

30GU120

主要参数 Main Characteristics

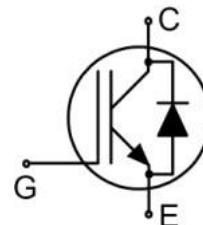
I_C	30A
V_{ces}	1200 V
$V_{cesat-tp}$	2.2V

用途

- 光伏逆变器
- UPS 电源
- 电焊机
- 中高频率逆变器

Applications

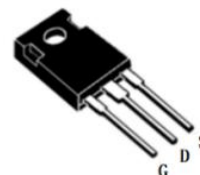
- Solar Converters
- Uninterrupted Power Supply
- Welding Converters
- Mid to High Range Switching
Frequency Converters



TO-247

产品特性

- 1200V, 30A
- $V_{CE(sat)(typ.)} = 2.2V @ V_{GE} = 15V, I_C = 30A$
- Maximum Junction Temperature 150°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}	1200	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	$I_c \quad T=25^{\circ}\text{C}$	50	A
	$I_c \quad T=100^{\circ}\text{C}$	30	A
最大脉冲集电极极电流 (注 1) Collector Current – pulse (note 1)	I_{CM}	90	A
短路时间 Short Circuit Withstand Time	t_{sc}	10	us
耗散功率 Power Dissipation	$P_D \quad T_c=25^{\circ}\text{C}$	260	W
	$P_D \quad T_c=100^{\circ}\text{C}$	105	W
最高结温 Operating Junction Temperature	T_J	$-55 \sim +150$	$^{\circ}\text{C}$
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	$R_{th \text{ j-c}}$	0.48	$^{\circ}\text{C}/\text{W}$
FRD结到管壳的热阻 Thermal Resistance, Junction to case for Diode	$R_{th \text{ j-c}}$	0.83	$^{\circ}\text{C}/\text{W}$
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th \text{ j-a}}$	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}	$I_C=250\mu\text{A}$, $V_{GE}=0\text{V}$	1200	-	-	V
零栅压下集电极漏电流 Collector-Emitter Leakage Current	I_{CES}	$V_{CE}=120\text{V}$, $V_{GE}=0\text{V}$,	-	-	250	μA
正向栅极体漏电流 Gate Leakage Current	I_{GES}	$V_{GE}=\pm 30\text{V}$, $V_{CE}=0\text{V}$	-	-	± 100	nA
阈值电压 Gate Threshold Voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}$, $I_C=250\mu\text{A}$	4.0	5.0	6.0	V
饱和压降 Collector-Emmitter saturation Voltage	$V_{CE(SAT)}$	$V_{GE}=15\text{V}$, $I_C=30\text{A}$	-	2.2	2.6	V
栅极电荷总量 Total Gate Charge	Q_g	$V_{CC}=960\text{V}$, $I_C=30\text{A}$, $V_{GE}=15\text{V}$	-	165	-	nC
栅极-反射极 Gate to emitter charge	Q_{ge}		-	33	-	nC
栅极-集电极 Gate to collector charge	Q_{gc}		-	70	-	nC
开启延迟时间 Turn-On delay time	$t_{d(on)}$	$V_{CC}=600\text{V}$, $I_C=30\text{A}$, $R_G=15\Omega$ $V_{GE}=15\text{V}$ Inductive Load	-	25	-	ns
上升时间 Turn-On rise time	t_r		-	53	-	ns
关断延迟时间 Turn-Off delay time	$t_{d(off)}$		-	323	-	ns
下降时间 Turn-Off Fall time	t_f		-	84	-	ns
开通损耗 Turn-On energy	E_{on}		-	1.72	-	mJ
关断损耗 Turn-off energy	E_{off}		-	1.45	-	mJ
总开关损耗 Total switching energy	E_{tot}		-	3.17	-	mJ
输入电容 Input capacitance	C_{ies}	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=1.0\text{MHz}$	-	1600	-	pF
输出电容 Output capacitance	C_{oes}		-	270	-	pF
反向传输电容 Reverse transfer capacitance	C_{res}		-	170	-	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	$I_F=30\text{A}$	-	2.1	2.4	V
反向恢复时间 Diode Reverse Recovery Time	t_{rr}	$V_{CE}=600\text{V}$	-	488		ns
反向恢复电流 Diode peak Reverse Recovery Current	I_{rr}	$I_F=30\text{A}$ $dI_F/dt =$	-	13.75		A
反向恢复电荷 Diode Reverse Recovery Charge	Q_{rr}	375A/us		2309		nC

