



NGTB20N60L2TF1G

N-Channel IGBT

600V, 20A, $V_{CE(sat)}$;1.45V TO-3PF-3L

低 V_F 开关二极管内置

ON Semiconductor®

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主要特长

- IGBT $V_{CE(sat)}$ =1.45V typ. (I_C =20A, V_{GE} =15V)
- IGBT t_f =67ns typ.
- Diode V_F =1.5V typ. (I_F =20A)
- Diode t_{rr} =70ns typ.
- 适应全绝缘型封装
- 增强型 (Enhancement type)
- 最高结温 T_j =175°C

应用

- 白物家电的功率因数校正
- 通用变频器 (General purpose inverter)

规格

绝对最大额定值 / $T_a = 25^\circ\text{C}$ (除非特殊指定)

参数	记号	条件	额定值	单位	
集电极-发射极电压(Collector to Emitter Voltage)	V_{CES}		600	V	
栅极-发射极电压(Gate to Emitter Voltage)	V_{GES}		± 20	V	
集电极电流(Collector Current) (DC)	I_C^{*1}	Limited by T_{jmax}	@ $T_c=25^\circ\text{C}$ *2	40	A
			@ $T_c=100^\circ\text{C}$ *2	20	A
集电极电流(Collector Current) (脉冲)	I_{CP}	Pulse width Limited by T_{jmax}	80	A	
二极管平均输出电流(Diode Average Output Current)	I_O		20	A	
允许功耗(Allowable Power Dissipation)	P_D	$T_c=25^\circ\text{C}$ (我司的理想散热条件) *2	64	W	
结温(Junction Temperature)	T_j		175	$^\circ\text{C}$	
储存温度(Storage Temperature)	T_{stg}		-55 to +175	$^\circ\text{C}$	

注: *1 集电极电流由下式计算:

$$I_C(T_c) = \frac{T_{jmax} - T_c}{R_{th(j-c)} \times V_{CE(sat)}(T_{jmax}, I_C(T_c))}$$

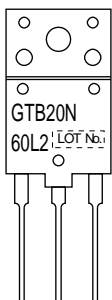
*2 我司的条件为背面散热。方法为:器件的背面涂上硅脂,然后将该器件贴在铝制的水冷散热器上。

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

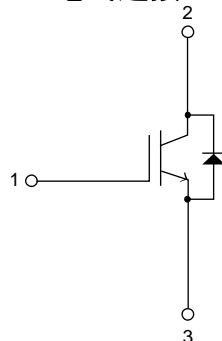
订单及封装情况

器件名称	封装	出货包装	注解
NGTB20N60L2TF1G	TO-3PF-3L SC-94	30 pcs. / tube	无铅

印刷图



电气连接



NGTB20N60L2TF1G

电气特性 / Ta = 25°C (除非特殊指定)

参数	记号	条件	额定值			单位
			min	typ	max	
集电极-发射极击穿电压 (Collector to Emitter Breakdown Voltage)	V(BR)CES	IC=500μA, VGE=0V	600			V
集电极-发射极截止电流 (Collector to Emitter Cutoff Current)	ICES	VCE=600V, VGE=0V Tc=25°C Tc=150°C			10	μA
					1	mA
栅极-发射极漏电流 (Gate to Emitter Leakage Current)	IGES	VGE=±20V, VCE =0V			±100	nA
栅极-发射极阈值电压 (Gate to Emitter threshold voltage)	VGE(th)	VCE =20V, IC=250μA	4.5		6.5	V
集电极-发射极饱和电压 (Collector to Emitter Saturated Voltage)	VCE (sat)	VGE=15V, IC=20A Tc=25°C Tc=150°C		1.45	1.65	V
				1.8		V
正向二极管电压(Forward Diode Voltage)	VF	IF=20A		1.5		V
输入电容(Input Capacitance)	Cies	VCE =20V, f=1MHz		2000		pF
输出电容(Output Capacitance)	Coes			60		pF
反向传输电容 (Reverse Transfer Capacitance)	Cres			50		pF
开启延迟时间(Turn-on delay time)	t _{d(on)}	VCC=300V, IC=20A RG=30Ω, L=200μH VGE=0V/15V, Vclamp=400V See Fig.1, Fig.2		60		ns
上升时间(Rise Time)	t _r			37		ns
开启时间(Turn-ON Time)	ton			400		ns
关断延迟时间(Turn-OFF Delay Time)	t _{d(off)}			193		ns
下降时间(Fall Time)	t _f			67		ns
关断时间(Turn-OFF Time)	toff			281		ns
总栅极电荷(Total Gate Charge)	Qg				84	
栅极-发射极电荷(Gate to Emitter charge)	Qge	VCE =300V, VGE=15V, IC=20A		16		nC
栅极-集电极米勒电荷 (Gate to Collector "Miller" Charge)	Qgc			37		nC
二极管反向恢复时间 (Diode Reverse Recovery Time)	t _{rr}	IF=10A , di/dt=100A/μs, VCC=50V See Fig.3		70		ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

