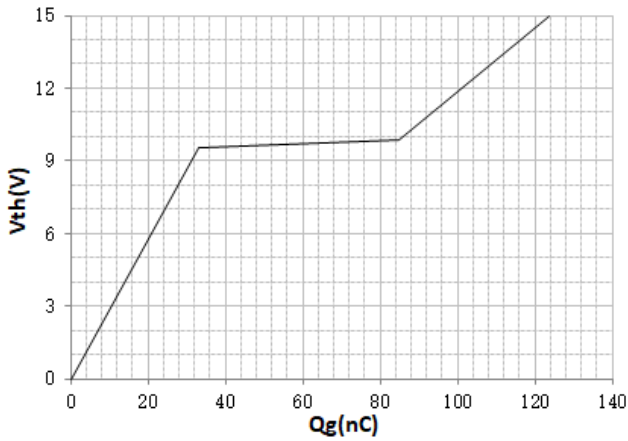
Vth vs. Tj





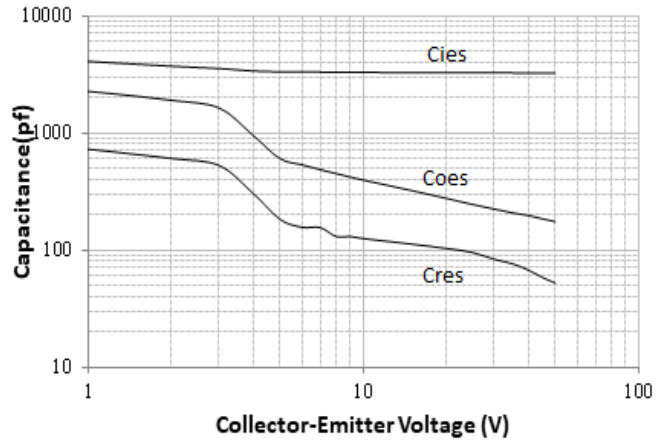
Gate Charge Characteristics

VGE=15V, VCC=480V, IC=60A



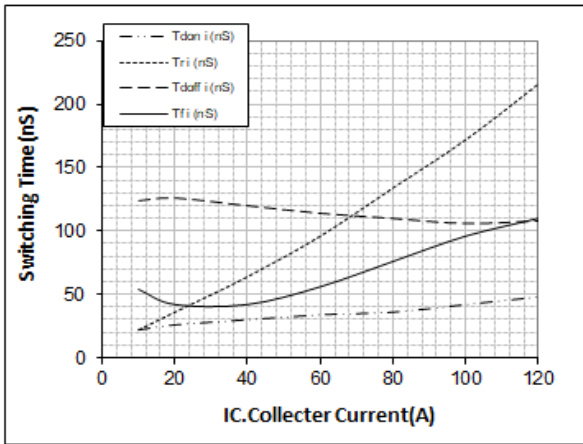
Capacitance Characteristic

VGE =0V, f=1.0MHZ



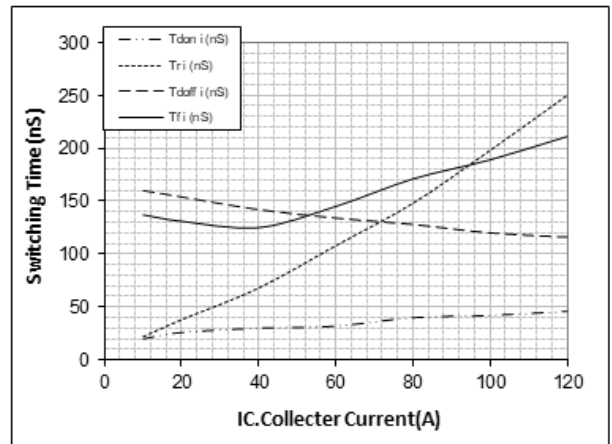
Switching Time vs. IC(25°C)

