

75GU65F1

主要参数 Main Characteristics

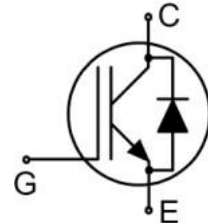
I _C	75A
V _{ces}	600 V
V _{cesat-typ}	1.9V

用途

- 光伏逆变器
- UPS 电源
- 电焊机
- 中高频率逆变器

Applications

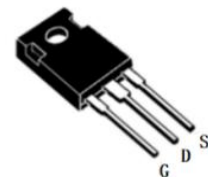
- Solar Converters
- Uninterrupted Power Supply
- Welding Converters
- Mid to High Range Switching
Frequency Converters



TO-247

产品特性

- 600V, 75A
- $V_{CE(sat)(typ.)} = 1.9V @ V_{GE} = 15V, I_C = 75A$
- Maximum Junction Temperature 175°C
- Pb-free Lead Plating; RoHS Compliant



产品中有毒有害物质或元素的名称及含量

部件名称 含量要求	有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
	≤0.1%	≤0.1%	≤0.01%	≤0.1%	≤0.1%	≤0.1%
引线框	○	○	○	○	○	○
塑封树脂	○	○	○	○	○	○
管 芯	○	○	○	○	○	○
内引线	○	○	○	○	○	○
焊 料	×	○	○	○	○	○
说 明	○：表示该元素的含量在 SJ/T11363-2006 标准的限量要求以下。 ×：表示该元素的含量超出 SJ/T11363-2006 标准的限量要求。 目前产品的焊料中含有铅 (Pb) 成分，但属于欧盟 RoHS 指令豁免范围。					

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}	650	V
最高栅极发射极电压 Gate-Emmitter Voltage	V_{GES}	± 30	V
连续集电极电流 Collector Current-continuous	$I_C \quad T_C=25^{\circ}\text{C}$	115	A
	$I_C \quad T_C=100^{\circ}\text{C}$	75	A
最大脉冲集电极极电流（注 1） Collector Current – pulse （note 1）	I_{CM}	225	A
二极管正向电流 Diode Continuous Forward Current	$I_F \quad T_C=100^{\circ}\text{C}$	75	A
二极管最大正向电流 Diode Maximum Forward Current (Note 1)	I_{FM}	225	A
短路时间 Short Circuit Withstand Time ($T_J \leq 150^{\circ}\text{C}$)	t_{sc}	5	μs
耗散功率 Power Dissipation	$P_D \quad T_C=25^{\circ}\text{C}$	375	W
	$P_D \quad T_C=100^{\circ}\text{C}$	187	W
最高结温 Operating Junction Temperature	T_J	$-55 \sim +175$	$^{\circ}\text{C}$
存储温度 Storage Temperature Range	T_{STG}	$-55 \sim +150$	$^{\circ}\text{C}$

热特性 **Electrical Characteristics**

项 目 Parameter	符 号 Symbol	数 值 Value	单位 Unit
IGBT结到管壳的热阻 Thermal Resistance, Junction to case for IGBT	$R_{th\ j-c}$	0.4	$^{\circ}\text{C}/\text{W}$
FRD结到管壳的热阻 Thermal Resistance, Junction to case for Diode	$R_{th\ j-c}$	0.42	$^{\circ}\text{C}/\text{W}$
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th\ j-a}$	40	$^{\circ}\text{C}/\text{W}$

IGBT电特性 Electrical Characteristics of IGBT($T_c=25^{\circ}\text{C}$ unless otherwise noted)

