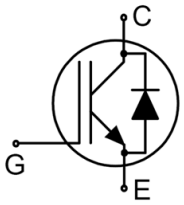
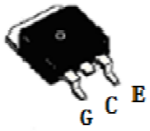
JT020N065SED/CED/WED/FED

主要参数 MAIN CHARACTERISTICS

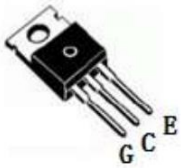
I_C	20 A
BV_{CES}	650V
V_{CESAT}-typ （V_{GE}=15V）	1.6V

封装 **Package**





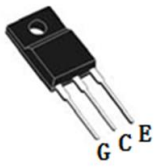
TO-263



TO-220C



TO-247



TO-220MF

用途 APPLICATIONS

- ●逆变器
- ●UPS 电源

- ●General purpose inverters
- ●UPS

产品特性 FEATURES

- ●低栅极电荷
- ●Trench FS 技术
- ●RoHS 产品

- ●Low gate charge
- ●Trench FS Technology
- ●RoHS product

订 货 型 号 Order codes		印 记 Marking	封 装 Package
无卤-条管 None Halogen-Tube	无卤-编带 Halogen-Free-Reel		
JT020N065SED-S-BR	JT020N065SED-S-AR	JT020N065SED	TO-263
JT020N065CED-C-BR	N/A	JT020N065CED	TO-220C
JT020N065WED-GE-BR	N/A	JT020N065WED	TO-247
JT020N065FED-F-BR	N/A	JT020N065FED	TO-220MF

绝对最大额定值　ABSOLUTE RATINGS (Tc=25°C)

项　　目 Parameter	符　号 Symbol	数　值 Value			单位 Unit
		JT020N065SED/ JT020N065CED	JT020N065WED	JT020N065FED	
最高集电极－发射极直流电压 Collector-Emitter Voltage	V_{CE}	650	650	650	V
*连续集电极电流 Collector Current-continuous	I_C	40 (T_C=25°C)	40 (T_C=25°C)	40 (T_C=25°C)	A
		20(T_C=100°C)	20(T_C=100°C)	20(T_C=100°C)	A
最大脉冲集电极极电流（注 1） Collector Current – pulse（note 1）	I_{CM}	80	80	80	A
二极管正向测试电流 Diode RMS forward current	I_F	40(T_C=25°C)	40(T_C=25°C)	40(T_C=25°C)	A
	I_F	20(T_C=100°C)	20(T_C=100°C)	20(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}	80	80	80	A
最高栅极发射极电压 Gate-Emitter Voltage	V_{GE}	±20	±20	±20	V
最高瞬态栅极发射极电压 Transient Gate-Emitter Voltage(t_p≤10us，*D*<0.010)	V_{GES}	±25	±25	±25	V
安全工作区 Turn-off safe area	-	80	80	80	A
耗散功率 Power Dissipation	P_D T_C=25°C	187	194	42	W
存储温度 Storage Temperature Range	T_{STG}	-55～+150	-55～+150	-55～+150	°C
结温 Operating Temperature Range	Tv_J	-55～+175	-55～+175	-55～+175	°C
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T_L	300	300	300	°C

*连续集电极电流由最高结温限制

*Collector current 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-Emitter Voltage	BV_{CES}	I_C=500μA, V_{GE}=0V	650	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	$\Delta BV_{CES}/\Delta T_J$	I_C=1mA, referenced to 25°C	-	0.5	-	V/°C
零栅压下集电极漏电流 Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=650V, V_{GE}=0V, T_C=25°C	-	-	10	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=250μA	5.5	-	6.5	V
饱和压降 Collector-Emitter saturation Voltage	V_{CESAT}	V_{GE}=15V,I_C=20A, T_c=25°C	-	1.6	2.0	V
		V_{GE}=15V,I_C=20A, T_c=125°C		1.75	2.15	V
		V_{GE}=15V,I_C=20A, T_c=175°C		1.9	2.3	V
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{ies}	V_{CE}=25V,V_{GE}=0V, f=1.0MHz,T_C=25°C	-	1500	-	pF
输出电容 Output capacitance	C_{oes}		-	128	-	pF
反向传输电容 Reverse transfer capacitance	C_{res}		-	28.7	-	pF
栅极电荷总量 Total Gate Charge	Qg	V_{CC}=400V,I_C=20A,R_G=10Ω,V_{GE}=15V,T_C=25°C	-	43.9	-	nC
栅极-发射极 Gate to emitter charge	Qge		-	10.0	-	
栅极-集电极 Gate to collector charge	Qgc		-	18.9	-	
栅极电阻- Gate resistance	Rg	f=1MHz,open collector	-	1.8	-	Ω
短路电流- Short current	Isc	V_{GE}=15V,V_{CE}=360V, T_{Jstart}≤175°C,tsc≤10μs	-	106	-	A

