



JT040K065WED

主要参数 MAIN CHARACTERISTICS

I_C	40 A
V_{CES}	650V
$V_{cesat-typ}(V_{ge}=15V)$	1.7V

用途

- 逆变器
- UPS 电源
- 电机控制

APPLICATIONS

- General purpose inverters
- UPS
- Motor Control

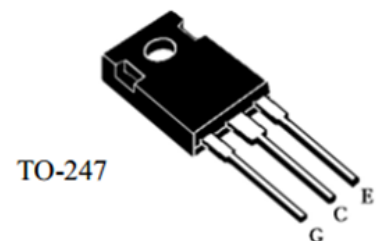
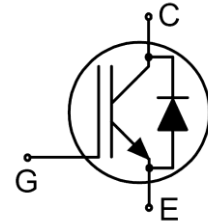
产品特性

- 低栅极电荷
- Trench FS 技术,
- RoHS 产品

FEATURES

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

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		
JT040K065WED-GE-B	JT040K065WED-GE-BR	N/A	N/A	JT040K065WED	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
		JT040K065WED	
最高集电极—发射极直流电压 Collector-Emmitter Voltage	V_{CES}	650	V
*连续集电极电流 Collector Current-continuous	I_C	80($T_C=25^{\circ}\text{C}$)	A
		40($T_C=100^{\circ}\text{C}$)	A
最大脉冲集电极极电流 (注 1) Collector Current – pulse (note 1)	I_{CM}	160	A
二极管正向测试电流 Diode RMS forward current	I_F	80($T_C=25^{\circ}\text{C}$)	A
		40($T_C=100^{\circ}\text{C}$)	A
二极管正向脉冲电流 Diode pulse current	I_{FSM}	160	A
最高栅极发射极电压 Gate-Emmitter Voltage	V_{GES}	± 20	V
Turn-off safe area	-	160	A
耗散功率 Power Dissipation	P_D $T_C=25^{\circ}\text{C}$	340	W
存储温度 Storage Temperature Range	T_{STG}	$-55 \sim +150$	$^{\circ}\text{C}$
结温 Junction Temperature Range	T_J	$-55 \sim +175$	$^{\circ}\text{C}$
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}	$I_C=250\mu A, V_{GE}=0V$	650	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	$\Delta BV_{CES}/\Delta T_J$	$I_C=0.5mA$, referenced to $25^\circ C$	-	0.6	-	V/ $^\circ C$
零栅压下集电极漏电流 Zero Gate Voltage Collector Current	I_{CES}	$V_{CE}=650V, V_{GE}=0V, T_C=25^\circ C$	-	-	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	$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C=250\mu A$	4.5	-	6.5	V
饱和压降 Collector-Emmitter saturation Voltage	V_{CESAT}	$V_{GE}=15V, I_C=40A$ $T_C=25^\circ C$ $T_C=175^\circ C$	- -	1.7 2.2	2.4 -	V
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{ies}	$V_{CE}=25V,$ $V_{GE}=0V,$ $f=1.0MHz$	-	2392	-	pF
输出电容 Output capacitance	C_{oes}		-	193	-	pF
反向传输电容 Reverse transfer capacitance	C_{res}		-	64.5	-	pF
栅极电荷总量 Total Gate Charge	Q_g	$V_{CC}=480V, I_C=40A, R_G=10\Omega, V_{GE}=15V$ $T_C=25^\circ C$	-	79.2	-	nC
栅极-发射极 Gate to emitter charge	Q_{ge}		-	24.6	-	
栅极-集电极 Gate to collector charge	Q_{gc}		-	34.1	-	
栅极电阻-Gate resistance	R_g	$f=1\text{ MHz}$, open collector	-	1.3	-	Ω
短路电流-short current	I_{SC}	$V_{GE}=15V, V_{CE} \leq 400V, t \leq 10\mu s$	-	190	-	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	$t_{d(on)}$	$V_{CC}=400V, I_c=40A, R_G=10.5\Omega$ $V_{GE}=15V$ $T_C=25^\circ C$	-	24		ns
上升时间 Turn-On rise time	t_r		-	84	-	ns
关断延迟时间 Turn-Off delay time	$t_{d(off)}$		-	70	-	ns
下降时间 Turn-Off Fall time	t_f		-	78	-	ns
开通损耗 Turn-On energy	E_{on}		-	1.11	-	mJ
关断损耗 Turn-off energy	E_{off}		-	1.11	-	mJ
总开关损耗 Total switching energy	E_{tot}		-	2.22	-	mJ
开启延迟时间 Turn-On delay time	$t_{d(on)}$	$V_{CC}=400V, I_c=40A, R_G=10.5\Omega$ $V_{GE}=15V$ $T_C=175^\circ C$	-	30	-	ns
上升时间 Turn-On rise time	t_r		-	78	-	ns
关断延迟时间 Turn-Off delay time	$t_{d(off)}$		-	96	-	ns
下降时间 Turn-Off Fall time	t_f		-	160	-	ns
开通损耗 Turn-On energy	E_{on}		-	1.13	-	mJ
关断损耗 Turn-off energy	E_{off}		-	1.25	-	mJ
总开关损耗 Total switching energy	E_{tot}		-	2.38	-	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	$V_{GE}=0V, I_F=20A, T_C=25^\circ C$	-	1.5	2.5	V
		$V_{GE}=0V, I_F=20A, T_C=175^\circ C$	-	1.15	-	V
反向恢复时间 Diode Reverse recovery time	t_{rr}	$V_{GE}=0V, V_R=400V, I_F=15A$ $dI_F/dt=1000A/\mu s$ $T_C=25^\circ C$	-	36	-	ns
反向恢复电荷 Diode Reverse recovery charge	Q_{rr}		-	0.3	-	uC
反向恢复电流 Diode Reverse recovery Current	I_{RRM}		-	10	-	A
反向恢复时间 Diode Reverse recovery time	t_{rr}	$V_{GE}=0V, V_R=400V, I_F=15A$ $dI_F/dt=1000A/\mu s$ $T_C=175^\circ C$	-	116	-	ns
反向恢复电荷 Diode Reverse recovery charge	Q_{rr}		-	1.1	-	uC
反向恢复电流 Diode Reverse recovery Current	I_{RRM}		-	15.8	-	A