项 目 Parameter	符 号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
集电极-发射极击穿电压 Collector-Emitter Breakdown Voltage	BV_{CES}	$V_{GE}=0V, I_C=250\mu A$	650	-	-	V
零栅压下集电极漏电流 Collector-Emitter Leakage Current	I_{CES}	$V_{CE}=650V, V_{GE}=0V$	-	-	75	μA
正向栅极体漏电流 Gate Leakage Current	I_{GES}	$V_{GE}=\pm 30V, V_{CE}=0V$	-	-	± 100	nA
阈值电压 Gate Threshold Voltage	$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C=250\mu A$	3.2	4.0	4.8	V
饱和压降 Collector-Emmitter saturation Voltage	$V_{CE(sat)}$	$I_C=75A \quad T_C=25^{\circ}\text{C}$	1.50	1.90	2.40	V
		$I_C=75A \quad T_C=125^{\circ}\text{C}$		2.15		V
栅极电荷总量 Total Gate Charge	Q_g	$V_{CC}=520V$ $V_{GE}=15V \quad I_C=75A$	-	118	-	nC
栅极-反射极 Gate to emitter charge	Q_{ge}		-	32	-	nC
栅极-集电极 Gate to collector charge	Q_{gc}		-	30	-	nC
开启延迟时间 Turn-On delay time	$t_{d(on)}$	$V_{CC}=520V$ $V_{GE}=15V \quad I_C=75A$ $R_G=15\Omega$ Inductive Load $T_C=25^{\circ}\text{C}$	-	45	-	ns
上升时间 Turn-On rise time	t_r		-	100	-	ns
关断延迟时间 Turn-Off delay time	$t_{d(off)}$		-	232	-	ns
下降时间 Turn-Off Fall time	t_f		-	137	-	ns
开通损耗 Turn-On energy	E_{on}		-	3.56	-	mJ
关断损耗 Turn-off energy	E_{off}		-	4.58	-	mJ
总开关损耗 Total switching energy	E_{tot}		-	8.14	-	mJ
输入电容 Input capacitance	C_{ies}	$V_{CE}=25V$ $V_{GE}=0V$ $f=1\text{MHz}$	-	3780	-	pF
输出电容 Output capacitance	C_{oes}		-	356	-	pF
反向传输电容 Reverse transfer capacitance	C_{res}		-	37	-	pF

二极管电特性 Electrical Characteristics of Diode ($T_c=25^{\circ}\text{C}$ unless otherwise noted)

正向压降 Diode Forward Voltage	V_F	$I_F=75A$	-	1.58	2.0	V
		$I_F=75A \quad T_C=125^{\circ}\text{C}$		1.35		V
反向恢复时间 Diode Reverse Recovery Time	t_{rr}	$V_{CE}=400V$ $I_F=75A$ $dI_F/dt=200A/\mu s$	-	135		ns
反向恢复电流 Diode peak Reverse Recovery Current	I_{rr}		-	28		A
反向恢复电荷 Diode Reverse Recovery Charge	Q_{rr}		-	1.8		nC

Note1: Repetitive rating, pulse width limited by maximum junction temperature

特征曲线 ELECTRICAL CHARACTERISTICS (curves)