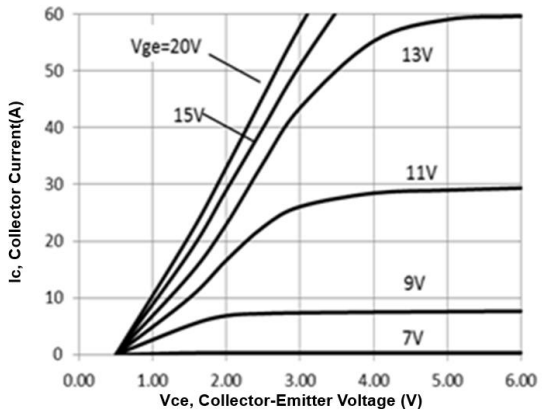
电特性 ELECTRICAL CHARACTERISTICS

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	td(on)	V_{CC}=400V,I_{CC}=20A,	-	16	-	ns
上升时间 Turn-On rise time	tr	R_G=10Ω, V_{GE}=15V,	-	56	-	ns
关断延迟时间 Turn-Off delay time	td(off)	T_C=25°C	-	52	-	ns
下降时间 Turn-Off Fall time	tf		-	82	-	ns
开通损耗 Turn-On energy	Eon		-	0.79	-	mJ
关断损耗 Turn-Off energy	Eoff		-	0.3	-	mJ
总开关损耗 Total switching energy	Etot		-	1.09	-	mJ
开启延迟时间 Turn-On delay time	td(on)	V_{CC}=400V,I_C=20A,	-	14.0	-	ns
上升时间 Turn-On rise time	tr	R_G=10Ω,V_{GE}=15V,	-	54.0	-	ns
关断延迟时间 Turn-Off delay time	td(off)	T_C=175°C	-	76.0	-	ns
下降时间 Turn-Off Fall time	tf		-	146.0	-	ns
开通损耗 Turn-On energy	Eon		-	0.8	-	mJ
关断损耗 Turn-Off energy	Eoff		-	0.49	-	mJ
总开关损耗 Total switching energy	Etot		-	1.3	-	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	V_{GE}=0V, I_F=20A,T_C=25°C	-	1.6	2.2	V
		V_{GE}=0V, I_F=20A,T_C=125°C	-	1.4	2.1	V
		V_{GE}=0V, I_F=20A,T_C=175°C	-	1.3	2.0	V
反向恢复时间 Diode Reverse recovery time	t_{rr}	T_C=25°C,I_F=20A, V_{GE}=0V,d_i/d_t =100A/us	-	254	-	ns
反向恢复电荷 Diode Reverse recovery charge	Q_{rr}		-	347	-	nC
反向恢复电流 Diode Reverse recovery Current	I_{rrm}		-	2.7	-	A
反向恢复时间 Diode Reverse recovery time	t_{rr}	T_C=175°C, I_F=20A, V_{GE}=0V,d_i/d_t=100A/us	-	429	-	ns
反向恢复电荷 Diode Reverse recovery charge	Q_{rr}		-	1010	-	nC
反向恢复电流 Diode Reverse recovery Current	I_{rrm}		-	4	-	A

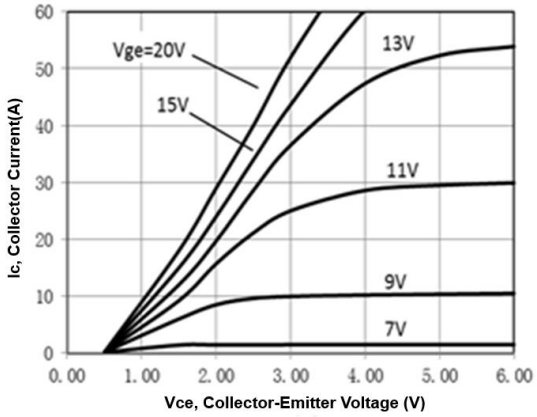
项目 Parameter	符号 Symbol	最大（max）			单位 Unit
		JT020N065SED/ JT020N065CED	JT020N065WED	JT020N065FED	
结到管壳的热阻（IGBT） Thermal Resistance, Junction to Case	$R_{th(J-C)}$	0.8	0.77	3.57	°C/W
结到管壳的热阻（FRD） Thermal Resistance, Junction to Case	$R_{th(J-C)}$	2.13	2.05	7.7	°C/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th(J-A)}$	62.5	40	62.5	°C/W

特征曲线 ELECTRICAL CHARACTERISTICS (curves)