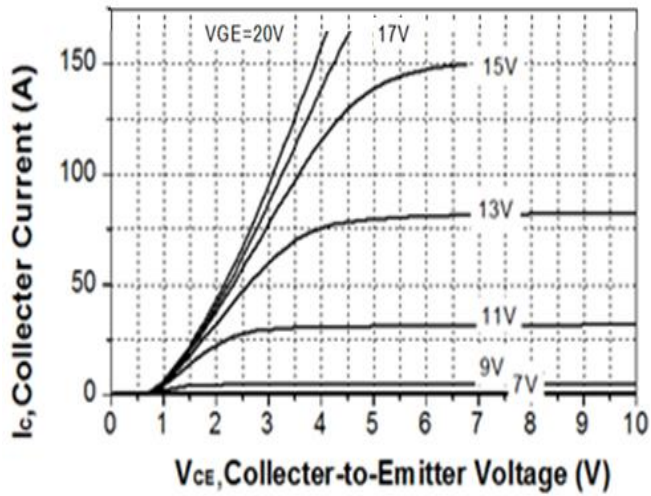
项 目 Parameter	符 号 Symbol	MAX	单 位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case IGBT	$R_{th(j-c)}$	0.44	$^\circ C/W$
结到管壳的热阻 Thermal Resistance, Junction to Case diode	$R_{th(j-c)}$	0.9	$^\circ C/W$
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	40	$^\circ C/W$



