



TT06N065EQ

主要参数 MAIN CHARACTERISTICS

Ic	6A
VCE	650V
Vcesat-typ	1.6V

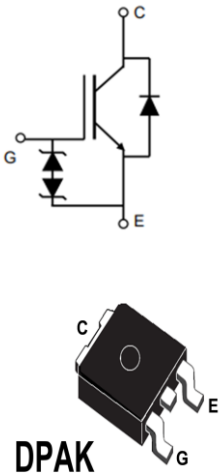
用途

- 逆变器
- 电机控制

APPLICATIONS

- General purpose inverters
- Motor control

封装 Package



产品特性

- 低栅极电荷
- Trench FS 技术
- RoHS 产品
- 低开关损耗
- VCE(sat)正温度系数
- ESD 人体模式 Class2

FEATURES

- Low gate charge
- Trench FS Technology
- RoHS product
- Low switching losses
- VCE(sat) with positive temperature coefficient
- ESD HBM Class2

订货信息 ORDER MESSAGE

订 货 型 号 Order codes	印 记 Marking	封 装 Package
无卤-编带 Halogen-Free-Reel		
TT06N065EQ-R-AR	TT06N065EQ	DPAK



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	12($T_c=25^{\circ}\text{C}$)	A
		6($T_c=100^{\circ}\text{C}$)	A
最大脉冲集电极极电流 (注 1) Collector current – pulse (note 1)	I_{CM}	20	A
*二极管正向测试电流 Diode RMS forward current	I_F	10 ($T_c=25^{\circ}\text{C}$)	A
		5($T_c=100^{\circ}\text{C}$)	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}	15	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}	± 25	V
耗散功率 Power dissipation	P_D $T_c=25^{\circ}\text{C}$	56.8	W
	P_D $T_c=100^{\circ}\text{C}$	28.4	
工作结温 Operating junction temperature range	T_{VJ}	$-40 \sim +150$	$^{\circ}\text{C}$
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	270	$^{\circ}\text{C}$

*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.





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}	$I_C=250\mu A, V_{GE}=0V$	650	-	-	V
零栅压下集电极漏电流 Zero gate voltage collector current	I_{CES}	$V_{CE}=650V, V_{GE}=0V, T_{vj}=25^{\circ}C$	-	-	10	μA
正向栅极体漏电流 Gate-body leakage current,forward	I_{GESF}	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$	-	-	100	μA
反向栅极体漏电流 Gate-body leakage current,reverse	I_{GESR}	$V_{CE}=0V, V_{GE}=-20V, T_{vj}=25^{\circ}C$	-	-	-100	μA
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-emitter saturation voltage	V_{CESAT}	$V_{GE}=15V, I_C=6A$ $T_{vj}=25^{\circ}C$ $T_{vj}=150^{\circ}C$	- -	1.6 1.9	2.0 -	V
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{ies}	$V_{CE}=25V$ $V_{GE}=0V$ $f=1.0MHz$	-	339	-	pF
输出电容 Output capacitance	C_{oes}		-	29	-	pF
反向传输电容 Reverse transfer capacitance	C_{res}		-	9	-	pF
栅极电荷总量 Total gate charge	Q_g	$V_{CC}=520V, I_C=6A, V_{GE}=15V$	-	15	-	nC
栅极-发射极 Gate to emitter charge	Q_{ge}		-	4.3	-	
栅极-集电极 Gate to collector charge	Q_{gc}		-	6.3	-	