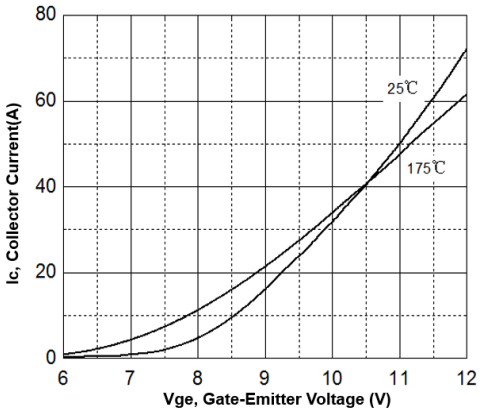
Output Characteristics
Tj=25℃



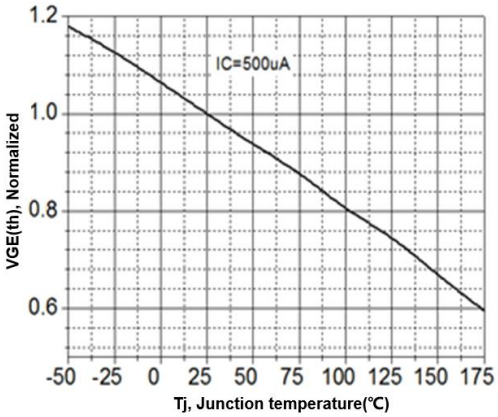
Output Characteristics
Tj=175℃



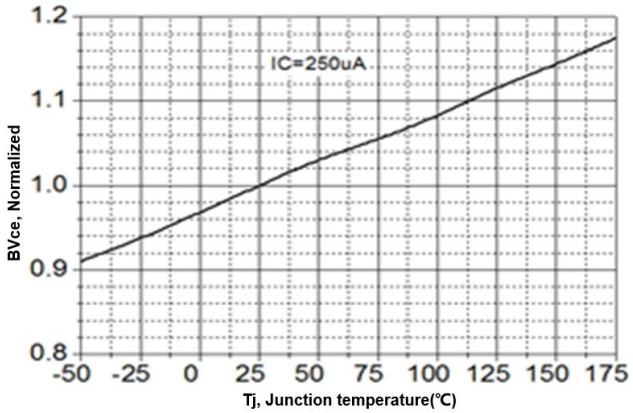
Transfer characteristics
Vce=6V



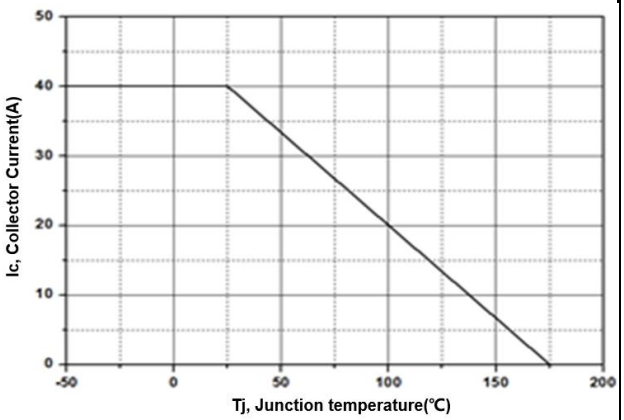
归一化的 Vge 与 Tj 关系曲线



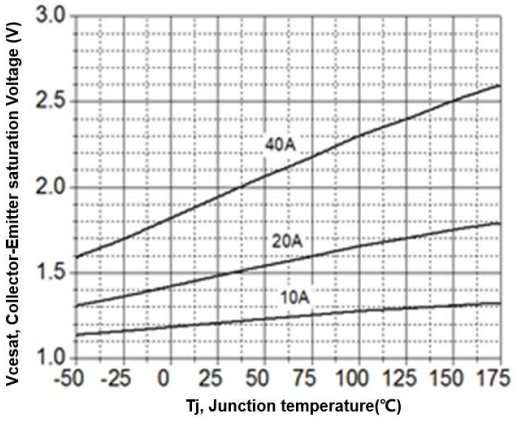
归一化的 BVce 与 Tj 关系曲线



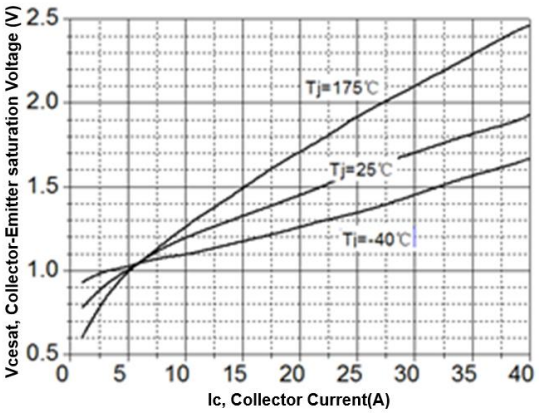
Ic VS Tj



Vcesat vs T_J

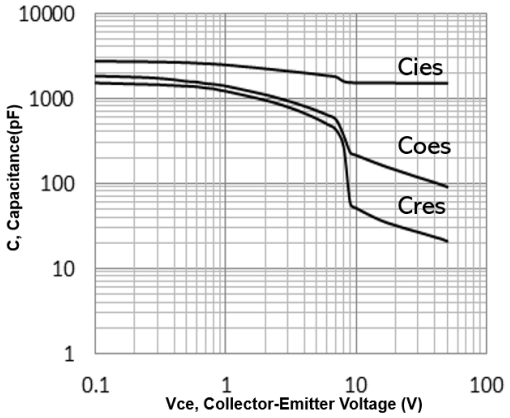


Vcesat vs Ic

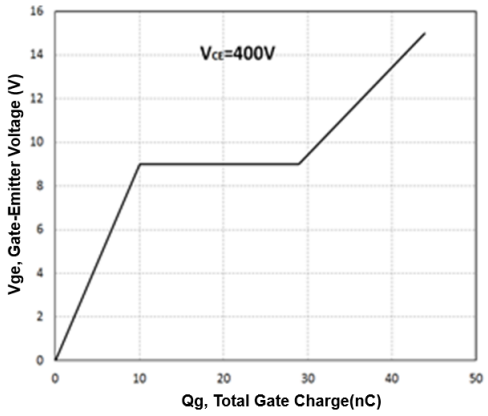


Capacitance Characteristic

Vge=0V,f=1.0MHz

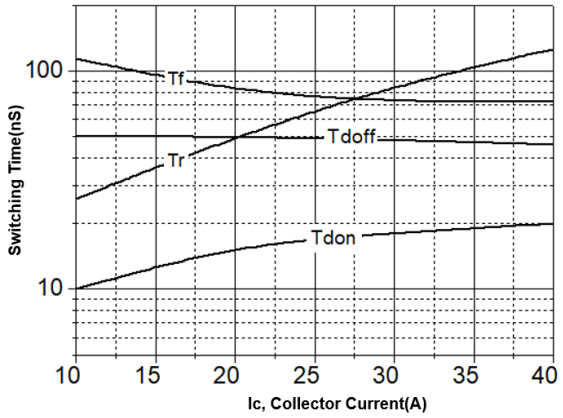


