NGTB10N60R2DT4G

IGBT
600V, 10A, N-Channel

ON Semiconductor®

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主要特长

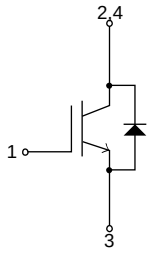
- 反向导通 ǁ IGBT
- IGBT V_{CE}(sat)=1.7V (typ) [I_C=10A, V_{GE}=15V]
- IGBT t_f=65ns (typ)
- Diode V_F=1.5V (typ) [I_F=10A]
- Diode t_{rr}=90ns (typ)
- 5μs 抗短路能力

应用

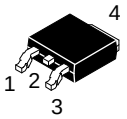
- 通用变频器 (General Purpose Inverter)

电气连接

N-Channel



1:Gate
2:Collector
3:Emitter
4:Collector



DPAK
CASE 369C

规格

绝对最大额定值 / Ta = 25°C (除非特殊指定)

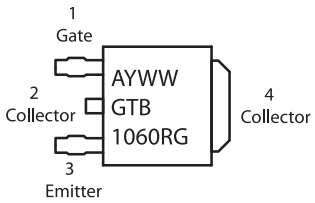
参数		记号	值	单位
集电极-发射极电压(Collector to Emitter Voltage)		V_{CES}	600	V
栅极-发射极电压(Gate to Emitter Voltage)		V_{GES}	±20	V
集电极电流(DC)	@Tc=25°C *2	I_C *1	20	A
受限于 Tjmax	@Tc=100°C *2		10	A
集电极电流 (峰值) 受限于 Tjmax 的脉冲		I_{CP}	40	A
二极管平均输出电流 (Diode Average Output Current)		I_O	10	A
功耗(Power Dissipation) Tc=25°C (我司理想的散热条件) *2		P_D	72	W
结温(Junction Temperature)		Tj	175	°C
储存温度(Storage Temperature)		Tstg	–55 to +175	°C

注: *1 集电极电流由下式计算:

$$I_C(Tc)= \frac{Tjmax - Tc}{R_{th}(j\text{-}c)\times V_{CE}(sat)\ (I_C(Tc))}$$

*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。

印刷图



GTB1060R	= Device Code
A	= Assembly Location
Y	= Year
WW	= Work Week
G	= Pb-Free Package

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.

ORDERING INFORMATION
See detailed ordering and shipping information on page 8 of this data sheet.

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电气特性 / Ta=25°C (除非特殊指定)

参数	记号	条件		值			单位
				min	typ	max	
集电极-发射极击穿电压 (Collector to Emitter Breakdown Voltage)	$V_{(BR)CES}$	I_C=1mA, V_{GE}=0V		600			V
集电极-发射极截止电流 (Collector to Emitter Cutoff Current)	I_{CES}	V_{CE}=600V, V_{GE}=0V	Tc=25°C			10	μA
			Tc=150°C			1	mA
栅极-发射极漏电流 (Gate to Emitter Leakage Current)	I_{GES}	V_{GE}=±20V, V_{CE}=0V				±100	nA
栅极-发射极阈值电压 (Gate to Emitter threshold voltage)	$V_{GE}(th)$	V_{CE}=20V, I_C=160μA		4.5		7.0	V
集电极-发射极饱和电压 (Collector to Emitter Saturated Voltage)	$V_{CE}(sat)$	V_{GE}=15V, I_C=10A	Tc=25°C		1.7	2.1	V
			Tc=100°C		1.9	2.3	V
正向二极管电压(Forward Diode Voltage)	V_F	I_F=10A			1.5	2.1	V
输入电容(Input Capacitance)	Cies	V_{CE}=20V, f=1MHz			1340		pF
输出电容(Output Capacitance)	Coes				45		pF
反向传输电容 (Reverse Transfer Capacitance)	Cres				33		pF
开启迟延时间(Turn-on delay time)	$t_d(on)$	V_{CC}=300V, I_C=10A R_G=30Ω, L=500μH V_{GE}=0V/15V Vclamp=400V Tc=25°C See Fig.1, See Fig.2			48		ns
上升时间(Rise Time)	t_r				34		ns
开启时间(Turn-ON Time)	ton				188		ns
关断迟延时间(Turn-OFF Delay Time)	$t_d(off)$				120		ns
下降时间(Fall Time)	t_f				65		ns
关断时间(Turn-OFF Time)	toff				220		ns
开启能量(Turn-ON Energy)	Eon				412		μJ
关断能量(Turn-OFF Energy)	Eoff				140		μJ
总栅极电荷(Total Gate Charge)	Qg	V_{CE}=300V, V_{GE}=15V, I_C=10A			53		nC
栅极-发射极电荷(Gate to Emitter charge)	Qge				10		nC
栅极-集电极米勒电荷 (Gate to Collector “Miller” Charge)	Qgc				25		nC
二极管反向恢复时间 (Diode Reverse Recovery Time)	t_{rr}	I_F=10A,di/dt=300A/μs, V_{CC}=300V, See Fig.3			90		ns