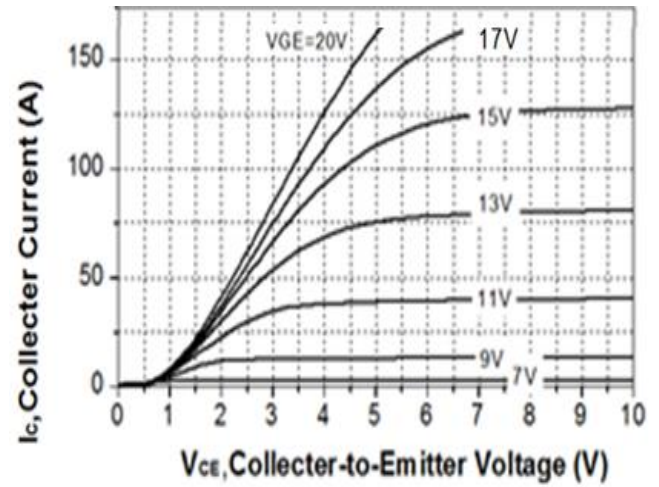
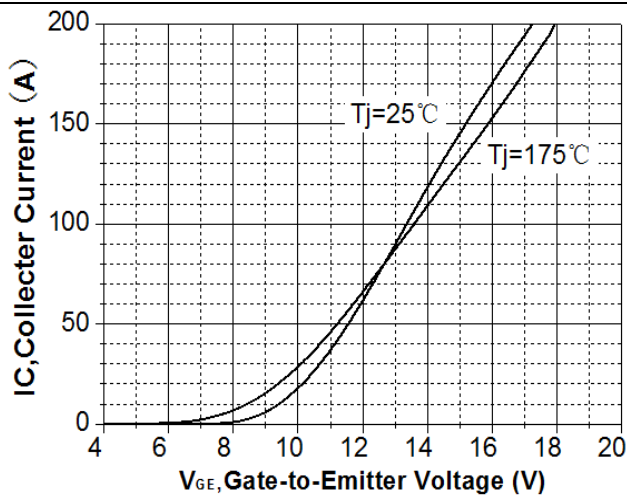
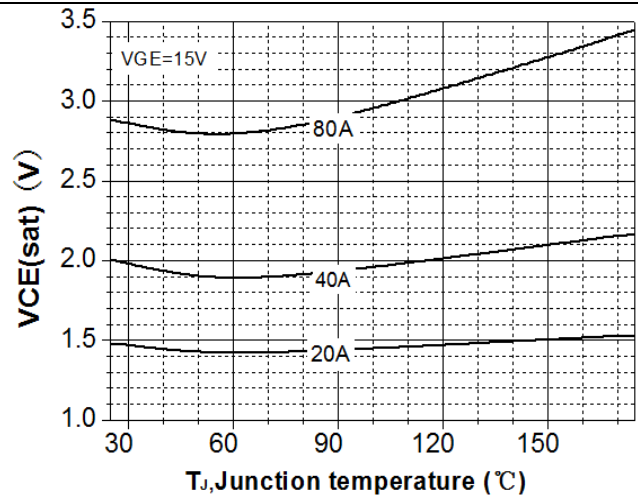
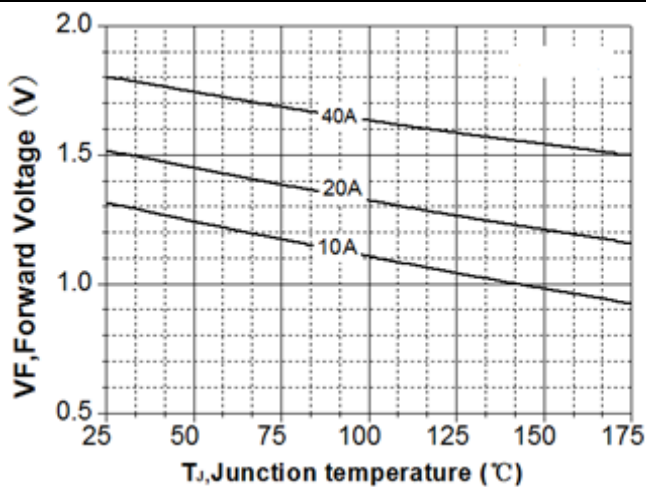
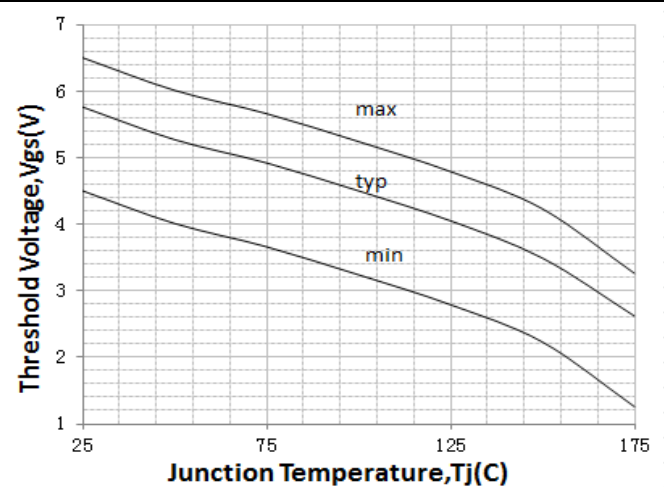