VCE=400V, VGE=15V, RG=10Ω



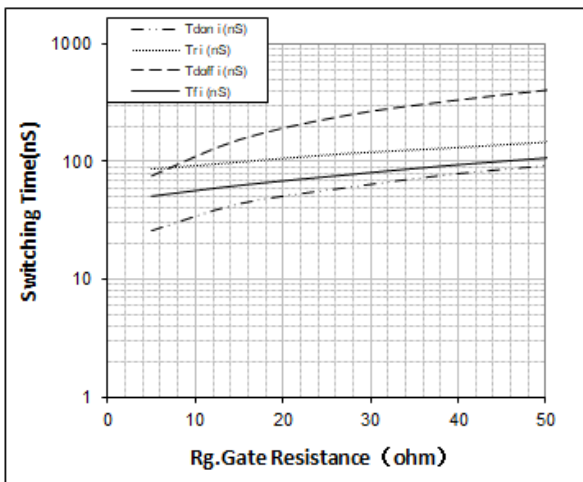
Switching Time vs. IC(175°C)

VCE=400V, VGE=15V, RG=10Ω



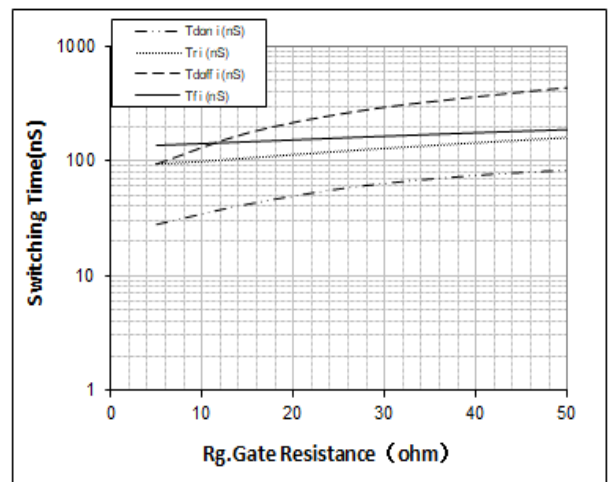
Switching Time vs. Rg(25°C)

VGE=15V, VCE=400V, IC=60A



Switching Time vs. Rg(175°C)

