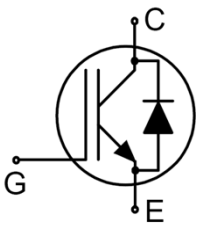
JT010N065SED/CED/FED/WED

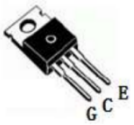
主要参数 MAIN CHARACTERISTICS

I_C	10 A
BV_{CES}	650V
V_{CESAT}-typ （V_{GE}=15V）	1.5V

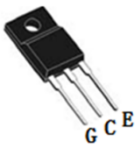
封装 **Package**



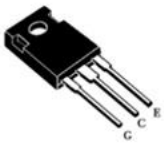
TO-263



TO-220C



TO-220MF



TO-247

用途

- ●逆变器
- ●UPS 电源
- ●电机控制

APPLICATIONS

- ●General purpose inverters
- ●UPS
- ●Motor Control

产品特性

- ●低栅极电荷
- ●Trench FS 技术,
- ●RoHS 产品

FEATURES

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

订 货 型 号 Order codes				印 记 Marking	封 装 Package
有卤-条管 Halogen-Tube	无卤-条管 None Halogen-Tube	有卤-编带 Halogen-Reel	无卤-编带 Halogen-Free-Reel		
JT010N065SED-S-B	JT010N065SED-S-BR	JT010N065SED-S-A	JT010N065SED-S-AR	JT010N065SED	TO-263
JT010N065CED-C-B	JT010N065CED-C-BR	N/A	N/A	JT010N065CED	TO-220C
JT010N065FED-F-B	JT010N065FED-F-BR	N/A	N/A	JT010N065FED	TO-220MF
JT010N065WED-GE-B	JT010N065WED-GE-BR	N/A	N/A	JT010N065WED	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
		JT010N065SED/ JT010N065CED	JT010N065FED	JT010N065WED	
最高集电极－发射极直流电压 Collector-Emmiter Voltage	V_{CES}	650	650	650	V
*连续集电极电流 Collector Current-continuous	I_C	20 (T_C=25°C)	20 (T_C=25°C)	20 (T_C=25°C)	A
		10(T_C=100°C)	10(T_C=100°C)	10(T_C=100°C)	A
最大脉冲集电极极电流（注1） Collector Current – pulse （note 1）	I_{CM}	40	40	40	A
二极管正向测试电流 Diode RMS forward current	I_F	20(T_C=25°C)	20(T_C=25°C)	20(T_C=25°C)	A
	I_F	10(T_C=100°C)	10(T_C=100°C)	10(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}	40	40	40	A
最高栅极发射极电压 Gate-Emmiter Voltage	V_{GES}	±30	±30	±30	V
Turn-off safe area	-	40	40	40	A
耗散功率 Power Dissipation	P_D T_C=25°C	136	37	166	W
存储温度 Storage Temperature Range	T_{STG}	-55～+150	-55～+150	-55～+150	°C
结温 Junction Temperature Range	T_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.

注 1：脉冲宽度由最高结温限制。Note1：The pulse width is limited by the 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-Emmiter 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
		V_{CE}=650V, V_{GE}=0V, T_C=175°C			2	mA
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=250Ua T_c=25°C	5.5	6	6.5	V
饱和压降 Collector-Emmiter saturation Voltage	V_{CESAT}	V_{GE}=15V,I_C=10A, T_c=25°C	-	1.5	1.9	V
		V_{GE}=15V,I_C=10A, T_c=125°C	-	1.65	2.05	V
		V_{GE}=15V,I_C=10A, T_c=175°C	-	1.8	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,T_C=25°C	-	800	-	pF
输出电容 Output capacitance	C_{oes}		-	60	-	pF
反向传输电容 Reverse transfer capacitance	C_{res}		-	17	-	pF
栅极电荷总量 Total Gate Charge	Q_g	V_{CC}=400V,I_C=10A,R_G=10Ω,V_{GE}=15V,T_C=25°C	-	27.4	-	nC
栅极-发射极 Gate to emitter charge	Q_{ge}		-	6.5	-	
栅极-集电极 Gate to collector charge	Q_{gc}		-	11.9	-	
栅极电阻-Gate resistance	R_g	f=1MHz,open collector	-	2.1	-	Ω
短路电流-short current	I_{sc}	V_{GE}=15V,V_{CE}=360V, T_{Jstart}≤175°C,t≤10μs	-	58	-	A