热特性 / Ta = 25°C (除非特殊指定)

参数	记号	条件	额定值	单位
热阻 IGBT(结到外壳) Thermal Resistance IGBT (junction- case)	Rth(j-c)(IGBT)	Tc=25°C (我司的理想散热条件)*2	2.33	°C /W
热阻二极管(结到外壳) Thermal Resistance Diode (junction- case)	Rth(j-c)(Diode)	Tc=25°C (我司的理想散热条件)*2	2.36	°C /W
热阻(结到环境) Thermal Resistance (junction- atmosphere)	Rth(j-a)		47.5	°C /W

图 1 : 开关时间测试电路

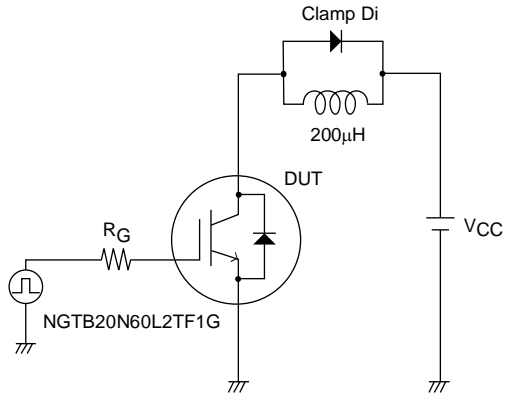
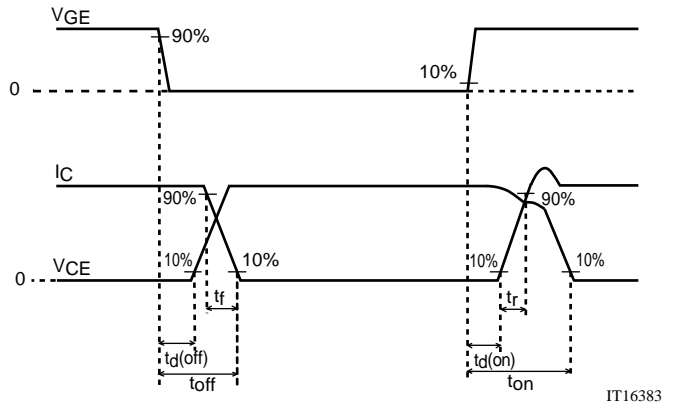
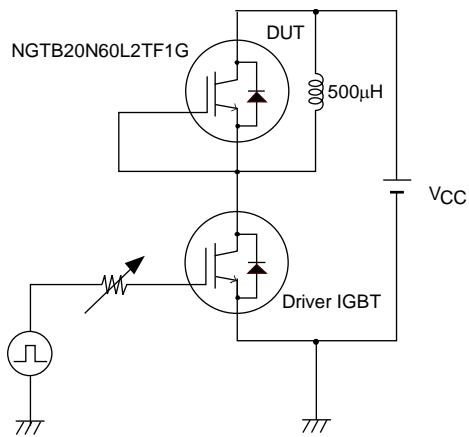