Qg VS Vge



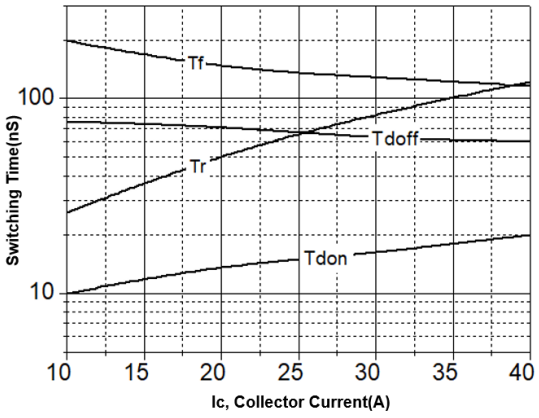
SwitchingTime vs. Ic

Tj=25 ℃,Vge=15V,Vce=400V,Rg=10Ω



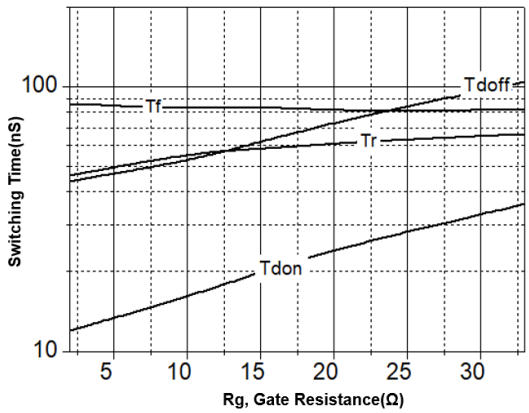
SwitchingTime vs. Ic

Tj=175 ℃,Vge=15V,Vce=400V,Rg=10Ω



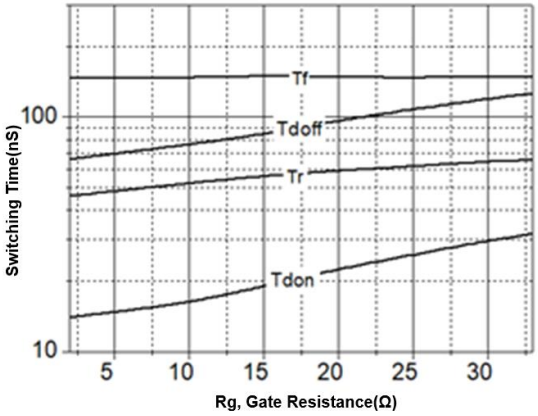
SwitchingTime vs. Rg

Tj=25 ℃,Vge=15V,Vce=400V,Ic=20A

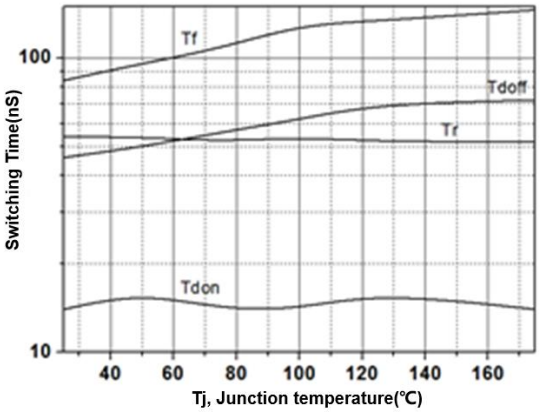


SwitchingTime vs. Rg

Tj=175 ℃,Vge=15V,Vce=400V,Ic=20A

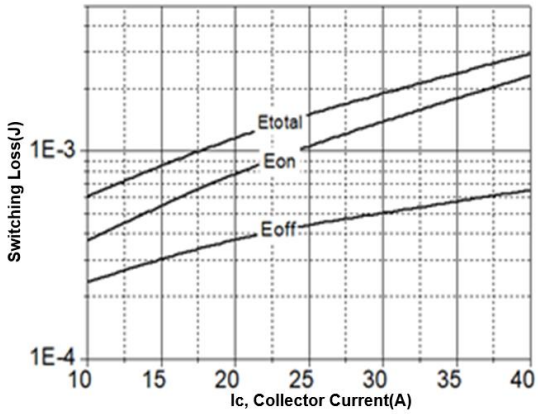


Switching Time vs. Tj



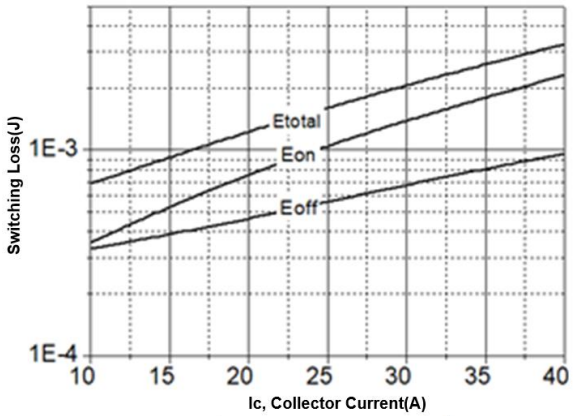
Switching Loss vs. Ic

Tj=25 ℃,Vge=15V,Vce=400V,Rg=10Ω



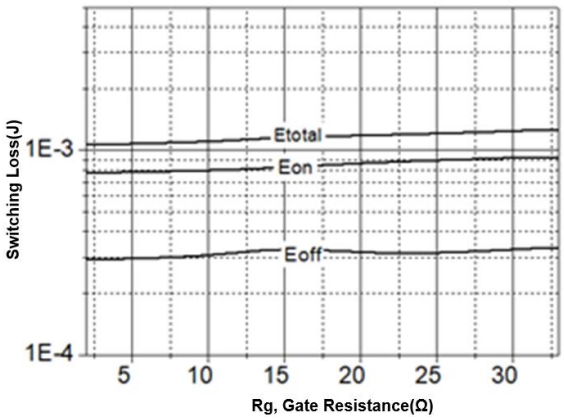