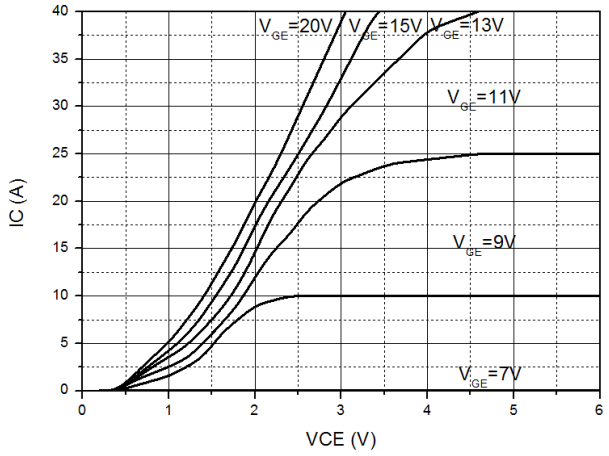
电特性 ELECTRICAL CHARACTERISTICS

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	$t_{d(on)}$	V_{CC}=400V,I_{CC}=10A,	-	13	-	ns
上升时间 Turn-On rise time	t_r	R_G=10Ω, V_{GE}=15V,	-	20	-	ns
关断延迟时间 Turn-Off delay time	$t_{d(off)}$	T_C=25°C	-	47	-	ns
下降时间 Turn-Off Fall time	t_f		-	60	-	ns
开通损耗 Turn-On energy	E_{on}		-	0.35	-	mJ
关断损耗 Turn-off energy	E_{off}		-	0.1	-	mJ
总开关损耗 Total switching energy	E_{tot}		-	0.45	-	mJ
开启延迟时间 Turn-On delay time	$t_{d(on)}$	V_{CC}=400V,I_C=10A,	-	16.0	-	ns
上升时间 Turn-On rise time	t_r	R_G=10Ω,V_{GE}=15V,	-	20.0	-	ns
关断延迟时间 Turn-Off delay time	$t_{d(off)}$	T_C=175°C	-	68.0	-	ns
下降时间 Turn-Off Fall time	t_f		-	84.0	-	ns
开通损耗 Turn-On energy	E_{on}		-	0.35	-	mJ
关断损耗 Turn-off energy	E_{off}		-	0.17	-	mJ
总开关损耗 Total switching energy	E_{tot}		-	0.52	-	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=10A,T_C=25°C	-	1.75	-	V
		V_{GE}=0V, I_F=10A,T_C=125°C	-	1.45	-	V
		V_{GE}=0V, I_F=10A,T_C=175°C	-	1.25	-	V
反向恢复时间 Diode Reverse recovery time	t_{rr}	T_C=25°C,I_F=10A, V_{GE}=0V,d_i/d_t =100A/us	-	54.6	-	ns
反向恢复电荷 Diode Reverse recovery charge	Q_{rr}		-	34.9	-	nC
反向恢复电流 Diode Reverse recovery Current	I_{rrm}		-	1.13	-	A
反向恢复时间 Diode Reverse recovery time	t_{rr}	T_C=175°C, I_F=10A, V_{GE}=0V,d_i/d_t=100A/us	-	80.9	-	ns
反向恢复电荷 Diode Reverse recovery charge	Q_{rr}		-	51.7	-	nC
反向恢复电流 Diode Reverse recovery Current	I_{rrm}		-	1.67	-	A

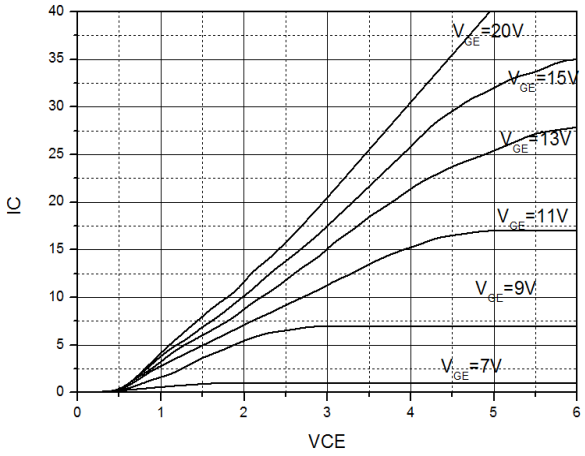
项目 Parameter	符号 Symbol	最大（max）			单位 Unit
		JT010N065SED/ JT010N065CED	JT010N065FED	JT010N065WED	
结到管壳的热阻（IGBT） Thermal Resistance, Junction to Case	$R_{th(J-C)}$	1.1	3.1	0.9	°C/W
结到管壳的热阻（FRD） Thermal Resistance, Junction to Case	$R_{th(J-C)}$	2.2	4.9	2.1	°C/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th(J-A)}$	62.5	62.5	40	°C/W

特征曲线 ELECTRICAL CHARACTERISTICS (curves)