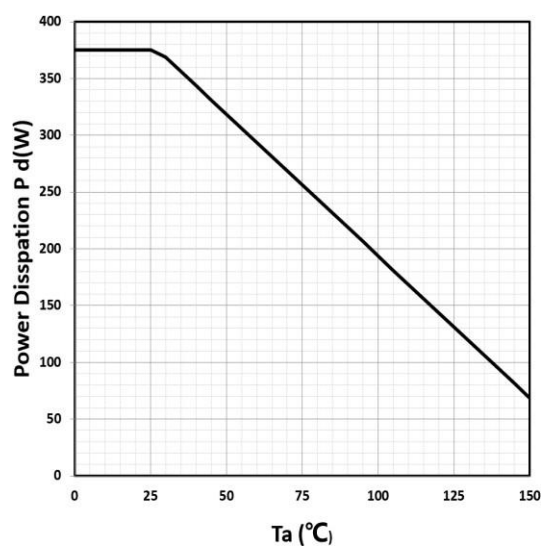


Figure1: power dissipation VS. case temperature

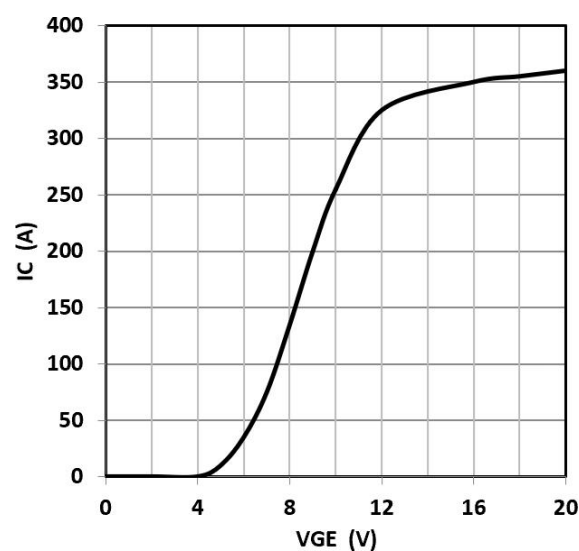
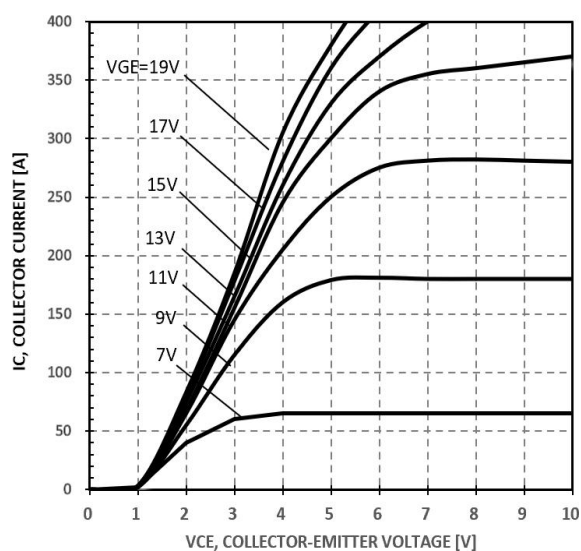
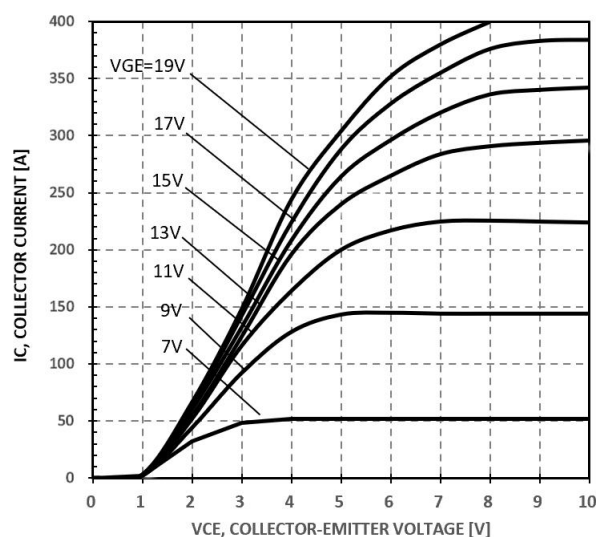


Figure2: VGE VS IC

Figure3: typical IGBT output characteristics,
TJ=25°CFigure4: typical IGBT output characteristics,
TJ=150°C