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

特征曲线 ELECTRICAL CHARACTERISTICS (curves)

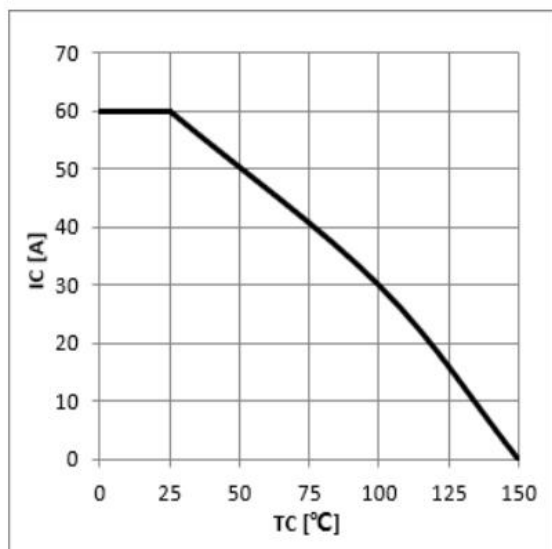


Figure 1: Maximum DC Collector Current VS. case temperature

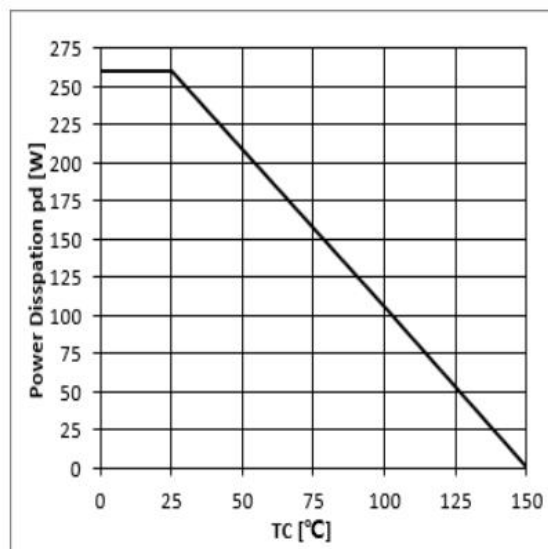
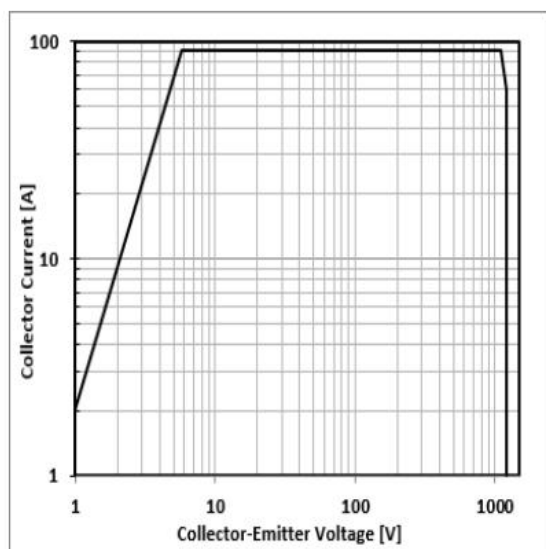
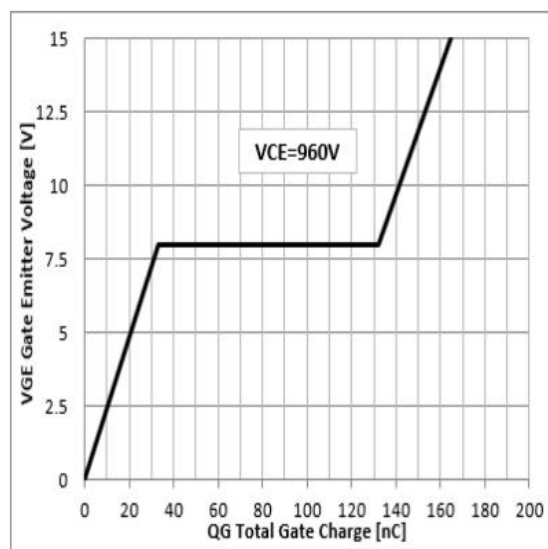