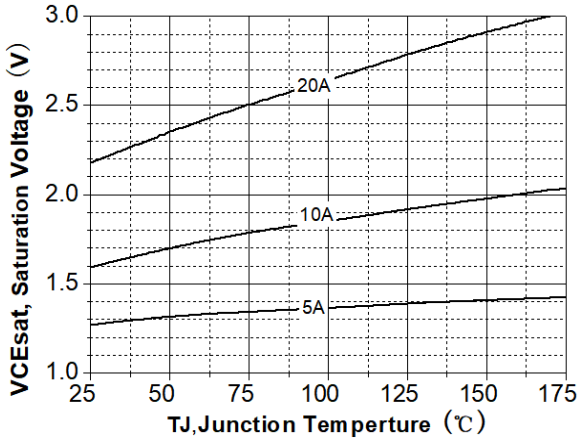
Output Characteristics T_J=25°C



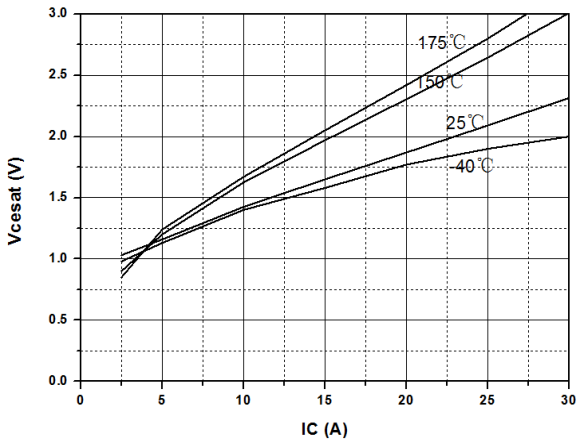
Output Characteristics T_J=175°C



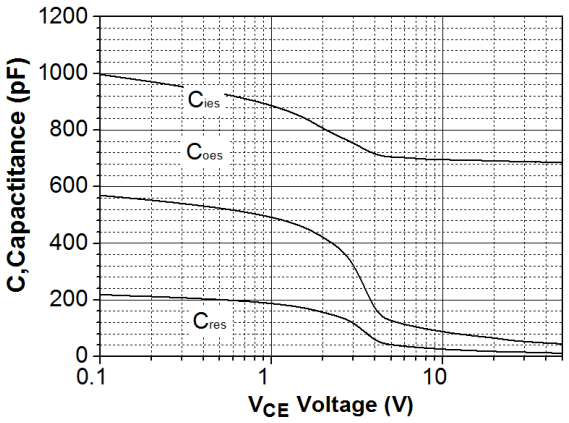
V_{CESAT} vs T_J



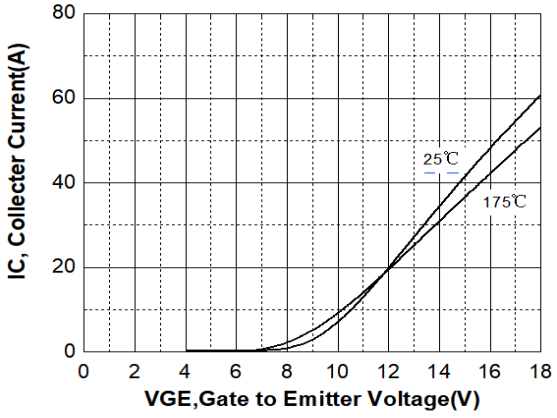
V_{CESAT} vs I_C



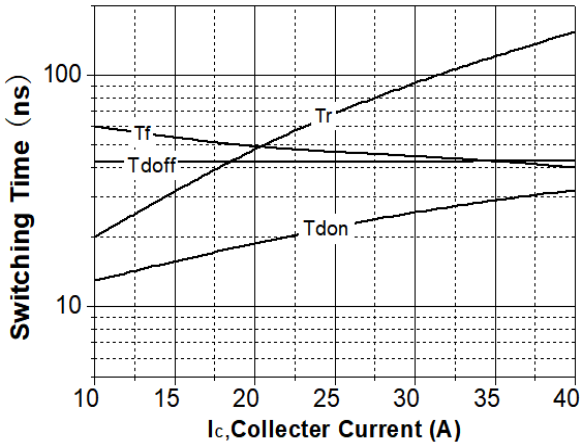
Capacitance Characteristic
V_{GE}=0V,f=1.0MHZ



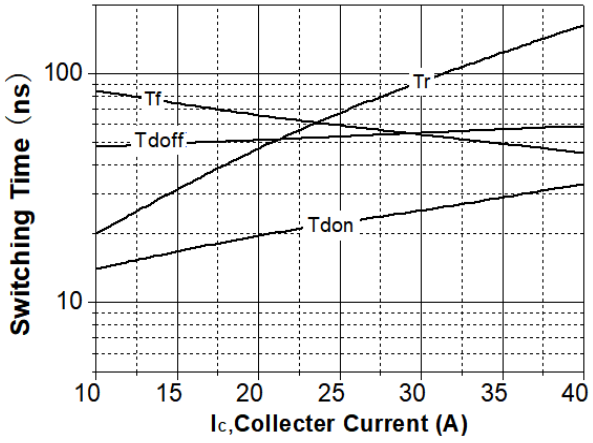
Transfer Characteristics



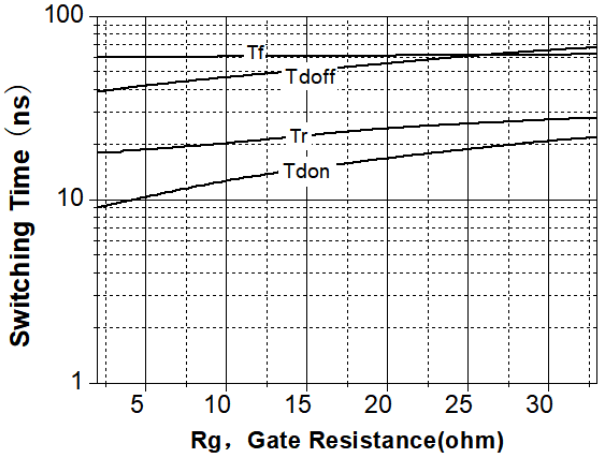
SwitchingTime vs. I_C
T_J=25°C,V_{GE}=15V,V_{CE}=400V,R_g=10Ω