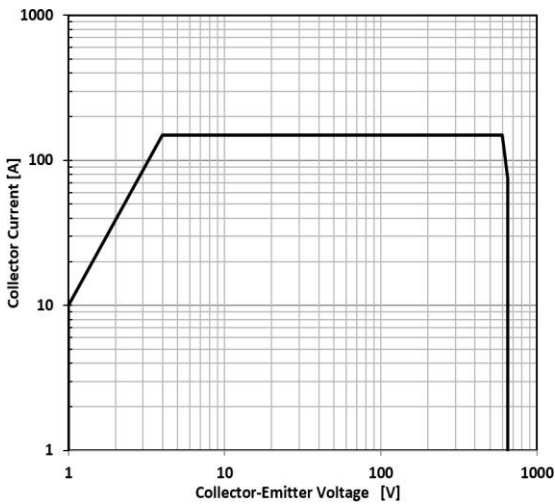


Figure5: reverse bias SOA, $T_J=125^{\circ}\text{C}$, $V_{GE}=15\text{V}$

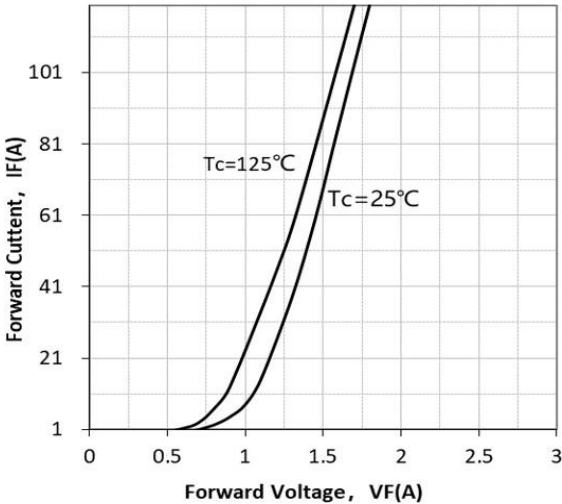


Figure6: typical diode forward characteristic

Figure7: gate threshold voltage

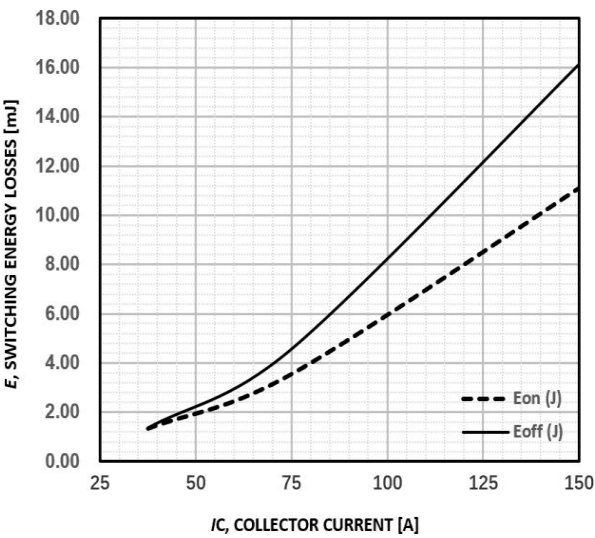


Figure7: typical energy loss VS. I_C , $T_C=25^{\circ}\text{C}$,
 $L=100\mu\text{H}$, $V_{CE}=520\text{V}$, $V_{GE}=15\text{V}$, $R_g=15\Omega$

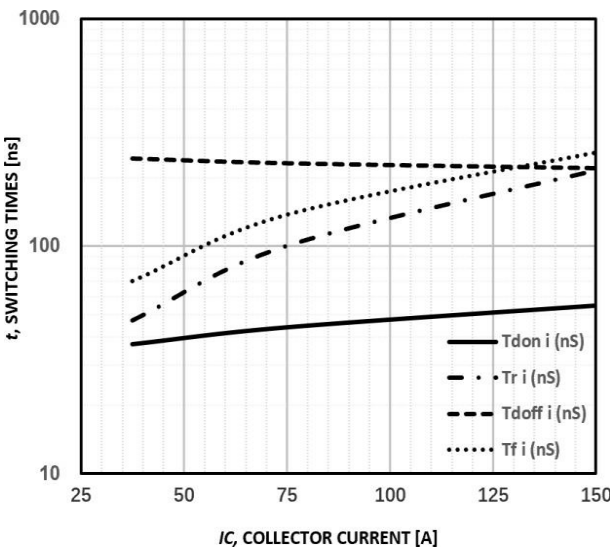


Figure8: typical switching time VS. I_C , $T_C=25^{\circ}\text{C}$,
 $L=100\mu\text{H}$, $V_{CE}=520\text{V}$, $V_{GE}=15\text{V}$, $R_g=15\Omega$