Figure 2: Power Dissipation VS. Case Temperature

Figure 3: Reverse Bias SOA, $T_J=125^{\circ}\text{C}$, $V_{GE}=15\text{V}$ Figure 4: Typical Gate charge VS. V_{GE} , $I_C=30\text{A}$

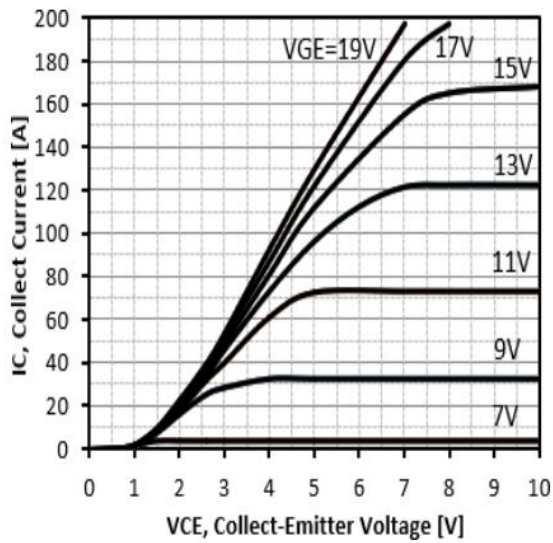


Figure 5: Typical IGBT Output characteristics,
 $T_C = 25^\circ\text{C}$; $t_p = 300\mu\text{s}$

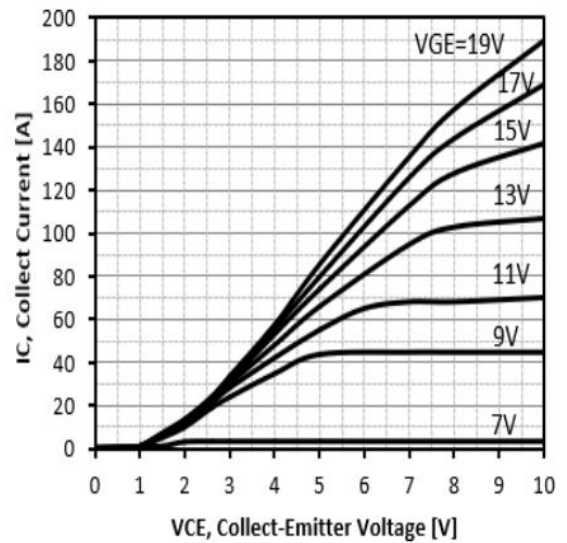


Figure 6: Typical IGBT Output characteristics,
 $T_C = 150^\circ\text{C}$; $t_p = 300\mu\text{s}$