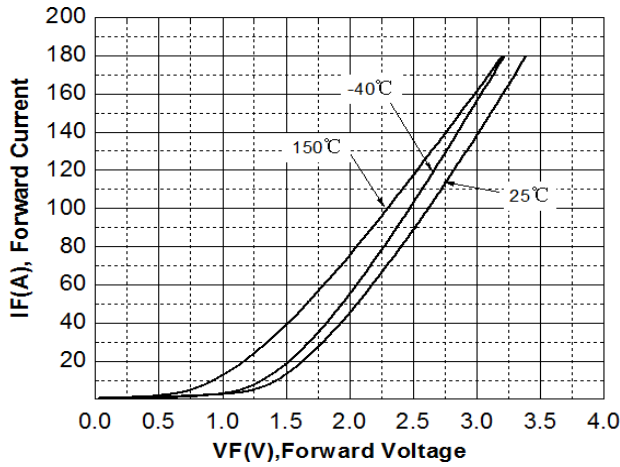
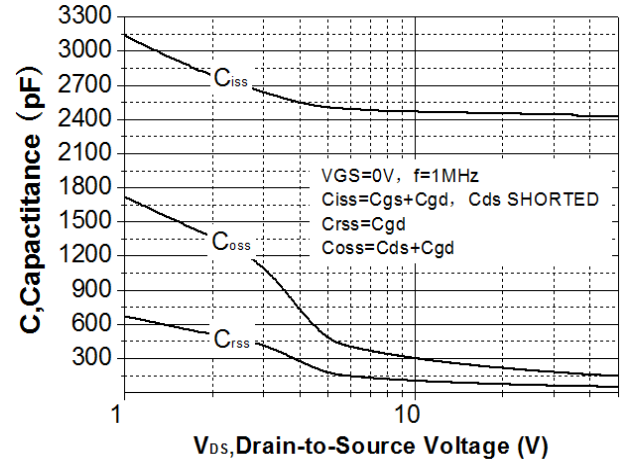
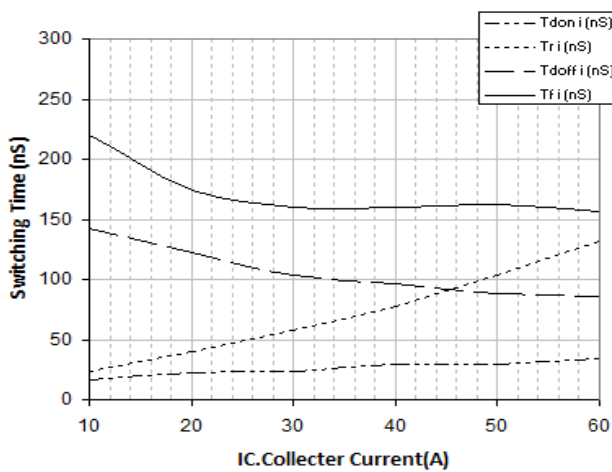
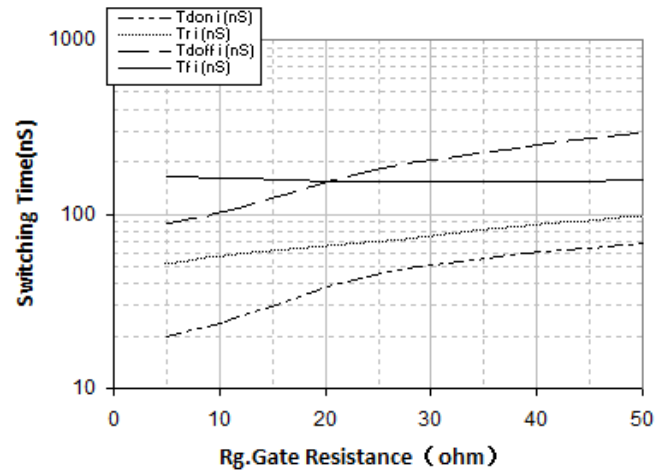
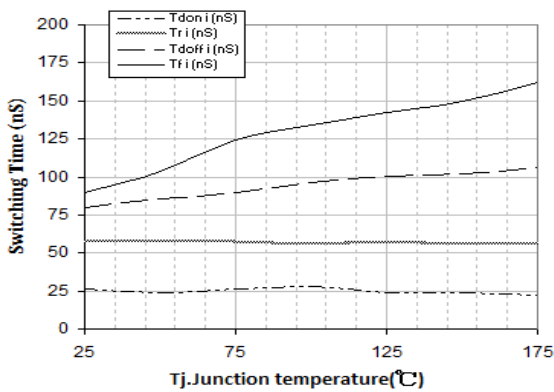
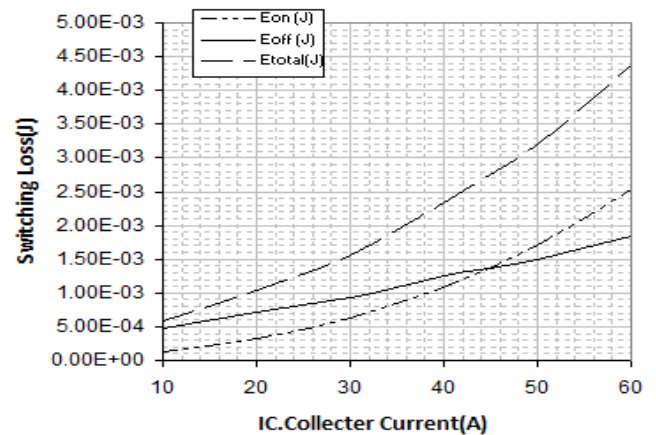
特征曲线 ELECTRICAL CHARACTERISTICS (curves)