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	$t_{d(on)}$	$V_{CC}=400V, I_c=6A, R_G=60\Omega$ $V_{GE}=15V$ $T_{vj}=25^\circ C$	-	10	-	ns
上升时间 Turn-on rise time	t_r		-	26	-	ns
关断延迟时间 Turn-off delay time	$t_{d(off)}$		-	56	-	ns
下降时间 Turn-off fall time	t_f		-	138	-	ns
开通损耗 Turn-on energy	Eon		-	92	-	uJ
关断损耗 Turn-off energy	Eoff		-	142	-	uJ
总开关损耗 Total switching energy	Etot		-	234	-	uJ
开启延迟时间 Turn-on delay time	$t_{d(on)}$	$V_{CC}=400V, I_c=6A, R_G=60\Omega$ $V_{GE}=15V$ $T_{vj}=150^\circ C$	-	10	-	ns
上升时间 Turn-on rise time	t_r		-	30	-	ns
关断延迟时间 Turn-off delay time	$t_{d(off)}$		-	66	-	ns
下降时间 Turn-off fall time	t_f		-	212	-	ns
开通损耗 Turn-on energy	Eon		-	100	-	uJ
关断损耗 Turn-off energy	Eoff		-	204	-	uJ
总开关损耗 Total switching energy	Etot		-	304	-	uJ

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

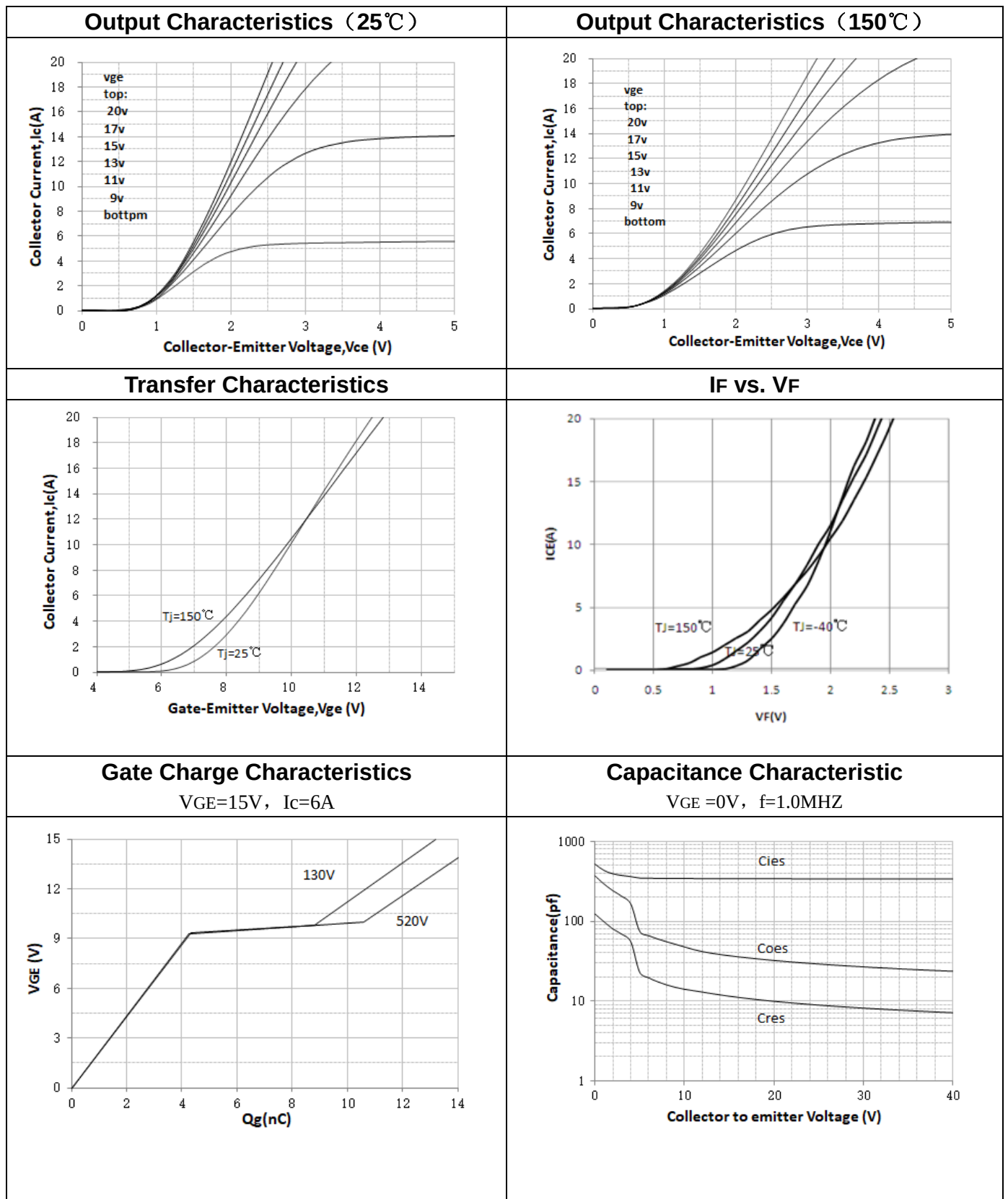
正向压降 Diode forward voltage	V_F	$I_F=5A, T_{vj}=25^\circ C$ $T_{vj}=150^\circ C$	-	1.65 1.4	2.2 -	V
反向恢复时间 Reverse recovery time	trr	$V_R=400V, I_F=5A$ $dI_F/dt=200A/\mu s$ $T_{vj}=25^\circ C$	-	89	-	ns
反向恢复电荷 Diode reverse recovery charge	Qrr		-	148	-	nC
反向恢复电流 Diode reverse recovery current	Irrm		-	1.8	-	A
反向恢复时间 Diode reverse recovery time	trr	$V_R=400V, I_F=5A$ $dI_F/dt=200A/\mu s$ $T_{vj}=150^\circ C$	-	232	-	ns
反向恢复电荷 Diode reverse recovery charge	Qrr		-	292	-	nC
反向恢复电流 Diode reverse recovery current	Irrm		-	2.6	-	A