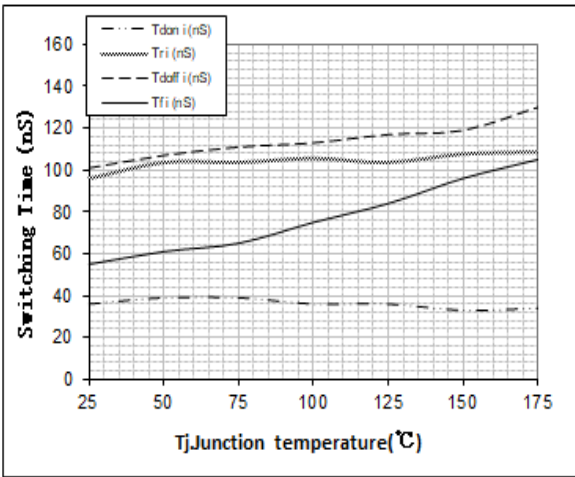
VGE=15V, VCE=400V, IC=60A





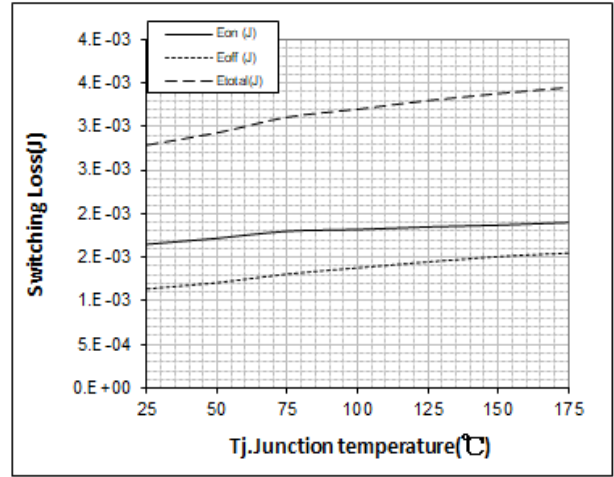
Switching Time vs. Tj

VGE=15V, VCE=400V, IC=60A, Rg=10Ω



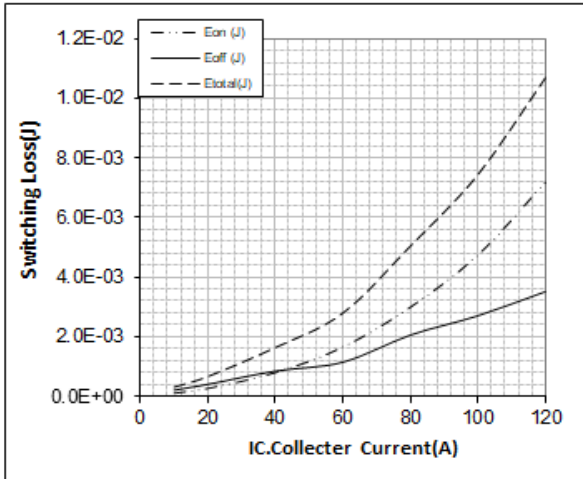
Switching Loss vs. Tj

VGE=15V, VCE=400V, IC=60A, Rg=10Ω



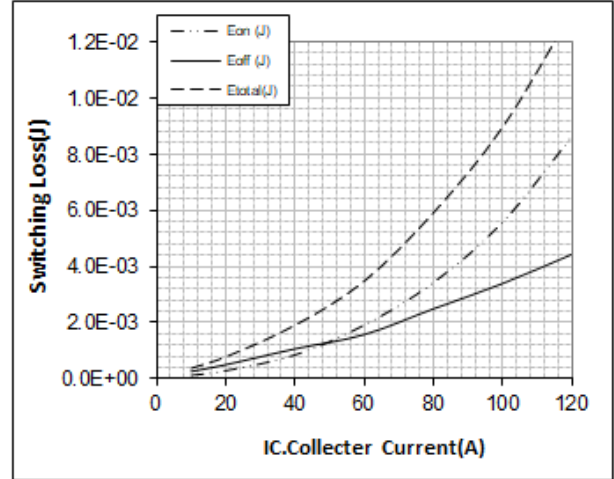
Switching Loss vs. IC(25°C)

VGE=15V, VCE=400V, Rg=10Ω



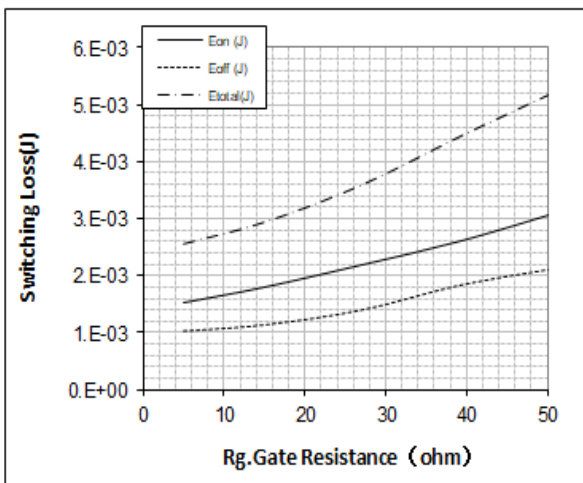
Switching Loss vs. IC(175°C)

VGE=15V, VCE=400V, Rg=10Ω



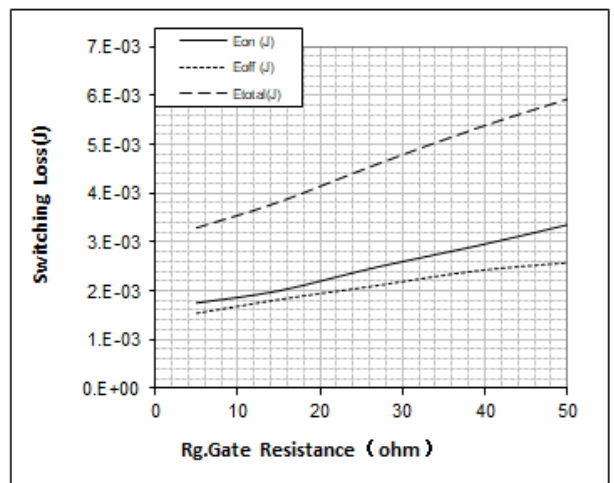
Switching Loss vs. Rg(25°C)