Switching Loss vs. Ic

Tj=175 ℃,Vge=15V,Vce=400V,Rg=10Ω



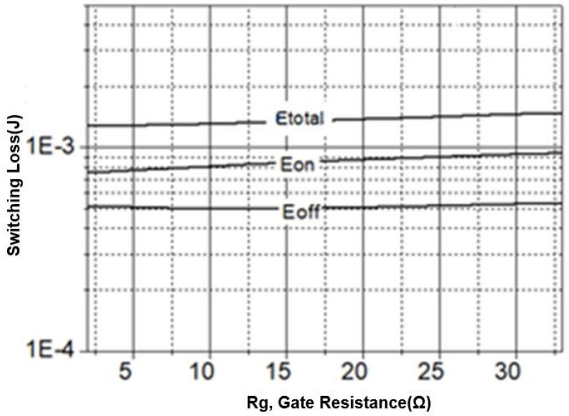
Switching Loss vs. Rg

Tj=25 ℃,Vge=15V,Vce=400V,Ic=20A



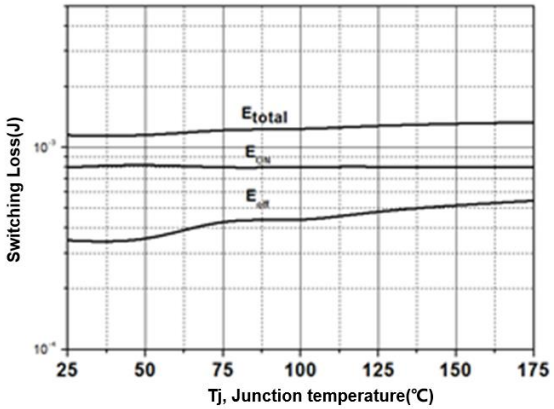
Switching Loss vs. Rg

Tj=175℃,Vge=15V,Vce=400V,Ic=20A



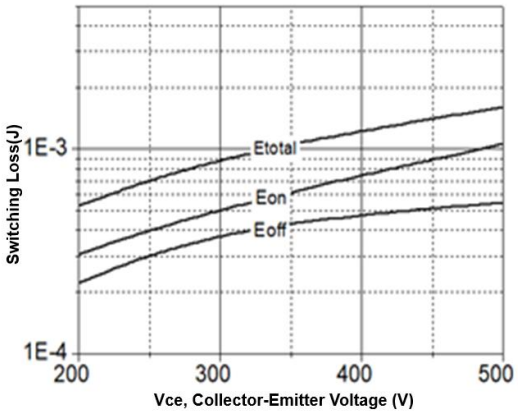
Switching Loss vs. Tj

Vge=15V,Vce=400V,Ic=20A Rg=10Ω

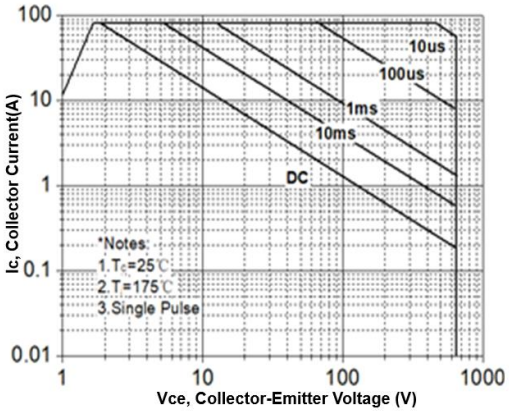


Switching Loss vs. Vce

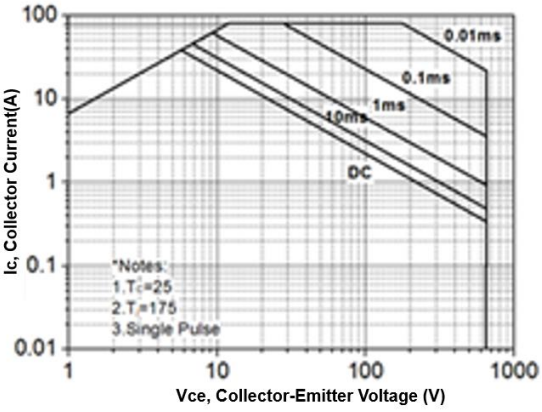
Tj=175℃,Vge=15V,Ic=20A,Rg=10Ω



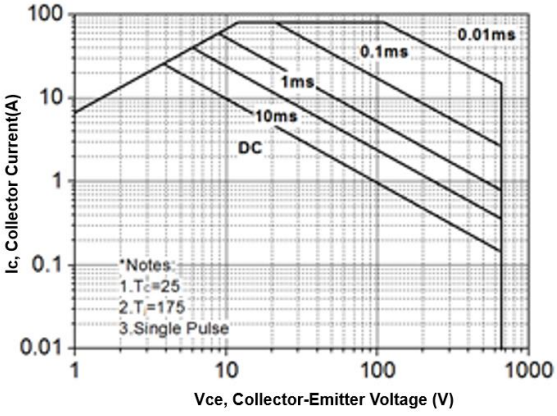
Safe Operating Area TO-247



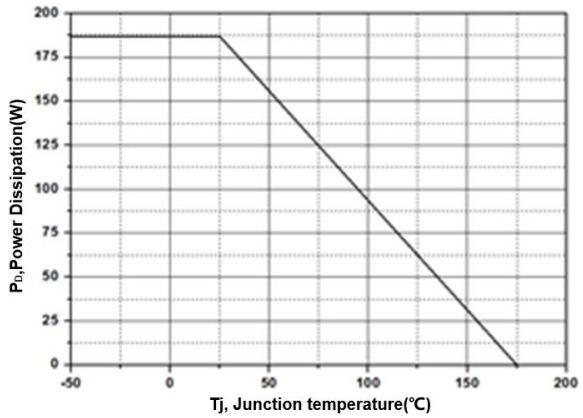