图 2 : 时间图

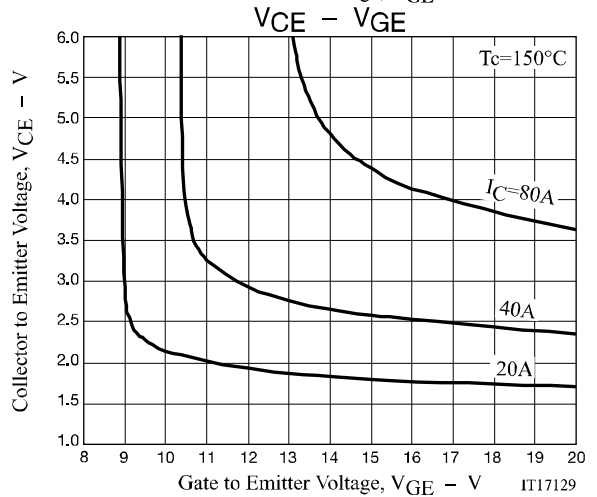
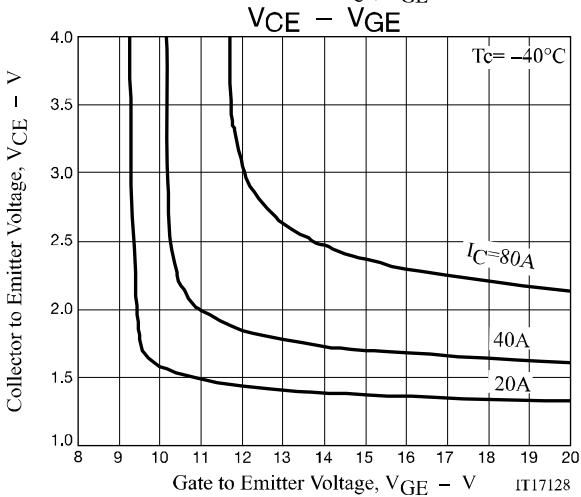
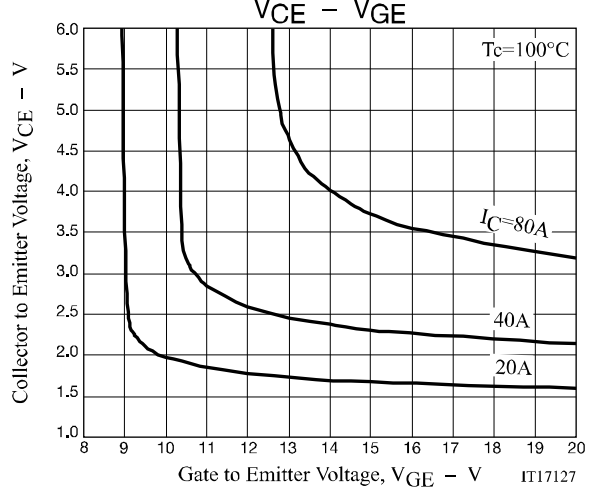
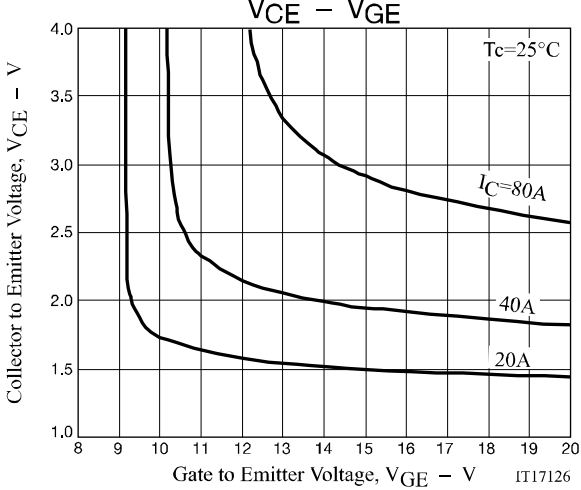