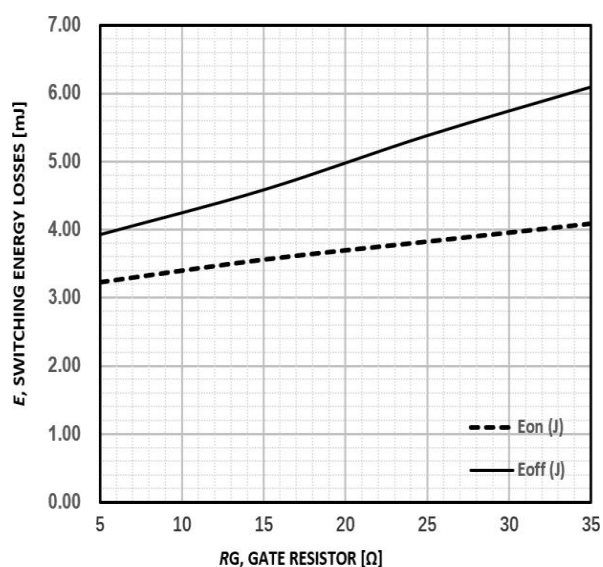


Figure9: typical energy loss VS. Rg, TC=25°C,
L=100uH, VCE=520V, VGE=15V, IC=75A

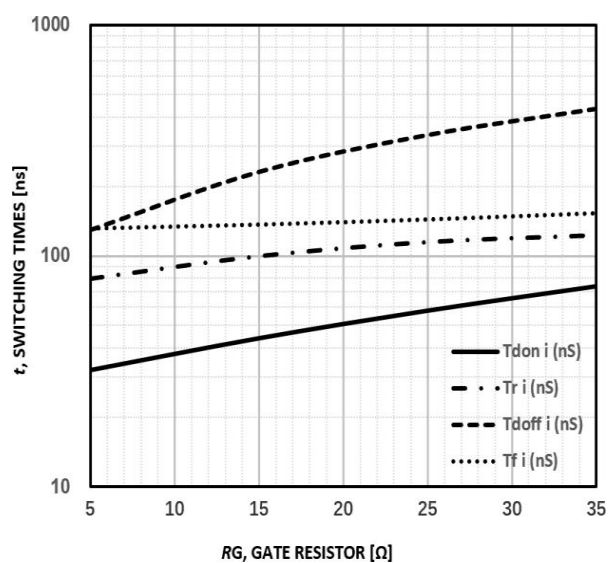


Figure10: typical switching time VS. Rg, TC=25°C,
L=100uH, VCE=520V, VGE=15V, IC=75A