Safe Operating Area TO-263/TO-220C



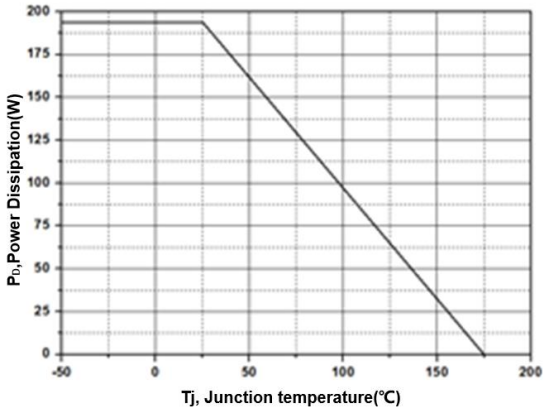
Safe Operating Area TO-220MF



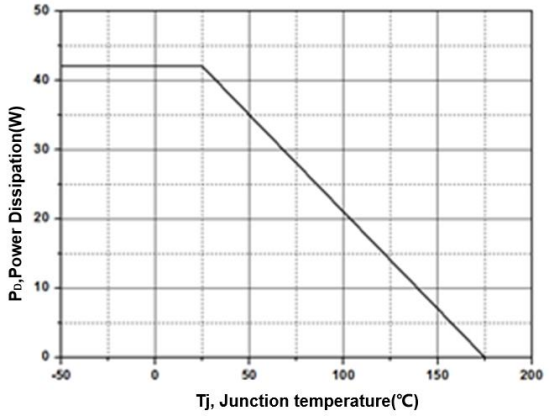
P_D VS temperature（TO-263/TO-220C）



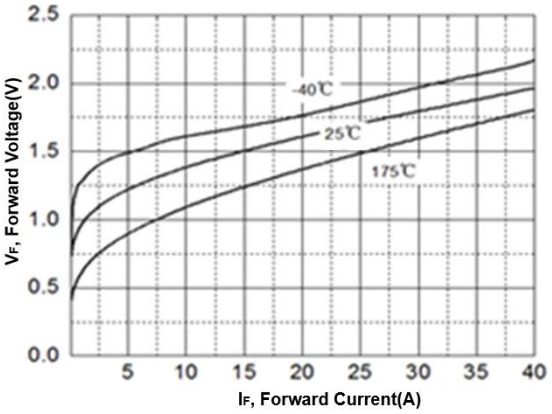
P_D VS temperature（TO-247）



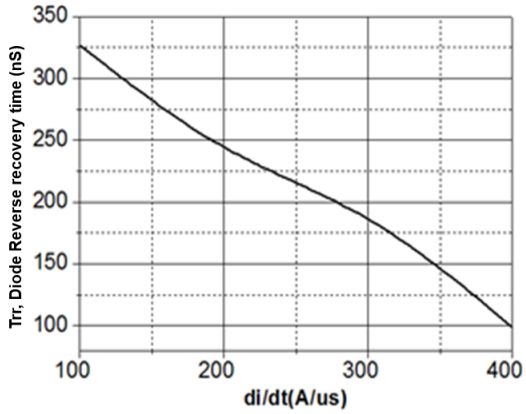
P_D VS temperature（TO-220MF）



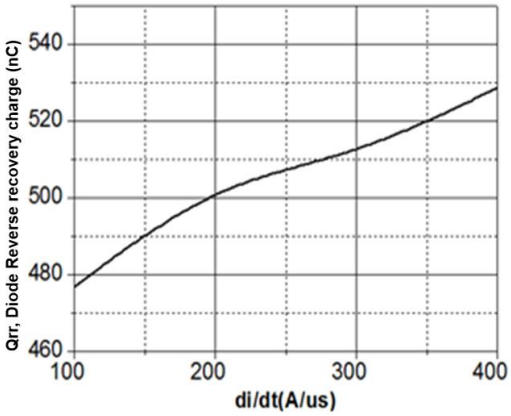
Diode Characteristic



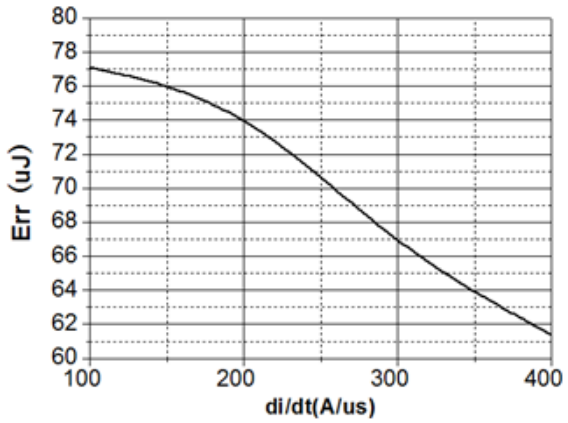
Trr与di/dt关系曲线



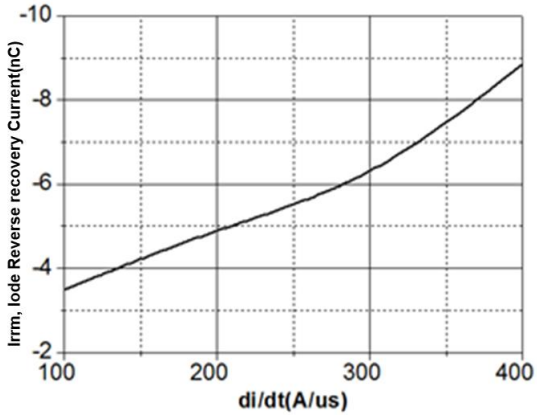
Qrr与di/dt关系曲线



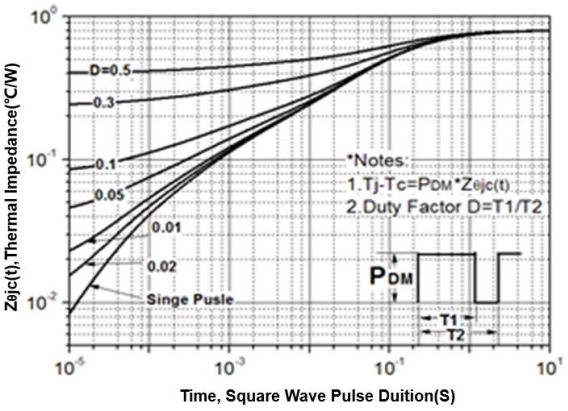
Err与di/dt关系曲线