Output Characteristics (25°C)



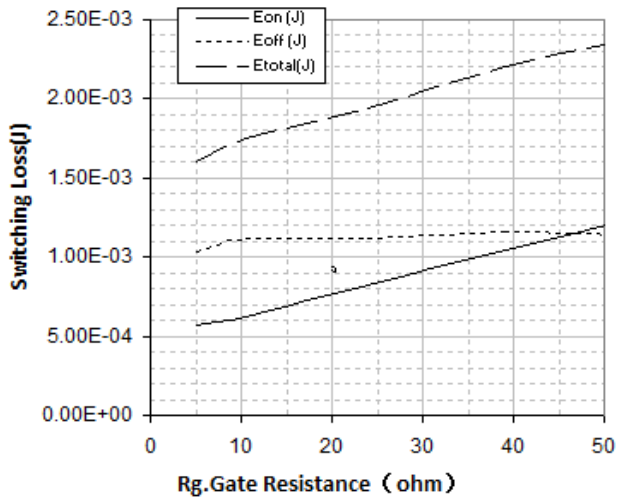
Output Characteristics (175°C)

Transfer Characteristics
 $V_{CE}=20V$  $V_{CE(sat)}$ vs. T_J  V_F vs. T_J  V_{TH} vs. T_J 

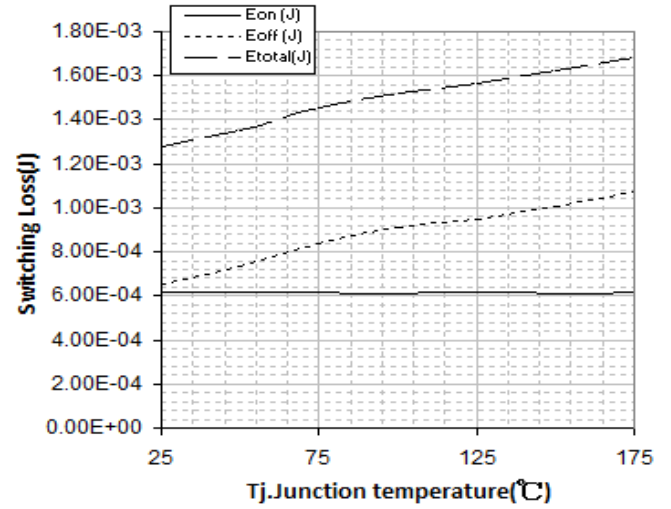
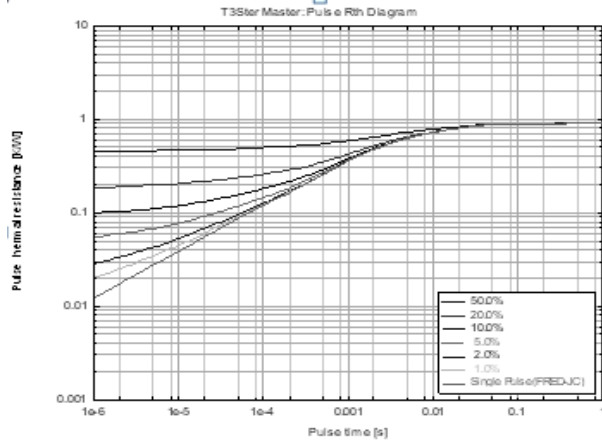
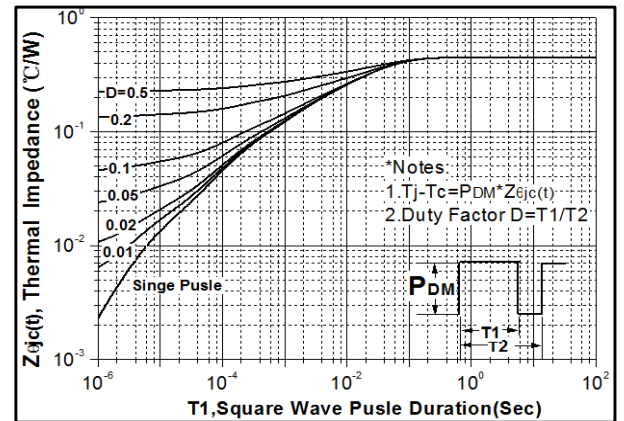
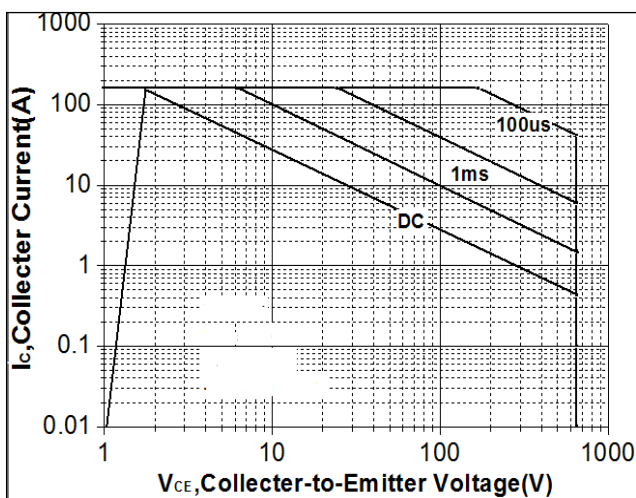
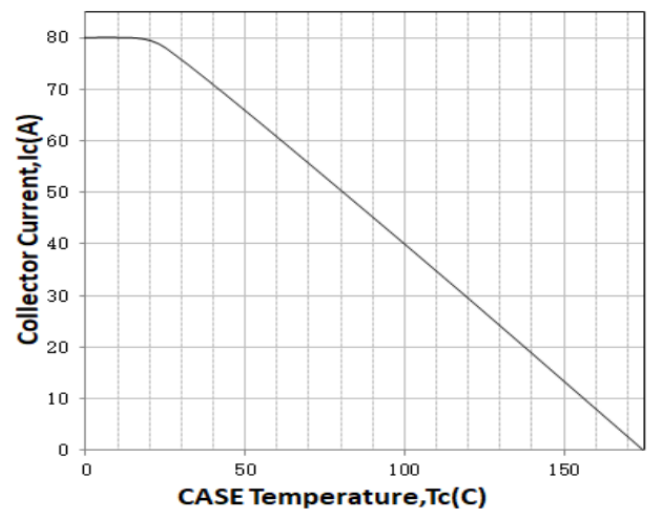
**Diode Characteristic****Capacitance Characteristic** $V_{GE} = 0V$, $f = 1.0MHz$ **Switching Time vs. I_C (175°C)** $V_{GE} = 15V$, $V_{CE} = 400V$, $R_G = 10.5\Omega$ **Switching Time vs. R_G (175°C)** $V_{GE} = 15V$, $V_{CE} = 400V$, $I_C = 40A$ **Switching Time vs. T_j** $V_{GE} = 15V$, $V_{CE} = 400V$, $I_C = 40A$, $R_G = 10.5\Omega$ **Switching Loss vs. I_C (175°C)** $V_{GE} = 15V$, $V_{CE} = 400V$, $R_G = 10.5\Omega$ 