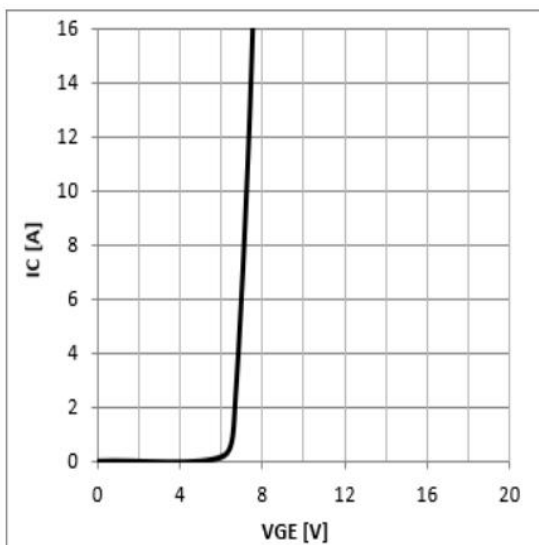


Figure 7: Typical Gate Threshold Voltage

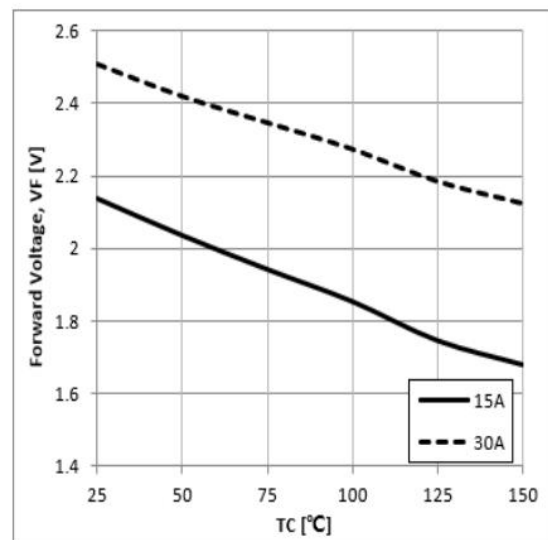


Figure 8: Typical Forward Voltage vs I_F

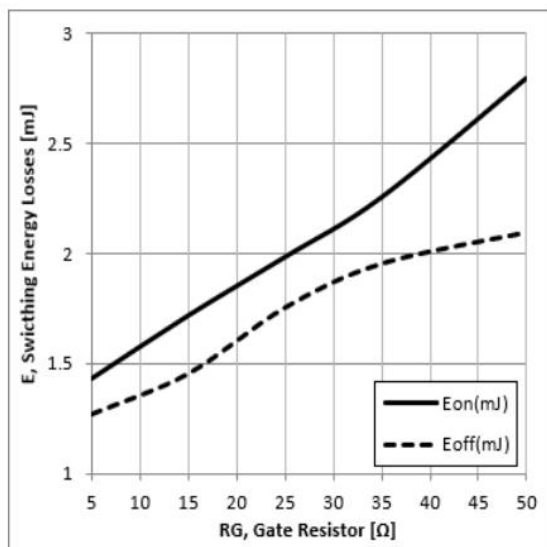


Figure 9: Typical Energy Loss VS. RG, TC=25°C,
L=100uH, VCE=600V, VGE=15V, IC=30A

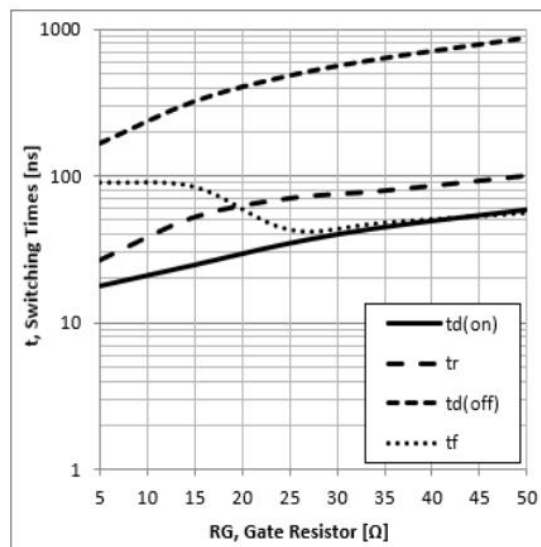


Figure 10: Typical Switching Time VS. RG, TC=25°C,
L=100uH, VCE=600V, VGE=15V, IC=30A

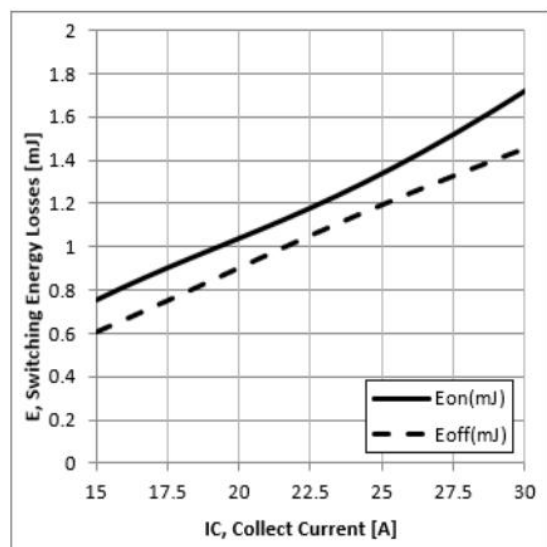


Figure 11: Typical Energy Loss VS. IC, TC=25°C,
L=100uH, VCE=600V, VGE=15V, RG=15 Ω