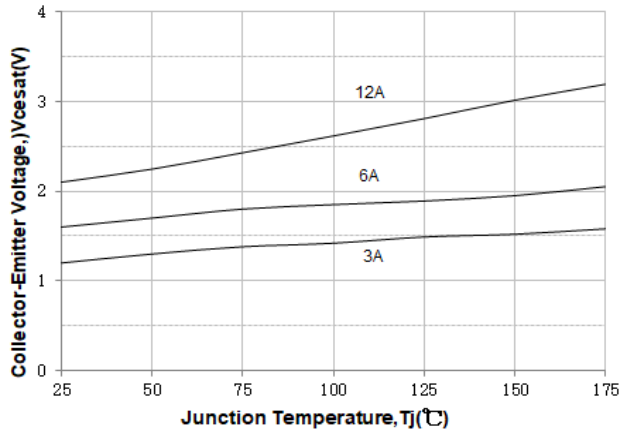
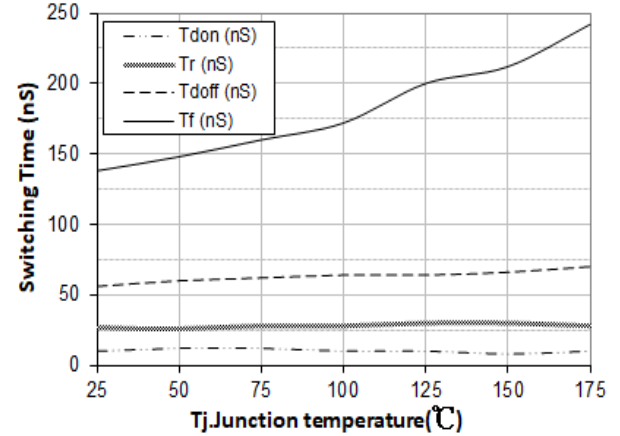
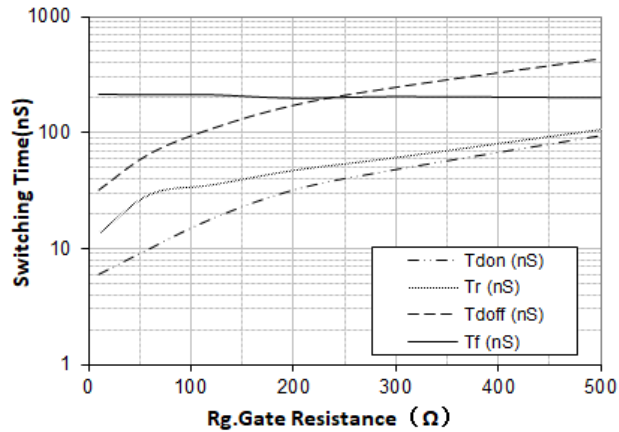
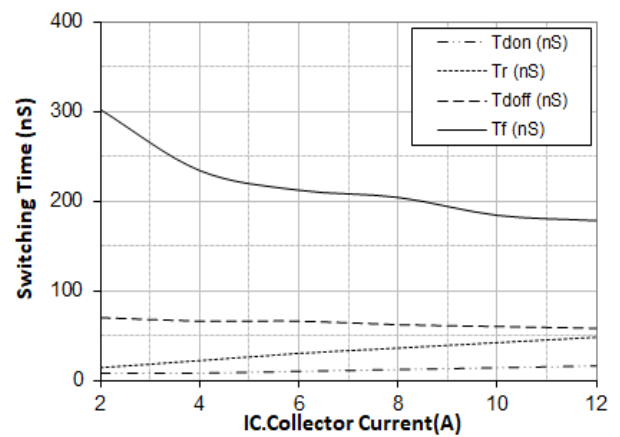
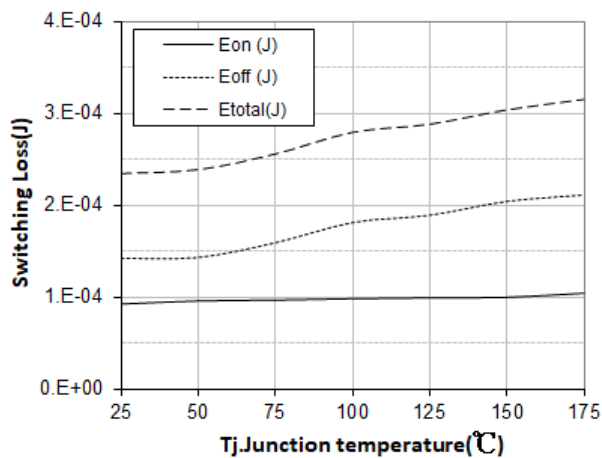
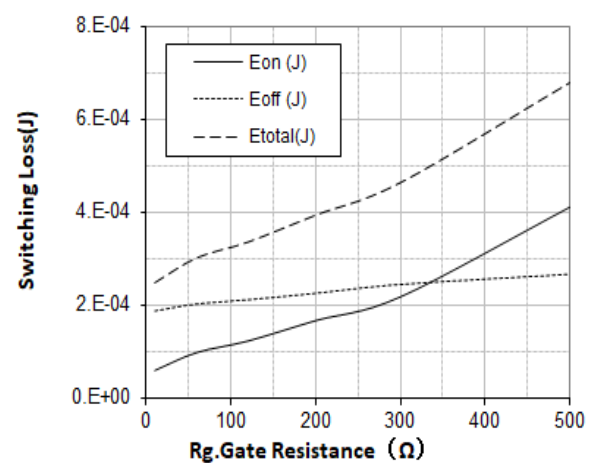
项 目 Parameter	符 号 Symbol	Typ	MAX	单 位 Unit
结到管壳的热阻 Junction to case IGBT	$R_{th(j-c)}$	1.8	2.2	$^\circ C/W$
结到管壳的热阻 Junction to case Diode	$R_{th(j-c)}$	6.1	6.5	$^\circ C/W$
结到环境的热阻 Junction to ambient	$R_{th(j-a)}$	65		$^\circ C/W$