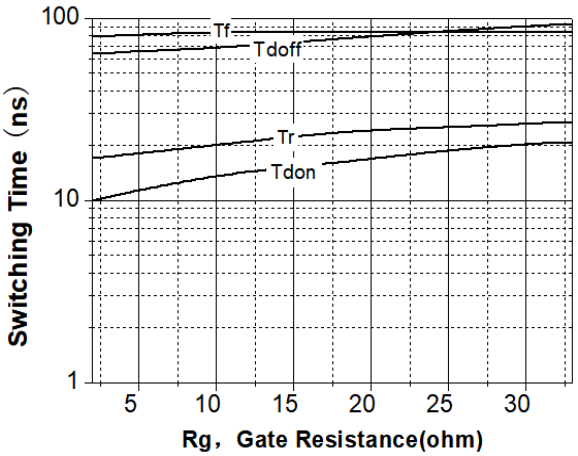
SwitchingTime vs. I_C
T_J=175°C,V_{GE}=15V,V_{CE}=400V,R_g=10Ω



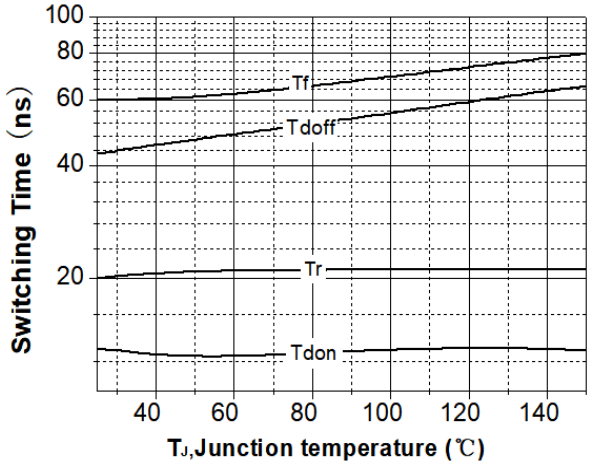
SwitchingTime vs. R_g
T_J=25°C,V_{GE}=15V,V_{CE}=400V,I_C=10A



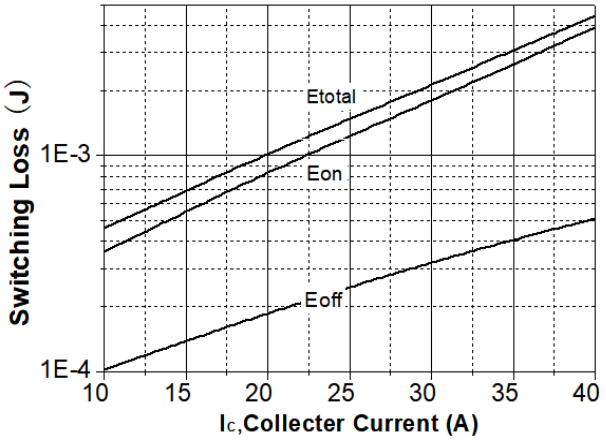
SwitchingTime vs. R_g
T_J=175°C,V_{GE}=15V,V_{CE}=400V,I_C=10A



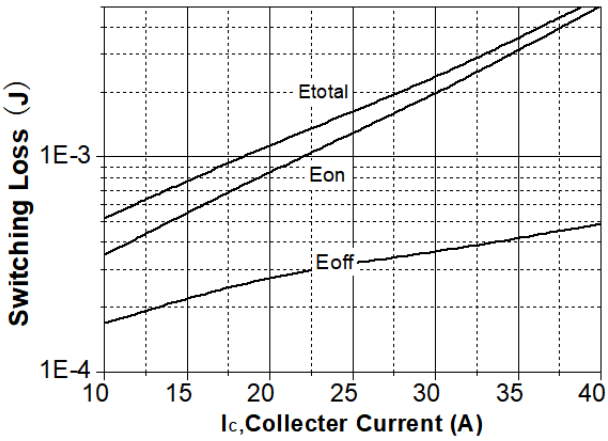
Switching Time vs. T_J



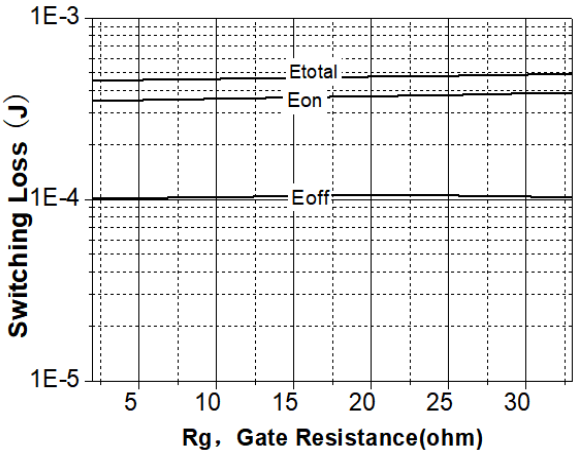
Switching Loss vs. I_C
T_J=25°C,V_{GE}=15V,V_{CE}=400V,R_g=10Ω



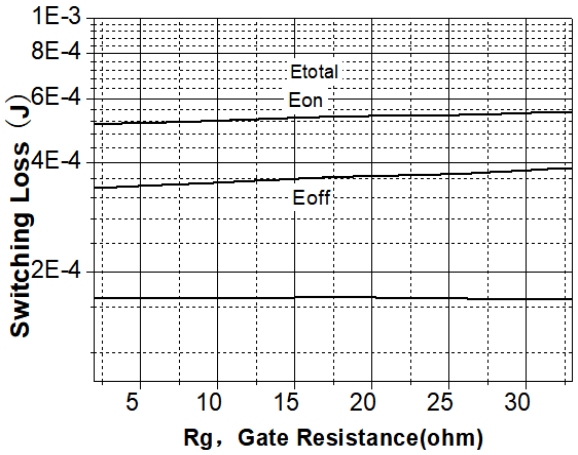
Switching Loss vs. I_C
T_J=175°C,V_{GE}=15V,V_{CE}=400V,R_g=10Ω