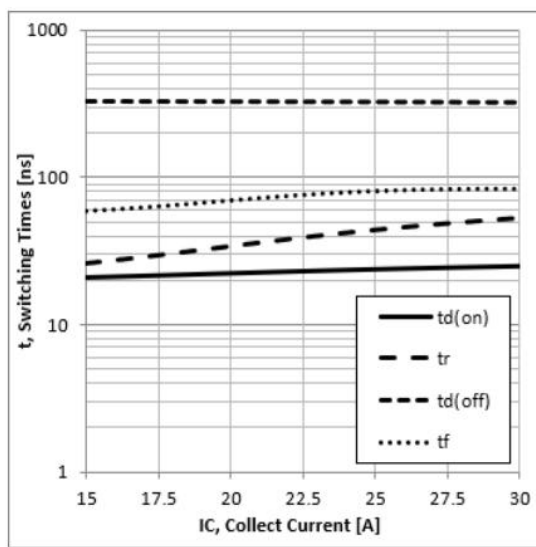


Figure 12: Typical Switching Time VS. IC, TC=25°C,
L=100uH, VCE=600V, VGE=15V, RG=15 Ω

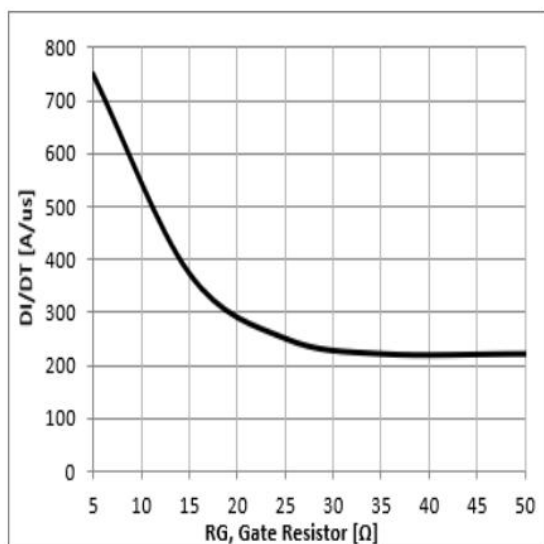


Figure 13: Typical Diode DI/DT VS. RG, TC=25°C
VCC=600V, VGE=15V, IF=30A

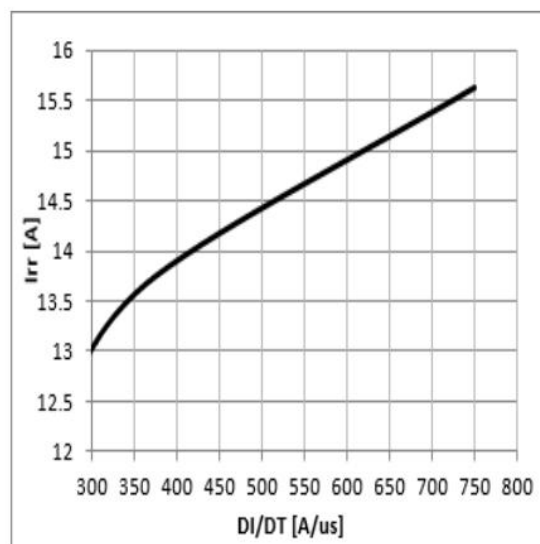


Figure 14: Typical Diode IRR VS. DI/DT, TC=25°C
VCC=600V, VGE=15V, IF=30A