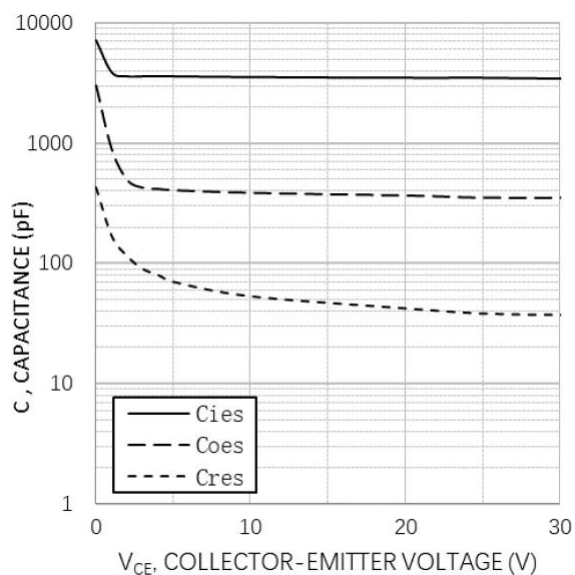


Figure11: typical capacitance VS. VCE,
VGE=0V, f=100kHz

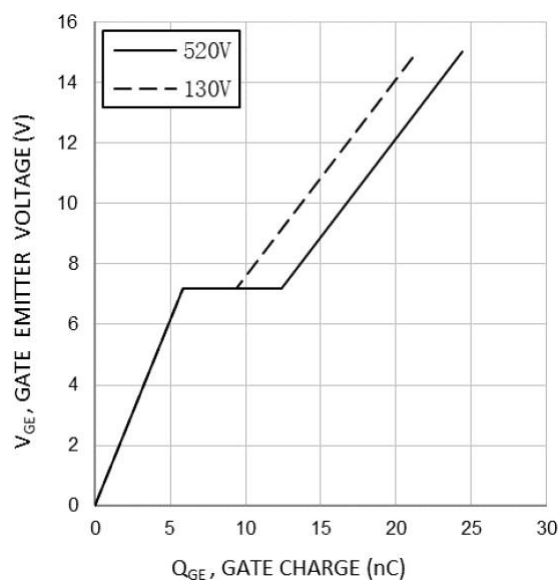
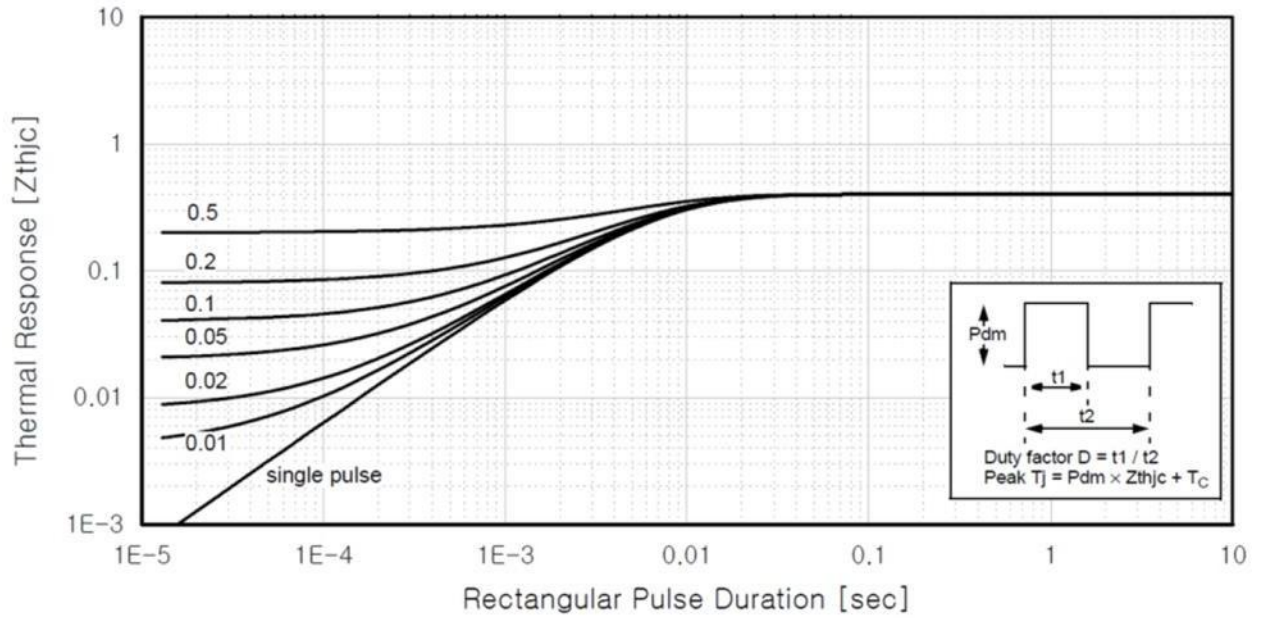