**Switching Loss vs. Rg(175℃)**

VGE=15V, VCE=400V, IC=40A

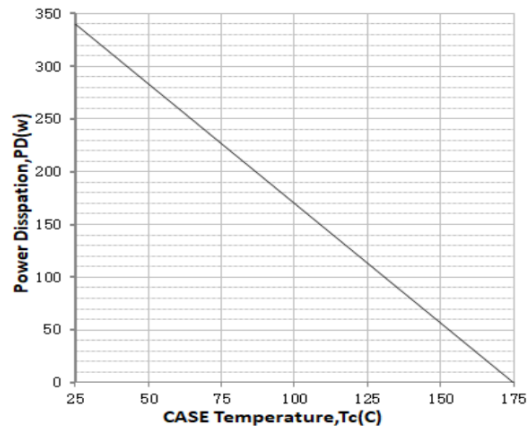
**Switching Loss vs. Tj**

VGE=15V, VCE=400V, IC=40A, Rg=10.5Ω

**Transient Thermal Impedance for Diode****Transient Thermal Impedance for IGBT****Forward Bias SOA****Collector vs.case temperature**



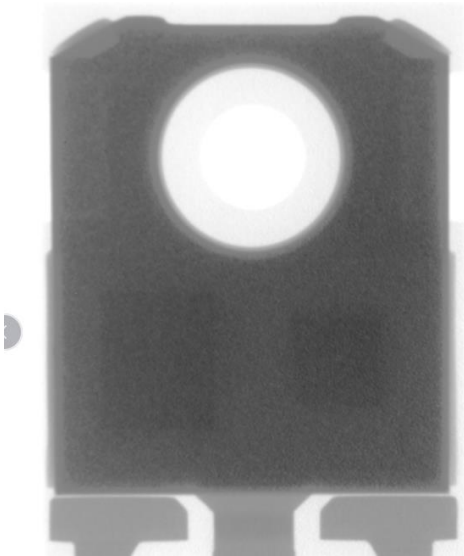
Power Dissipation vs.case temperature





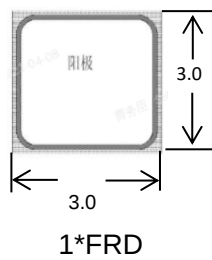
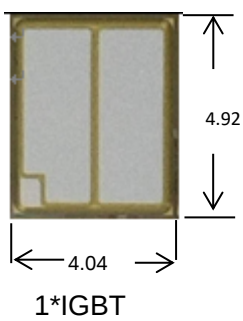
产品内部结构

X光图片：



芯片尺寸及规格：

芯片名称	IGBT	FRD
规格	650V/40A	700V/40A
合封芯片数量	1	1
晶粒尺寸（mm*mm）	4.04*4.94	3.0*3.0
键合线	6mil 铝线/15mil 铝线	15mil 铝线
晶圆厂家	吉林华微	吉林华微
晶圆型号	T040K065E	D300E7
封装厂	华羿	华羿

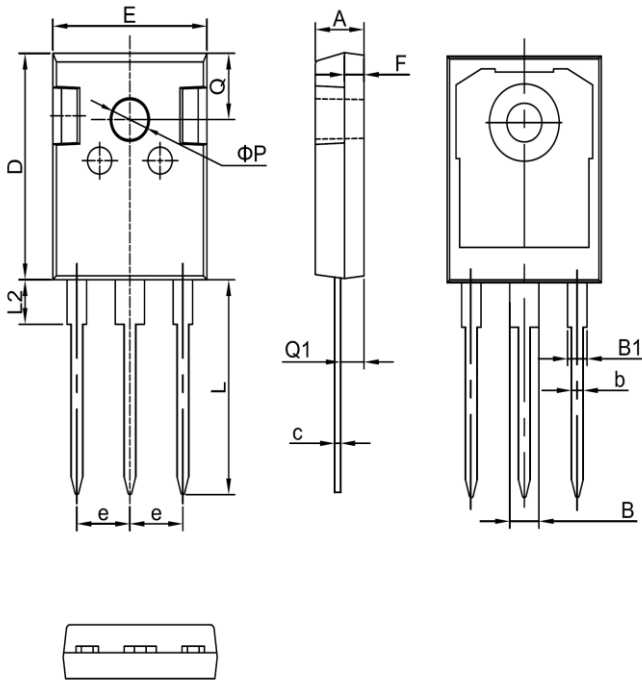




外形尺寸 PACKAGE MECHANICAL DATA

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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