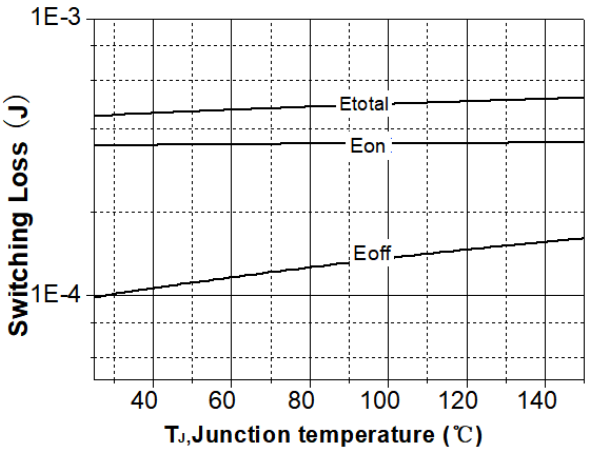
Switching Loss vs. I_C
T_J=25°C,V_{GE}=15V,V_{CE}=400V,I_C=10A



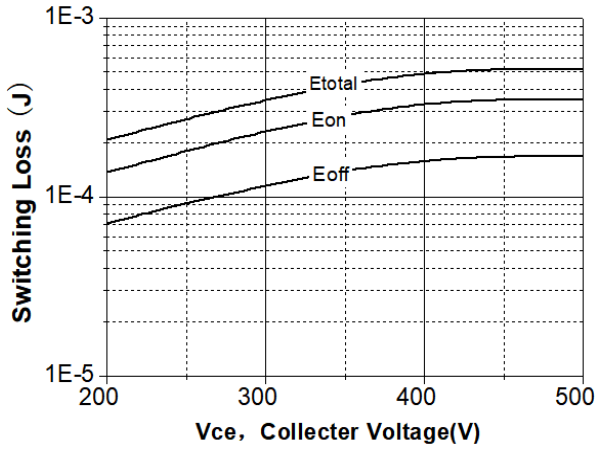
Switching Loss vs. R_g
T_J=175°C,V_{GE}=15V,V_{CE}=400V,I_C=10A



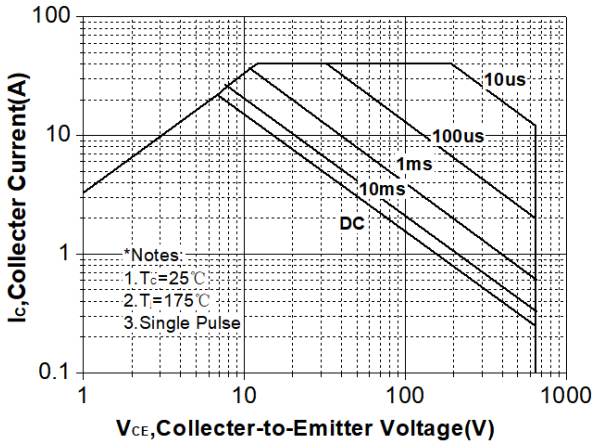
Switching Loss vs. T_J
V_{GE}=15V,V_{CE}=400V,I_C=10A R_g=10Ω



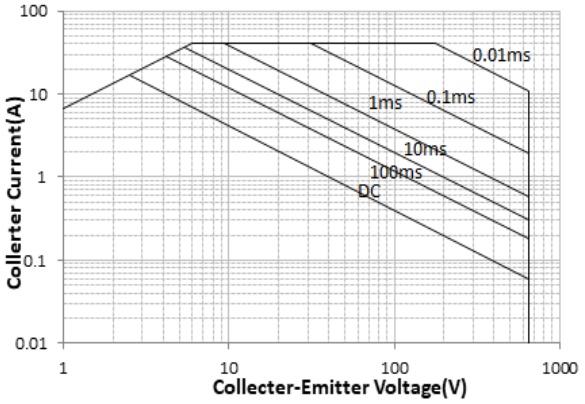
Switching Loss vs. V_{CE}(V)
T_J=175°C,V_{GE}=15V,I_C=10A,R_g=10Ω