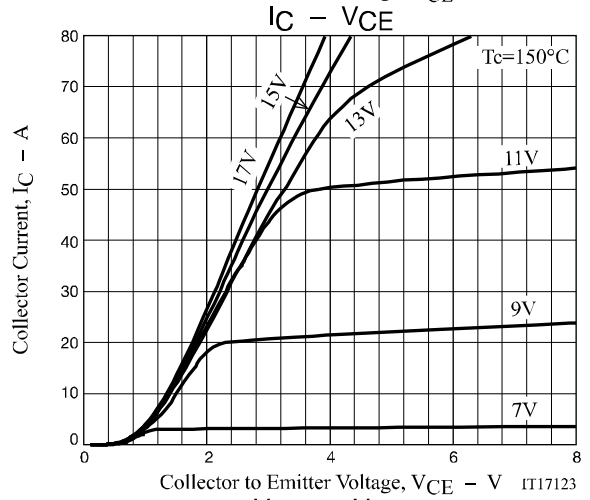
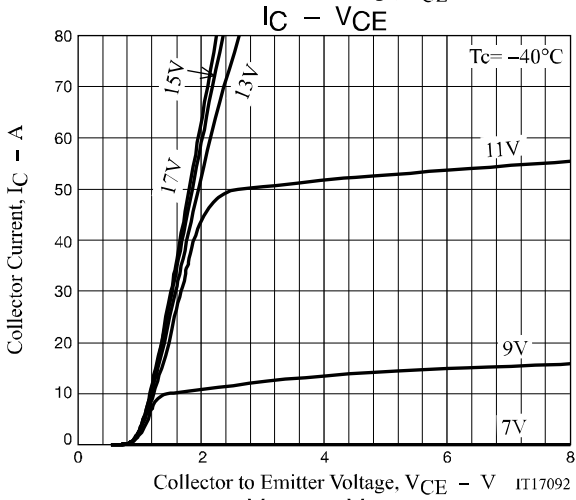
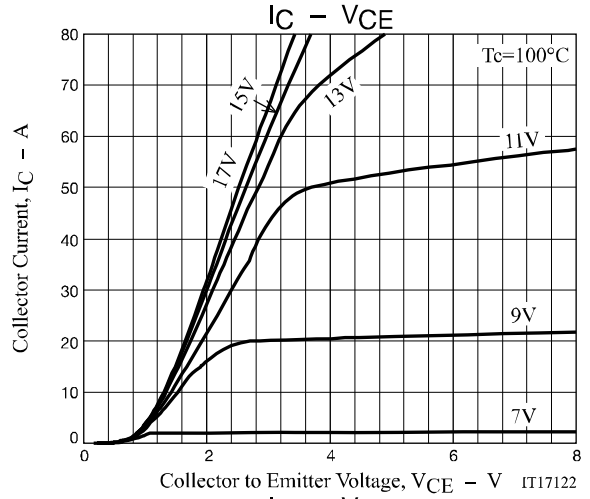
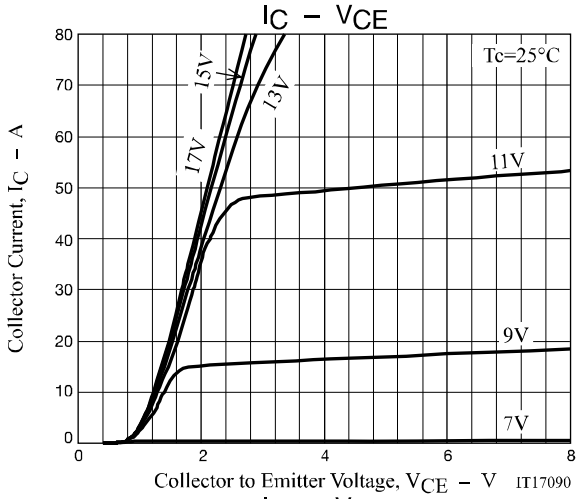