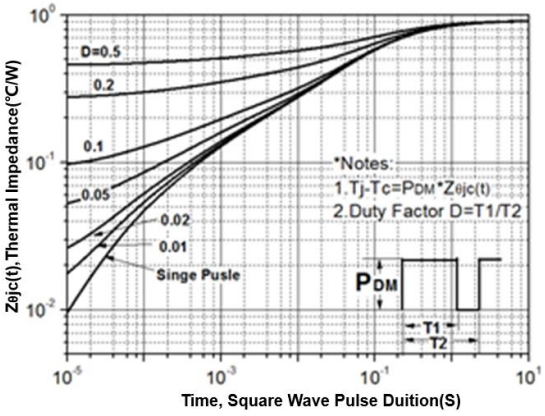
Irrm与di/dt关系曲线



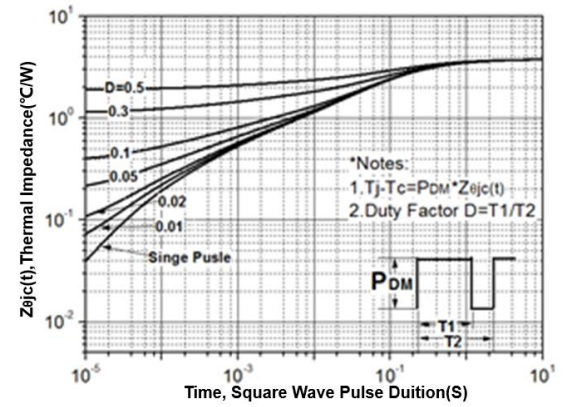
Normalized Maximum Transient Thermal Impedance for IGBT(TO-247)



Normalized Maximum Transient Thermal Impedance for IGBT(TO-263/TO-220C)



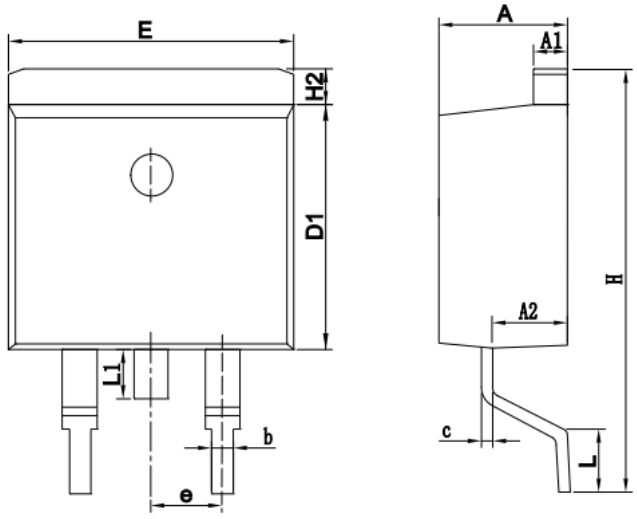
Normalized Maximum Transient Thermal Impedance for IGBT(TO-220MF)



外形尺寸PACKAGE MECHANICAL DATA

TO-263

单位 UNIT:mm

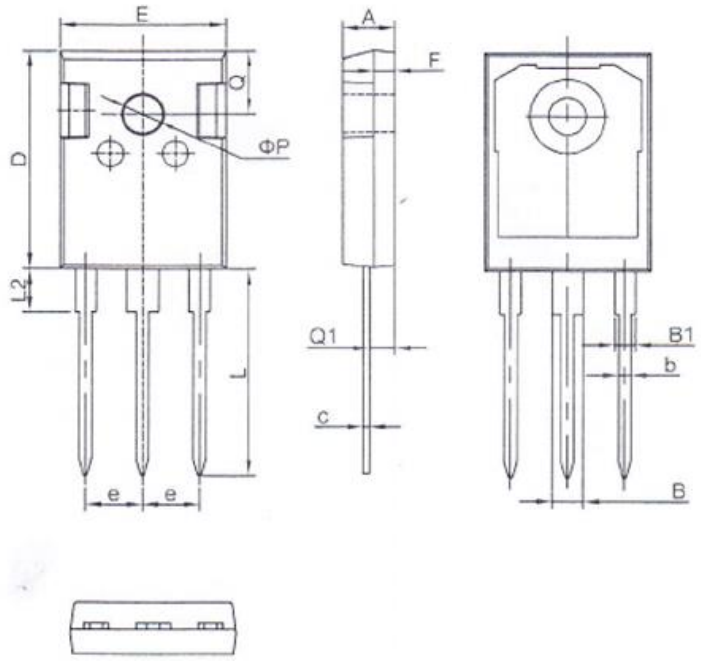


SYMBOL	MM	
	MIN	MAX
A	4.30	4.80
A1	1.12	1.42
A2	2.54	2.84
b	0.67	1.00
c	0.29	0.52
D1	8.40	9.00
E	9.80	10.46
e	2.54BSC	
H	14.00	16.00
H2	1.12	1.45
L	1.50	3.10
L1	1.45	1.70