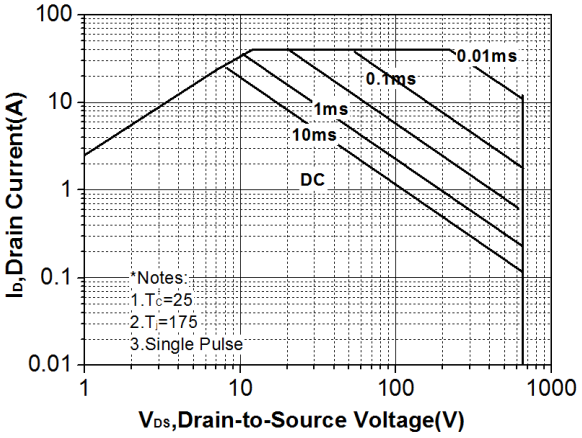
Safe Operating Area TO-263/TO-220C



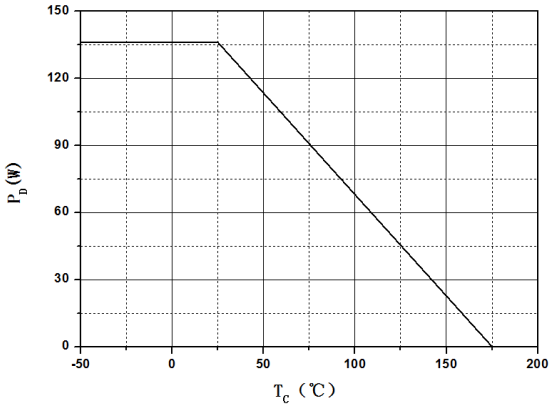
Safe Operating Area TO-220MF



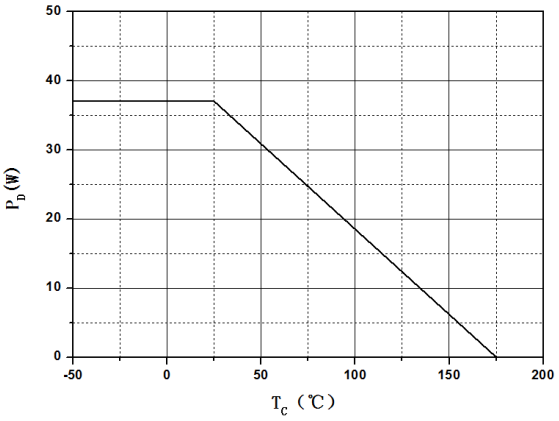
Safe Operating Area TO-247



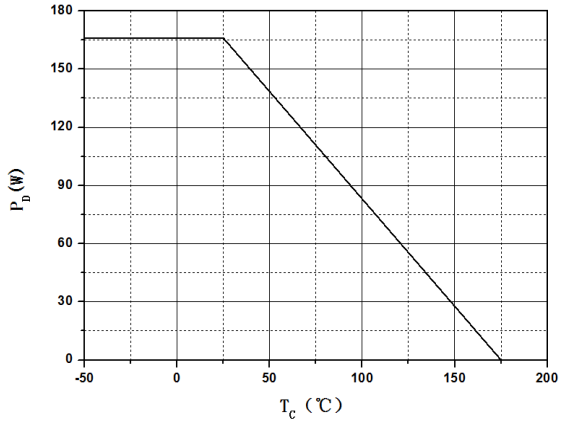
P_D VS temperature（TO-263/TO-220C）



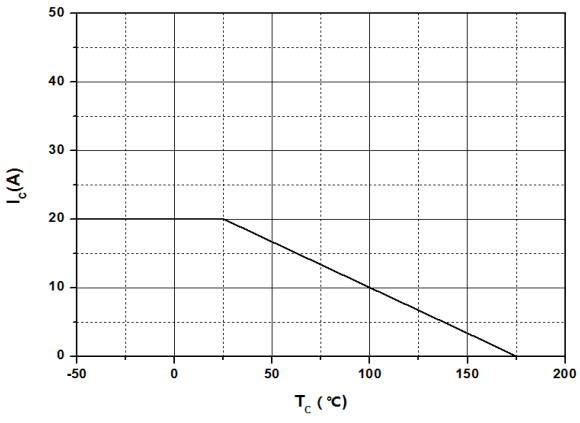
P_D VS temperature（TO-220MF）



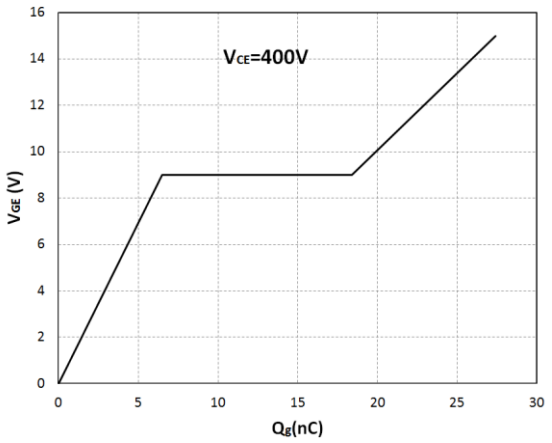
P_D VS temperature（TO-247）