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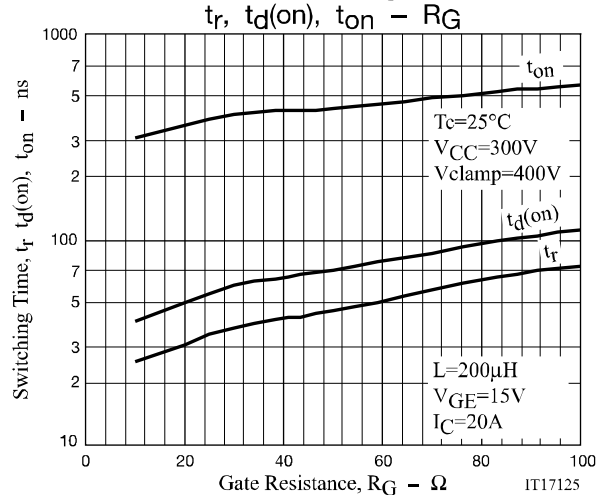
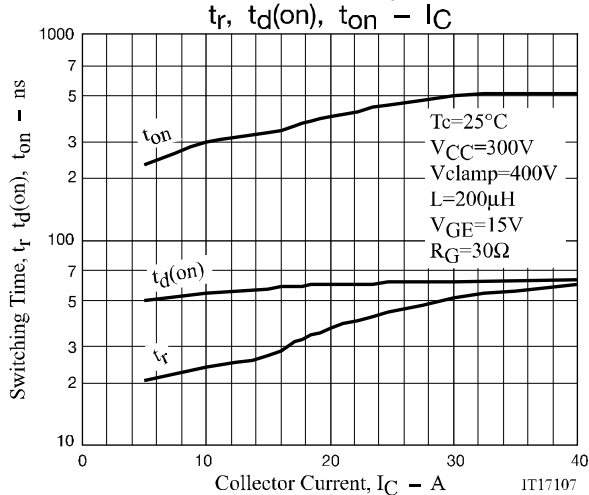
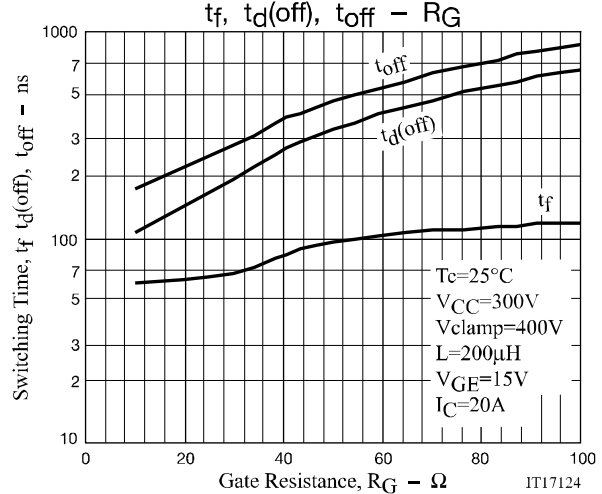
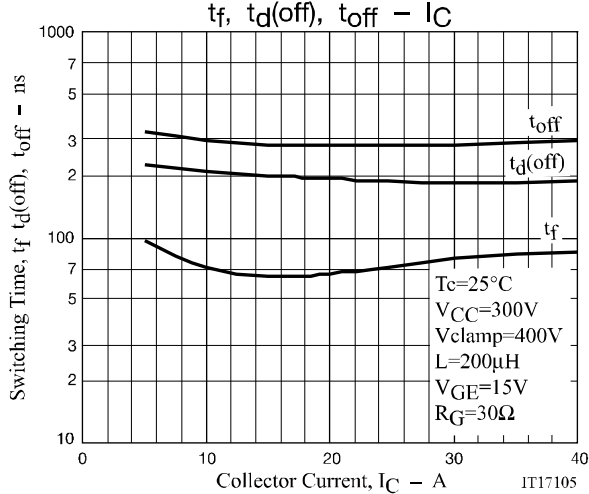
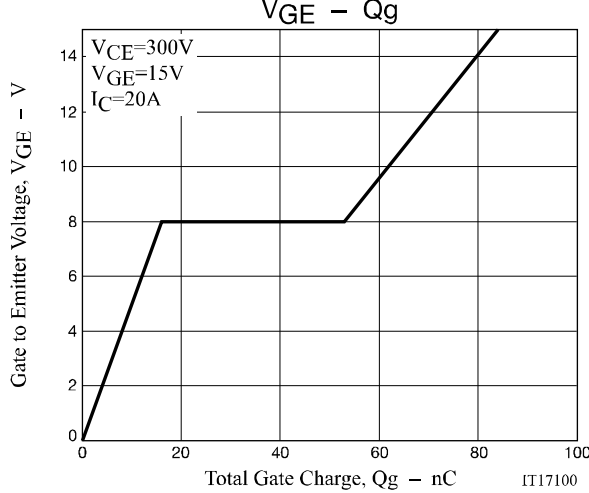
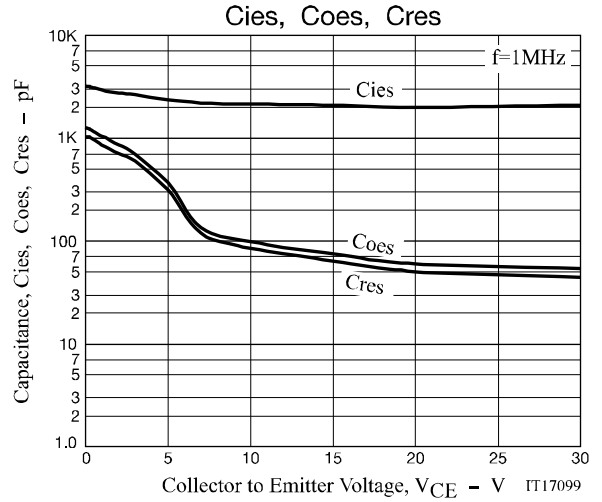
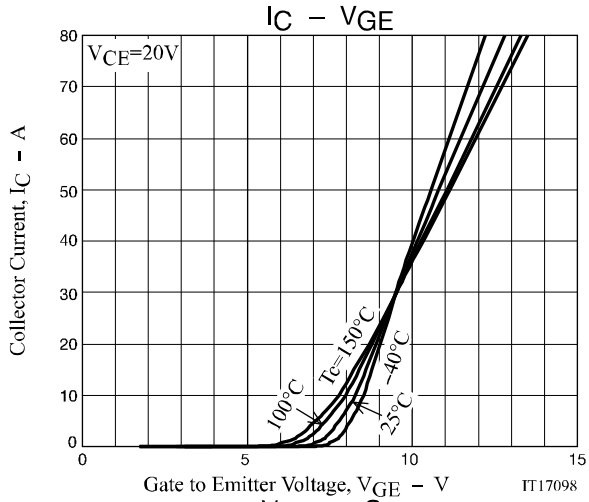
图 3 : 反向恢复时间测试电路