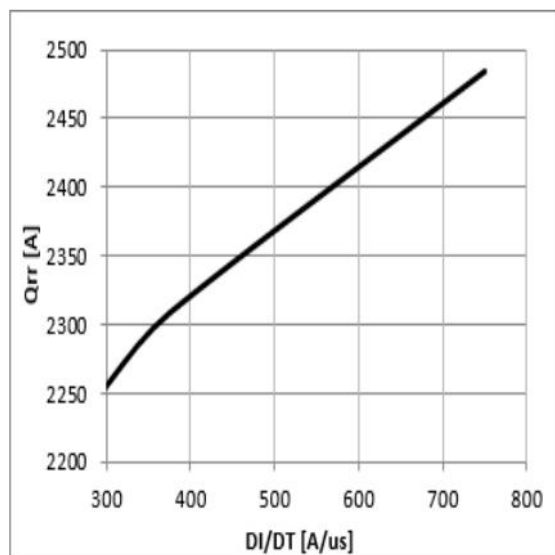


Figure 15: Typical Diode Qrr VS. DI/DT, TC=25°C
VCC=600V, VGE=15V, IF=30A

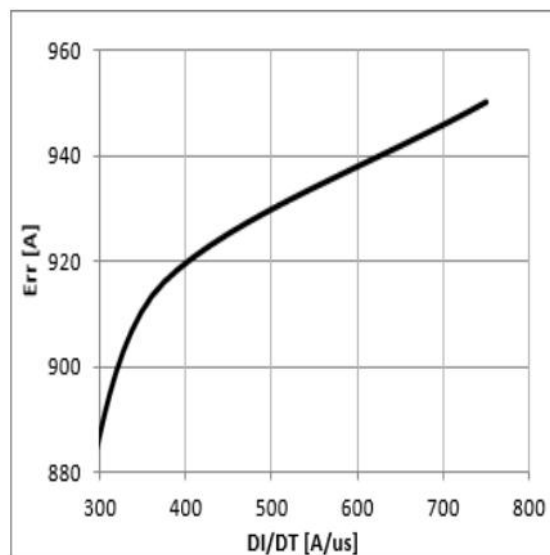


Figure 16: Typical Diode Err VS. DI/DT, TC=25°C
VCC=600V, VGE=15V, IF=30A

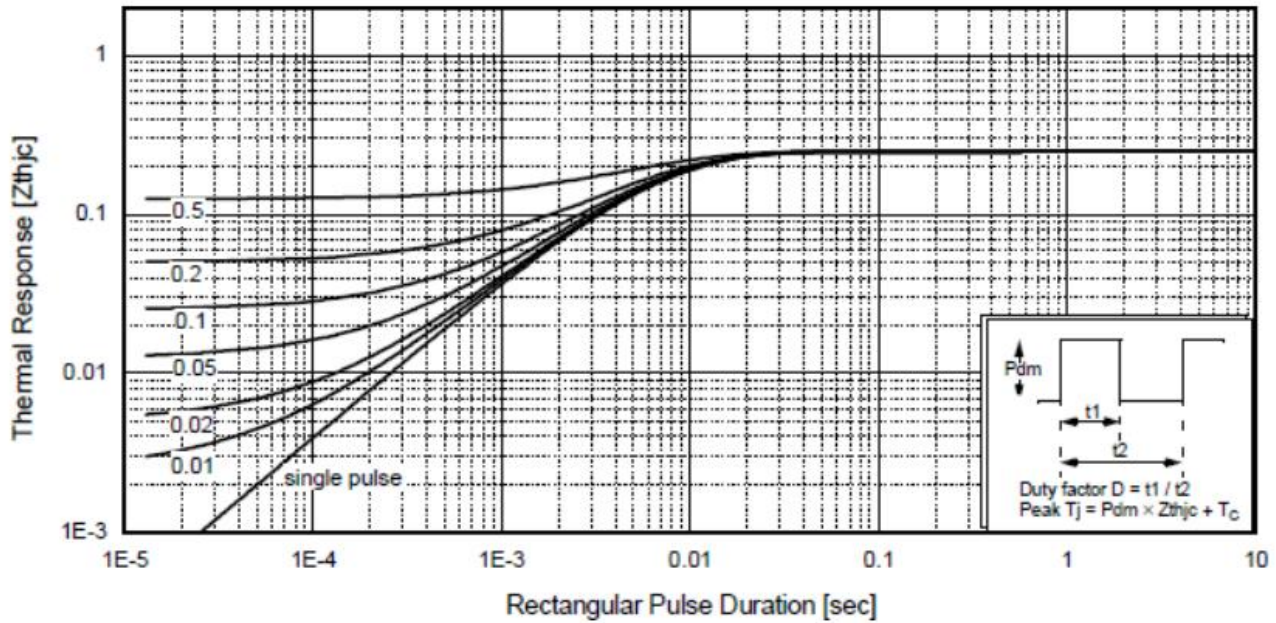


Figure 17: Normalized Transient Thermal Impedance, junction-to-case

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