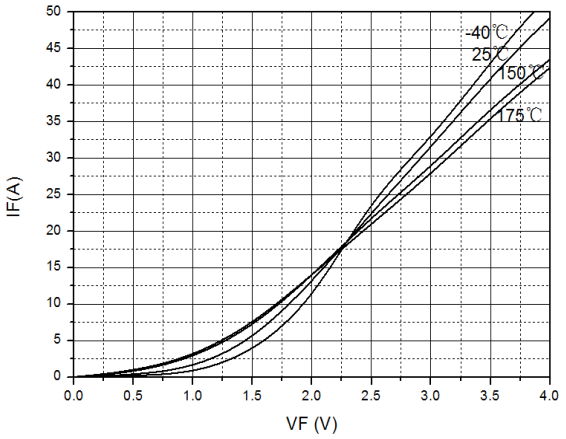
I_C VS temperature



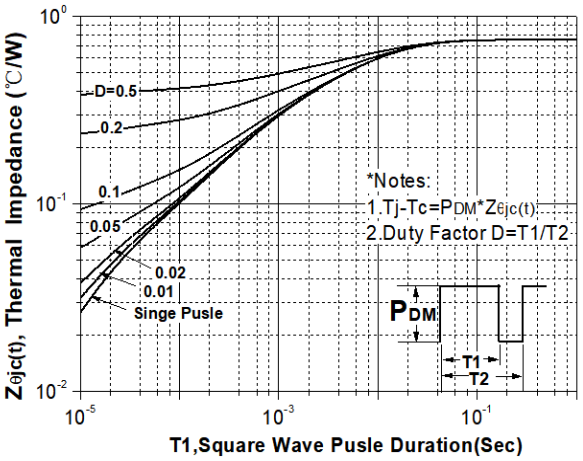
Q_g VS V_{GE}



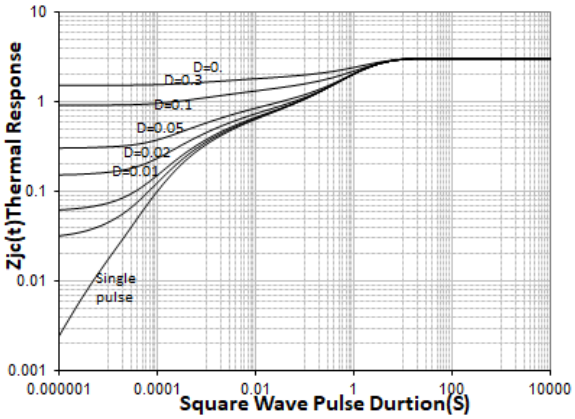
Diode Characteristic



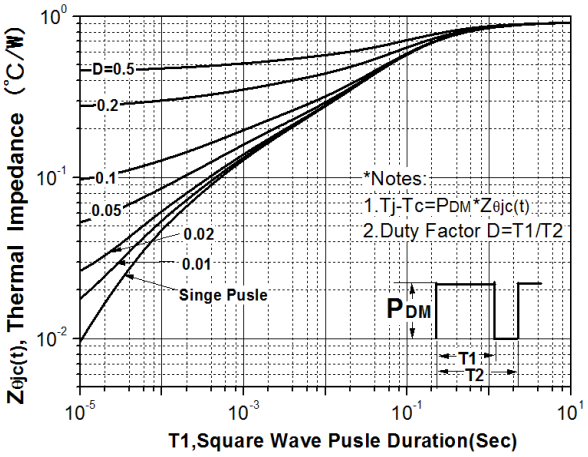
Normalized Maximum Transient Thermal Impedance for IGBT(TO-263/TO-220C)



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

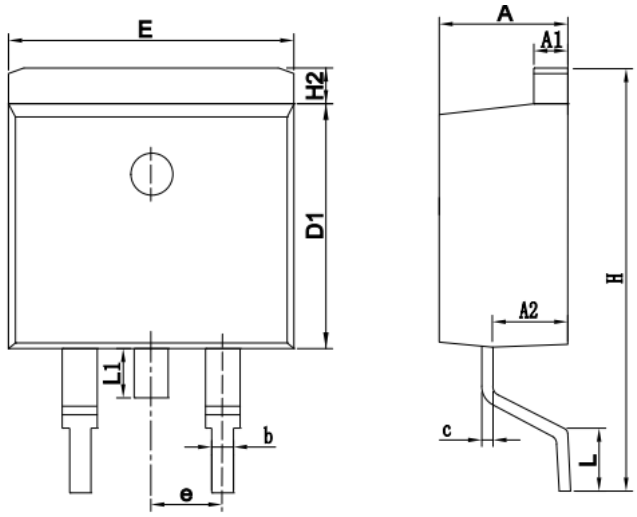


Normalized Maximum Transient Thermal Impedance for IGBT(TO-247)