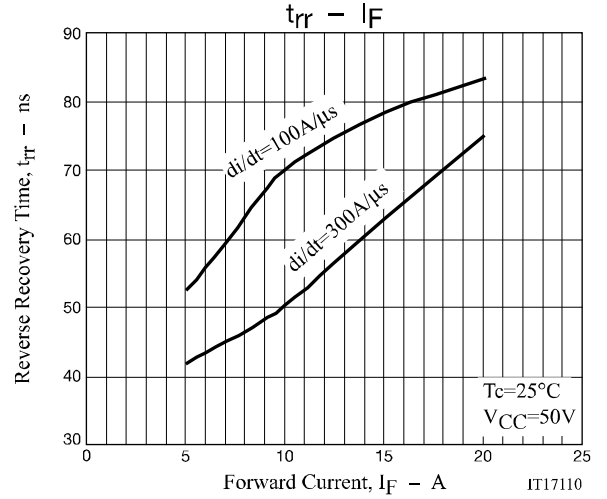
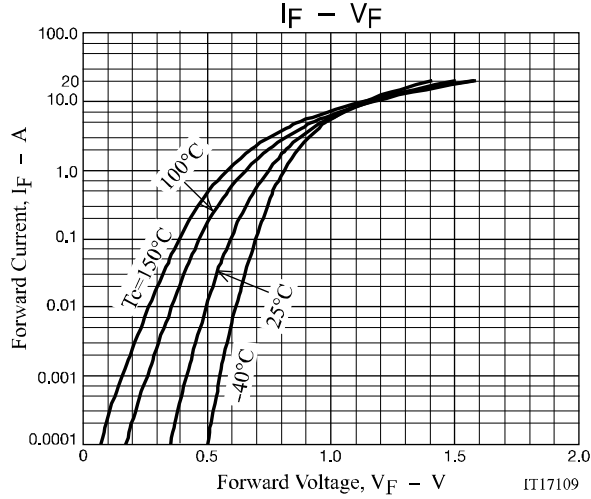
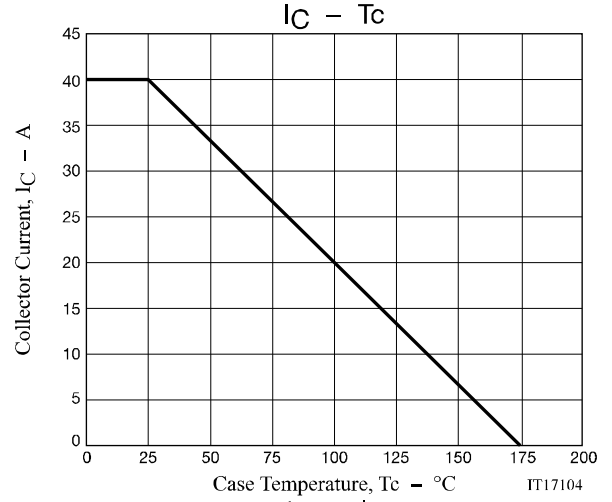
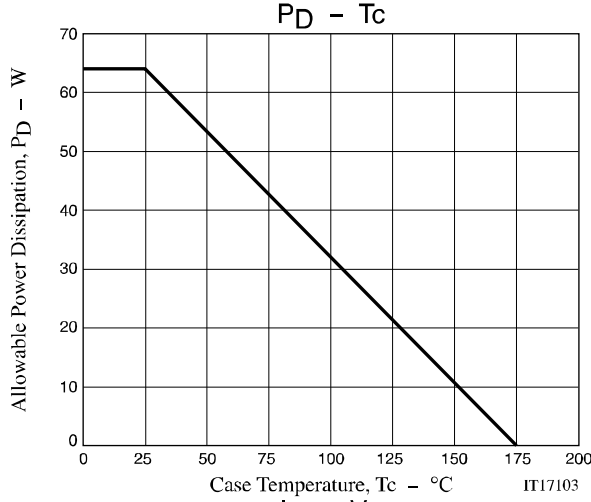