外形尺寸PACKAGE MECHANICAL DATA

TO-247

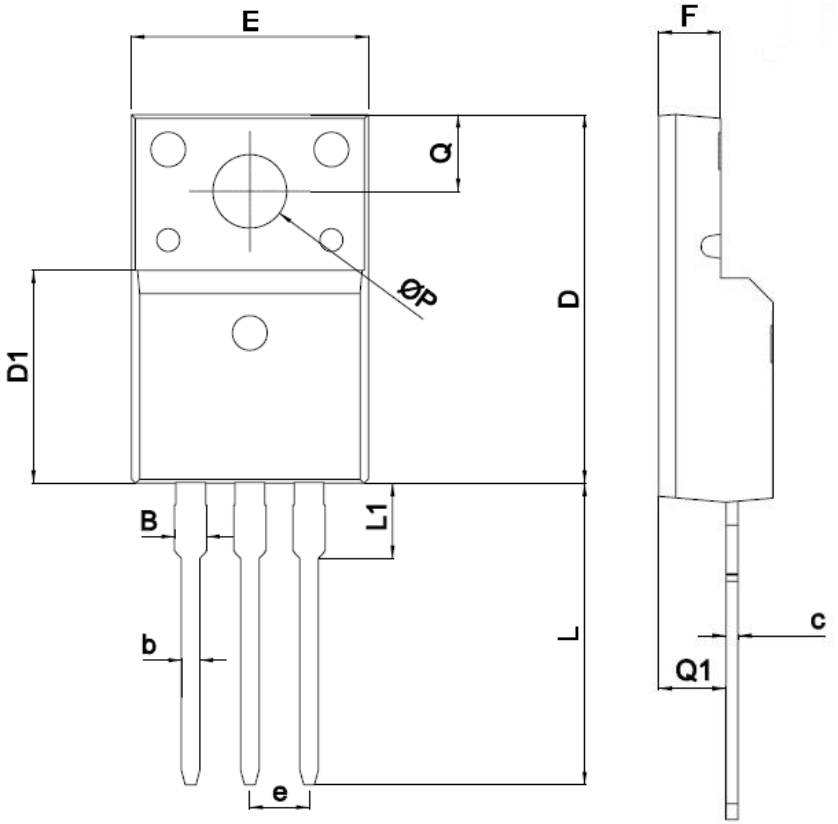
单位 UNIT:mm

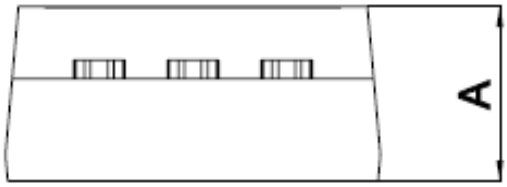


符号 symbol	MIN	MAX
A	4.90	5.10
B	2.95	3.35
B1	1.95	2.35
b	1.15	1.35
c	0.50	0.70
D	20.90	21.10
E	15.70	15.90
e	5.34	5.54
F	1.90	2.10
L	19.40	20.40
L2	4.03	4.23
Q	6.00	6.40
Q1	2.30	2.50
P	3.50	3.70

外形尺寸PACKAGE MECHANICAL DATA

TO-220MF 单位 **UNIT:mm**



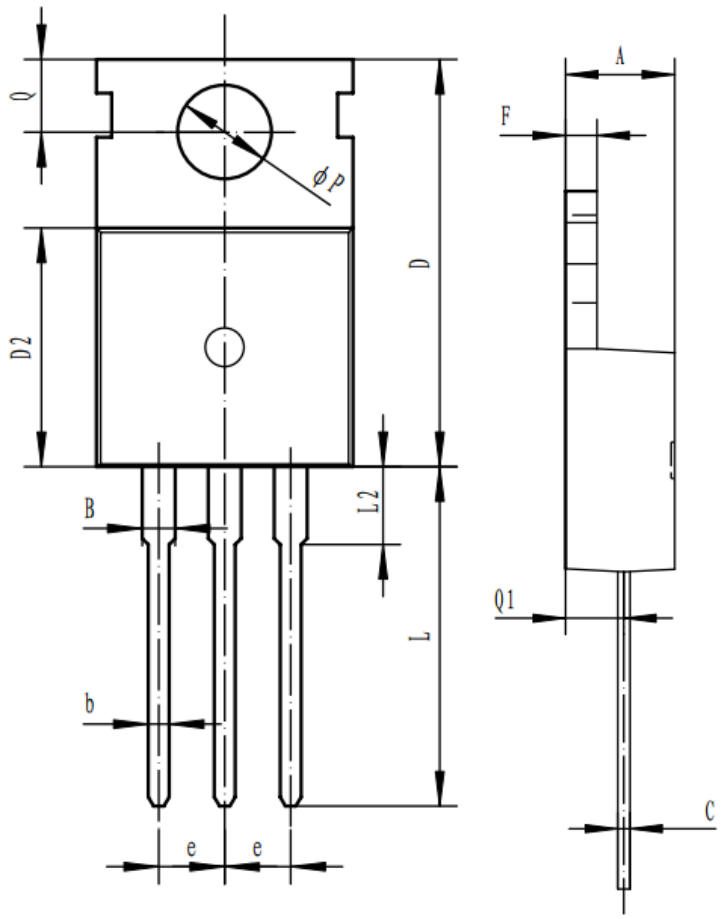


SYMBOL	mm	
	MIN	MAX
A	4.5	4.9
B		1.47
b	0.7	0.9
c	0.45	0.60
D	15.67	16.07
D1	9.04	9.20
e	2.54TYPE	
E	9.96	10.36
F	2.34	2.74
L	12.58	13.38
L1	3.13	3.33
Q	3.2	3.4
Q1	2.56	2.96
ΦP	3.08	3.28

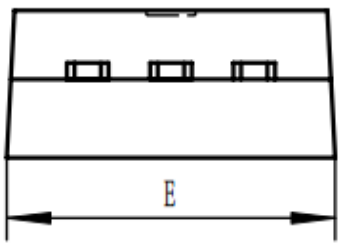
外形尺寸PACKAGE MECHANICAL DATA

TO-220C

单位 UNIT:mm



符号 symbol	MIN	MAX
A	4.30	4.70
B	1.22	1.40
b	0.70	0.95
c	0.40	0.65
D	15.20	16.20
D2	9.00	9.40
E	9.70	10.10
e	2.39	2.69
F	1.25	1.40
L	12.60	13.60
L2	2.80	3.20
Q	2.60	3.00
Q1	2.20	2.60
P	3.50	3.80



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