外形尺寸PACKAGE MECHANICAL DATA

TO-263

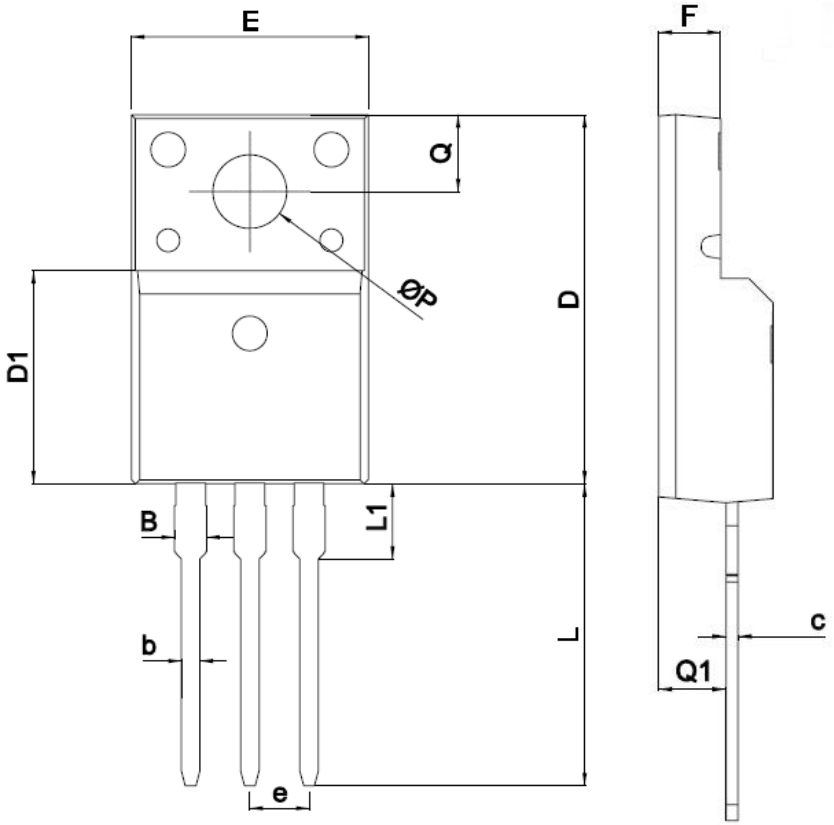


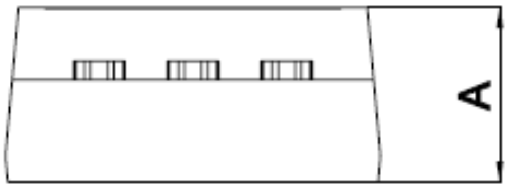
单位 **UNIT:mm**

SYMBOL	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	2.54 BSC	
H	14.50	15.50
H2	1.12	1.45
L	1.50	2.80
L1	1.45	1.70

外形尺寸PACKAGE MECHANICAL DATA

TO-220MF 单位 **UNIT:mm**



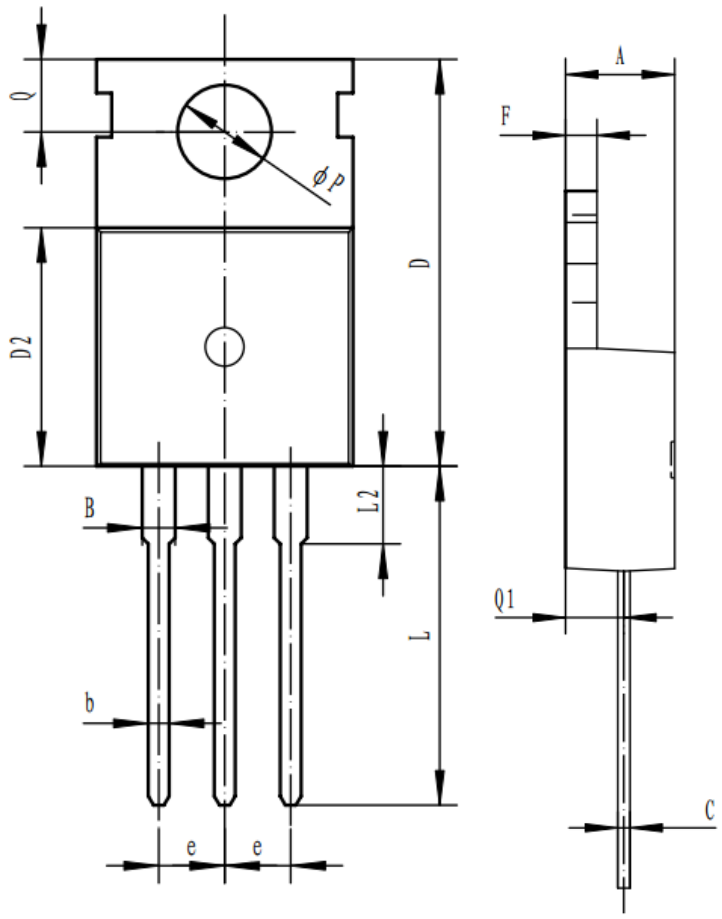


SYMBOL	mm	
	MIN	MAX
A	4.5	4.9
B		1.47
b	0.7	0.9
c	0.45	0.60
D	15.67	16.07
D1	9.04	9.20
e	2.54TYPE	
E	9.96	10.36
F	2.34	2.74
L	12.58	13.38
L1	3.13	3.33
Q	3.2	3.4
Q1	2.56	2.96
ΦP	3.08	3.28

外形尺寸PACKAGE MECHANICAL DATA

TO-220C

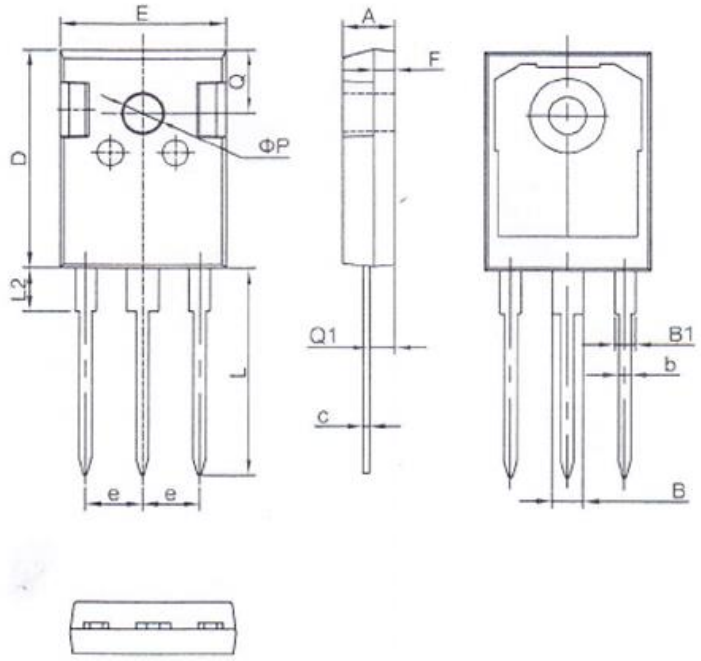
单位 UNIT:mm



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

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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