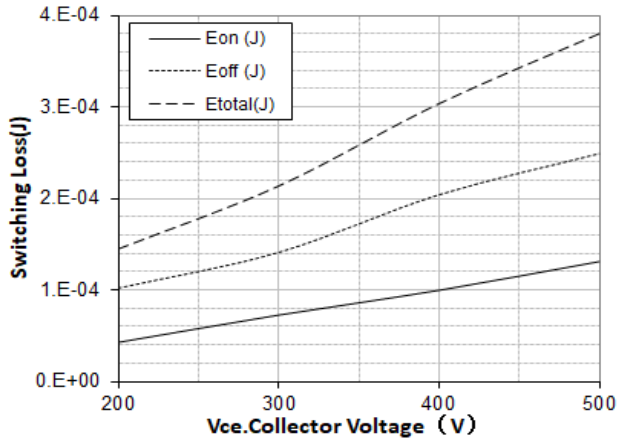
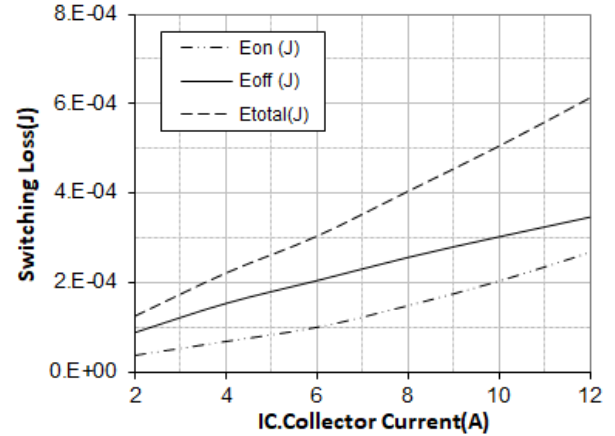
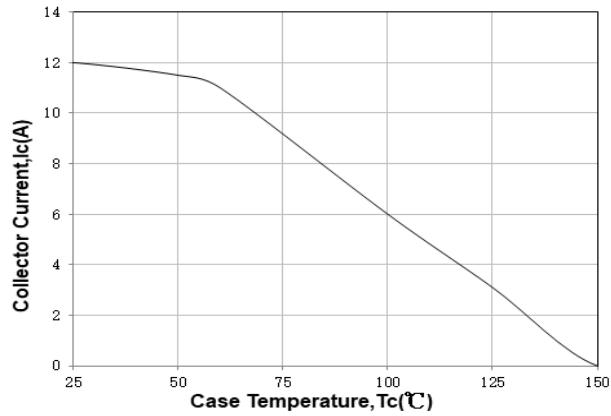
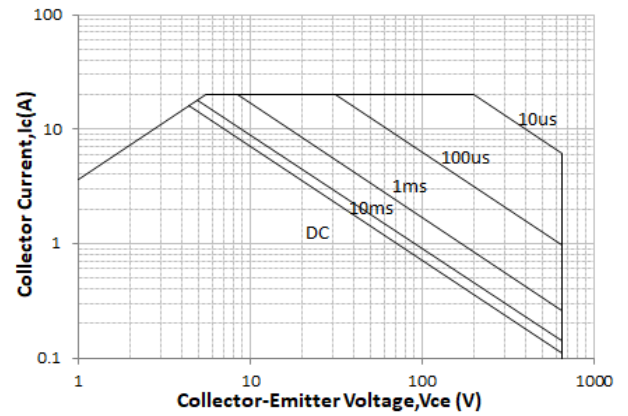
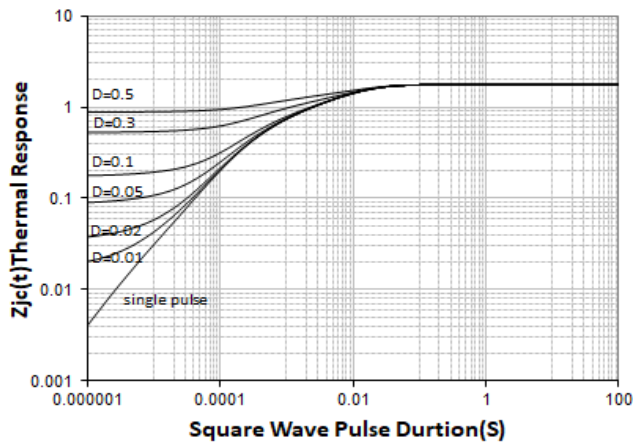
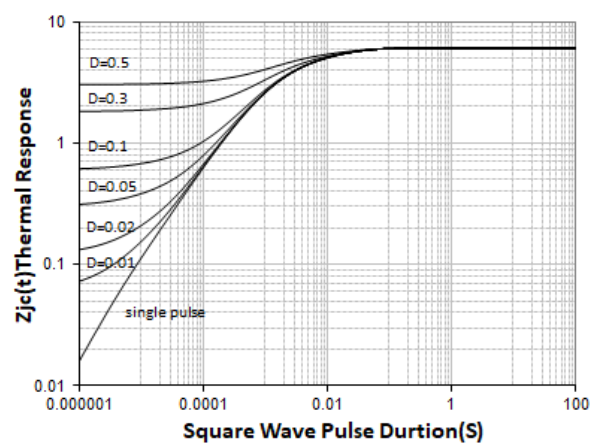