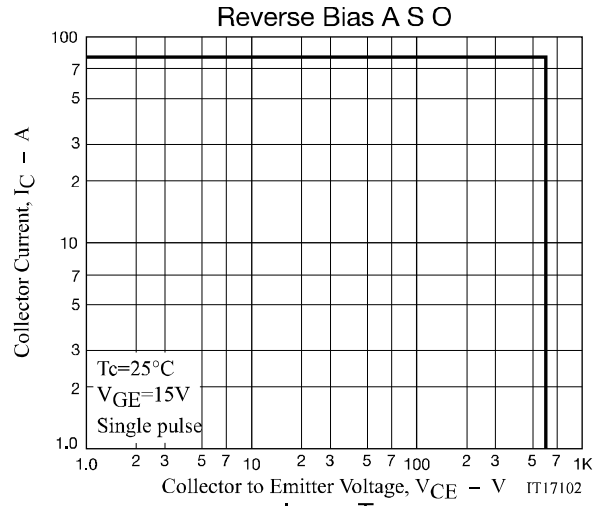
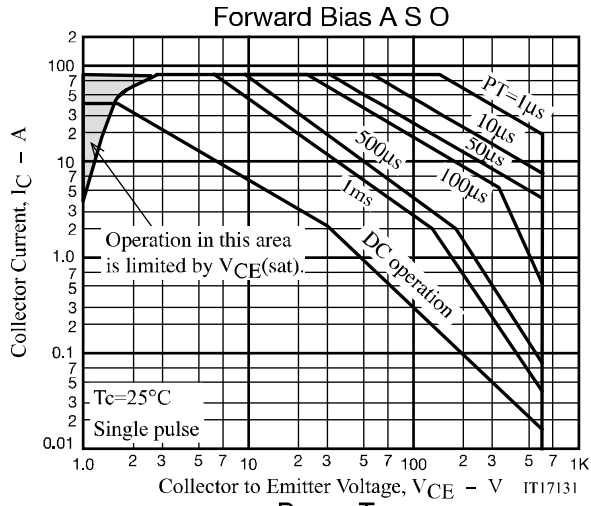
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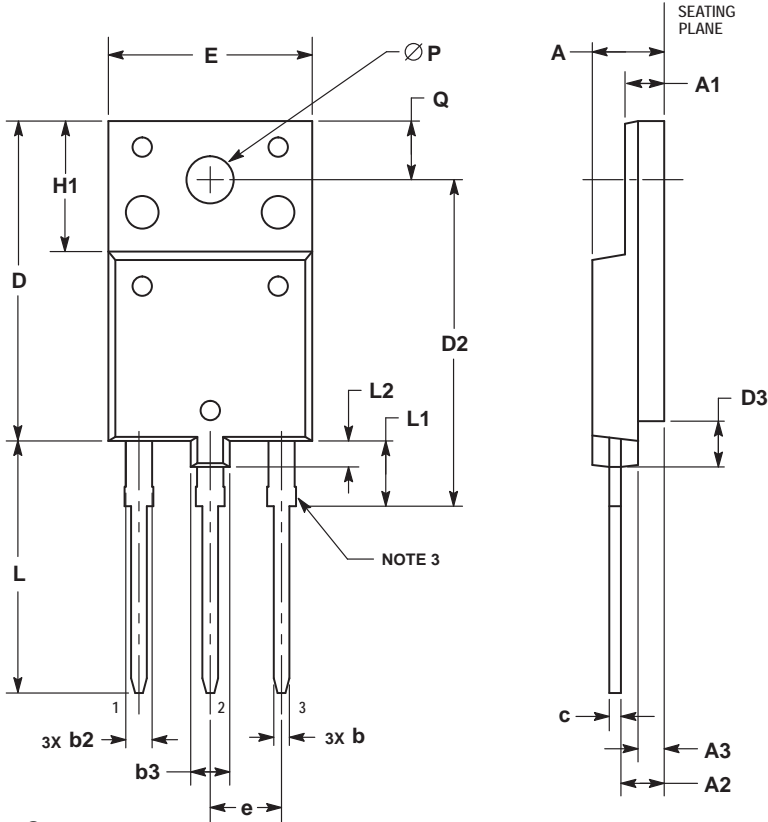