VGE=15V, VCE=400V, IC=60A



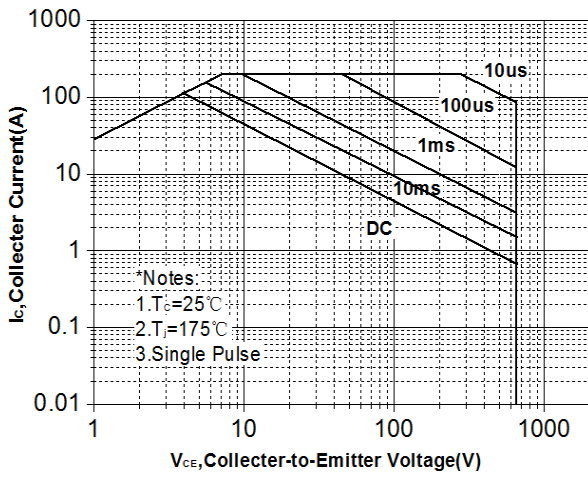
Switching Loss vs. Rg(175°C)

VGE=15V, VCE=400V, IC=60A

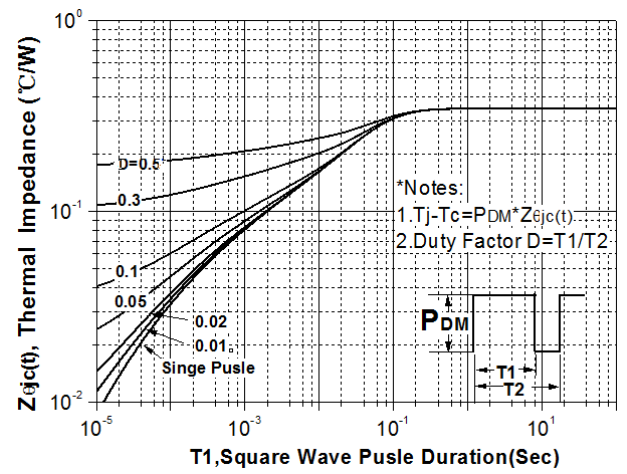




Forward Bias SOA



Normalized Maximum Transient Thermal Impedance for IGBT(RJC)

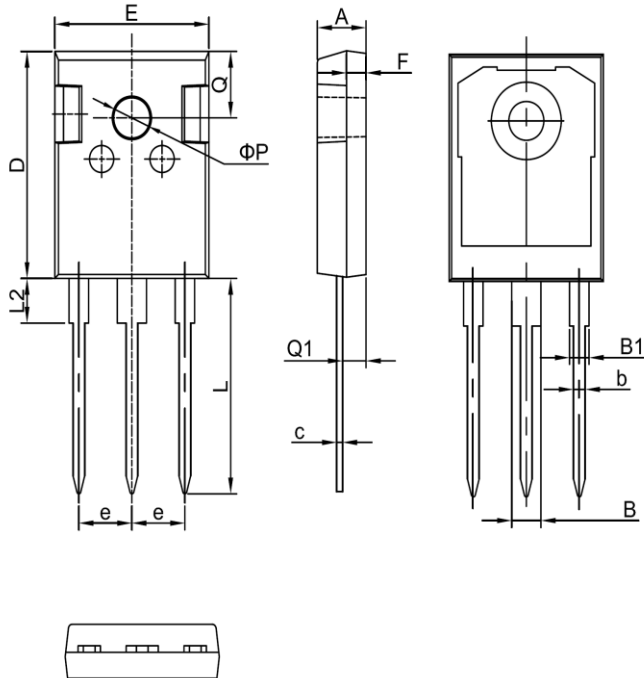




外形尺寸 PACKAGE MECHANICAL DATA

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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