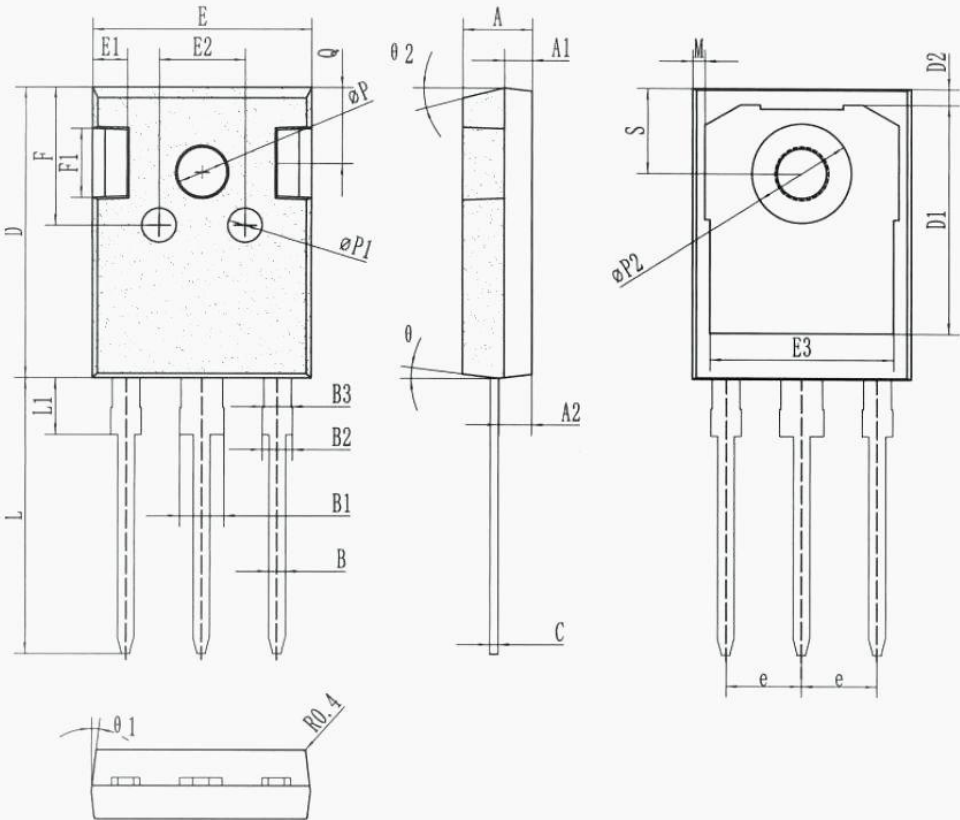
Figure12: typical gate charge VS. VGE, IC=75A

Figure13: normalized transient thermal impedace, junction-to-case

Note1.Duty factor $D=t_1/t_2$ Note2: peak $T_J=P_{DM} \times Z_{thjc} + T_C$ 

外形尺寸 PACKAGE MECHANICAL DATA

TO-247



COMMON DIMENSIONS			
SYMBOL	MM		
	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	1.90	2.00	2.10
A2	2.30	2.40	2.50
B	1.15	1.20	1.25
B1	3.05	3.15	3.25
B2	2.00	2.10	2.20
B3	1.90	2.00	2.10
C	0.55	0.60	0.65
D	20.90	21.00	21.10
D1	16.35	16.55	16.75
D2	1.02	1.17	1.32
E	15.70	15.80	15.90
E1	2.40	2.50	2.60
E2	6.10	6.20	6.30
E3	13.10	13.30	13.50
F	9.80	10.00	10.20
F1	4.90	5.00	5.10
e	5.44 BSC		
L	19.72	19.92	20.12
L1	3.90	4.10	4.30
ΦP	3.50	3.60	3.70
ΦP1	2.40	2.50	2.60
ΦP2	7.10	7.20	7.30
S	6.05	6.15	6.25
M	0.45	—	0.95
Q	5.60	5.80	6.00
θ	5°	7°	9°
θ 1	5°	7°	9°
θ 2	13°	15°	17°