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封装尺寸

单位: mm

TO-3PF-3L
CASE 340AH
ISSUE A



- 1 : Gate
- 2 : Collector
- 3 : Emitter

- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
 2. CONTROLLING DIMENSION: MILLIMETERS.
 3. CONTOUR UNCONTROLLED IN THIS AREA (6 PLACES).
 4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR GATE PROTRUSIONS. MOLD FLASH AND GATE PROTRUSIONS NOT TO EXCEED 0.13 PER SIDE. THESE DIMENSIONS ARE TO BE MEASURED AT THE OUTERMOST EXTREME OF THE PLASTIC BODY.
 5. DIMENSION b2 DOES NOT INCLUDE DAMBAR PROTRUSION. LEAD WIDTH INCLUDING PROTRUSION SHALL NOT EXCEED 2.20.

DIM	MILLIMETERS	
	MIN	MAX
A	5.30	5.70
A1	2.80	3.20
A2	3.10	3.50
A3	1.80	2.20
b	0.65	0.95
b2	1.90	2.15
b3	3.80	4.20
c	0.80	1.10
D	24.30	24.70
D2	24.70	25.30
D3	3.30	3.70
E	15.30	15.70
e	5.35	5.55
H1	9.80	10.20
L	19.10	19.50
L1	4.80	5.20
L2	1.90	2.20
P	3.40	3.80
Q	4.30	4.70

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