特征曲线 ELECTRICAL CHARACTERISTICS (curves)



**V_{CESAT} vs. T_j**V_{GE}=15V, I_C=3A, 6A, 12A**Switching Time vs. T_j**V_{GE}=15V, V_{CE}=400V, I_C=6A, R_G=60Ω**Switching Time vs. R_G(150°C)**V_{GE}=15V, V_{CE}=400V, I_C=6A**Switching Time vs. I_C(150°C)**V_{CE}=400V, V_{GE}=15V, R_G=60Ω**Switching Loss vs. T_j**V_{GE}=15V, V_{CE}=400V, I_C=6A, R_G=60Ω**Switching Loss vs. R_G(150°C)**V_{GE}=15V, V_{CE}=400V, I_C=6A

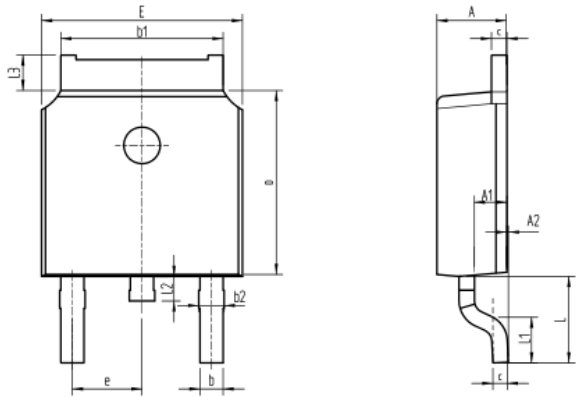
**Switching Loss vs. $V_{CE}(150^{\circ}\text{C})$** $V_{GE}=15\text{V}$, $I_C=6\text{A}$, $R_G=60\Omega$ **Switching Loss vs. $I_C(150^{\circ}\text{C})$** $V_{GE}=15\text{V}$, $R_G=60\Omega$ **Collector current vs. Case temperature****Forward Bias Safe Operating Area****Transient Thermal Impedance for IGBT****Transient Thermal Impedance for FRD**



外形尺寸 PACKAGE MECHANICAL DATA

DPAK

单位 Unit: mm



SYMBOL	mm	
	MIN	MAX
A	2.16	2.41
A1	0.97	1.17
A2	0.00	0.15
b	0.63	0.93
b1	5.13	5.53
b2	0.66	0.96
c	0.40	0.60
D	5.80	6.40
E	6.30	6.90
e	2.286BSC	
L	2.50	3.30
L1	1.20	1.80
L2	0.60	1.00
L3	0.85	1.30



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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