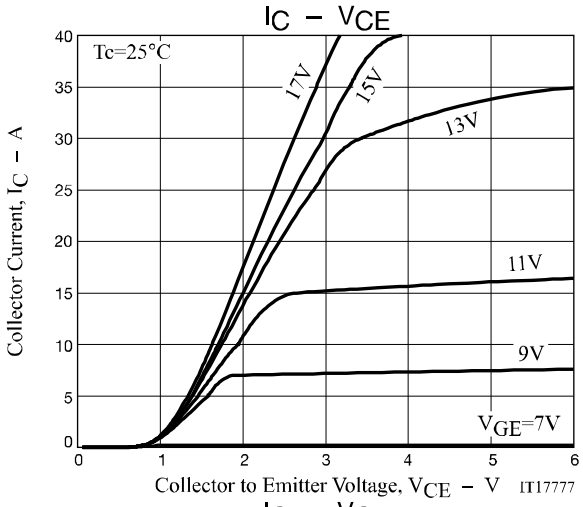
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

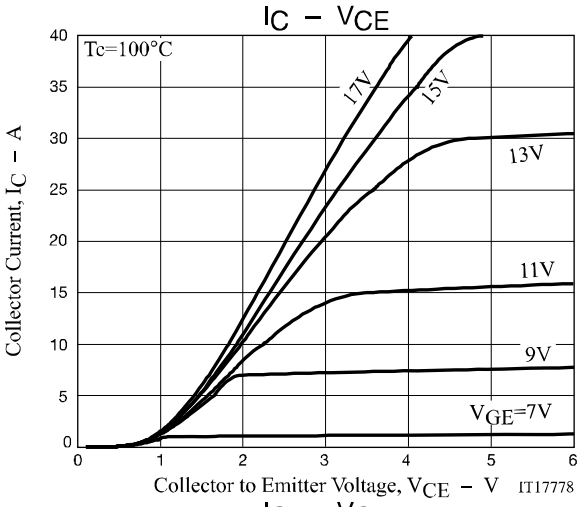
热特性 / Ta=25°C (除非特殊指定)

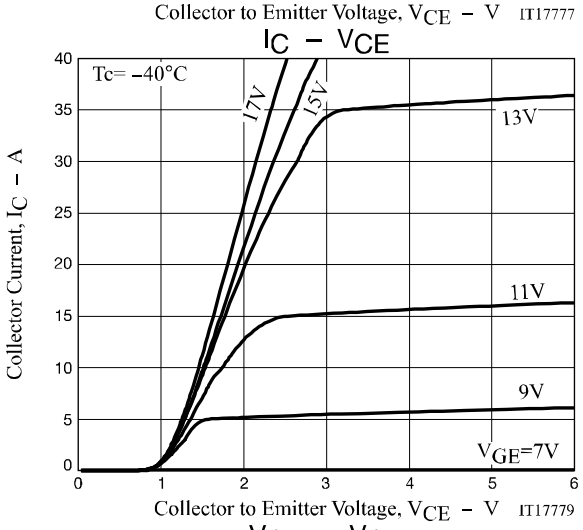
参数	记号	条件	值	单位
热阻 IGBT(结到外壳) Thermal Resistance IGBT (Junction to Case)	Rth(j-c) (IGBT)	Tc=25°C (我司的理想散热条件) *2	2.07	°C/W
热阻(结到环境) Thermal Resistance (Junction to Ambient)	Rth(j-a)		100	°C/W

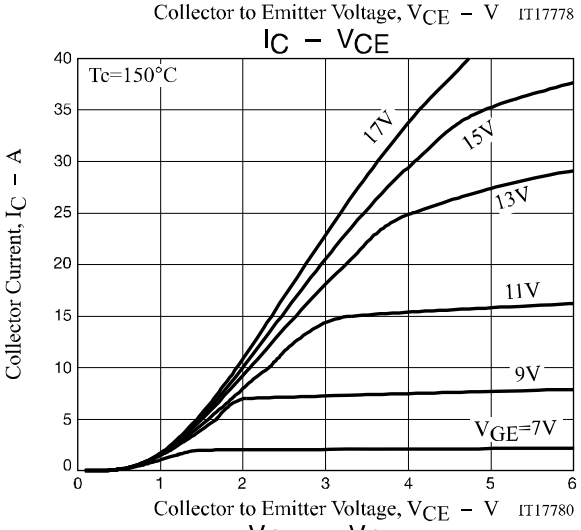
注: *2 我司的条件为背面散热。

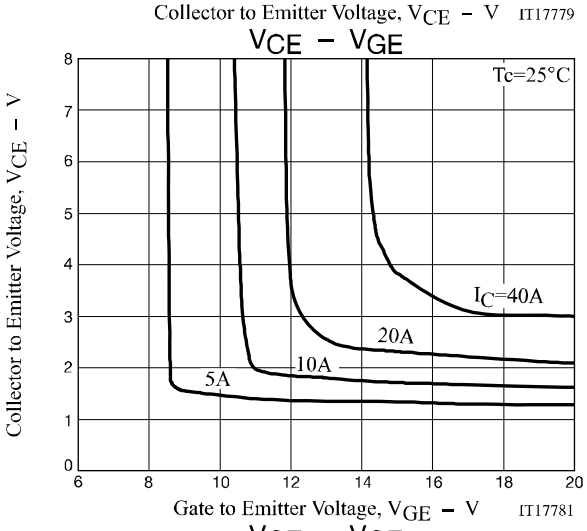
方法为:器件的背面涂上硅脂, 然后将该器件贴在 铝制的水冷散热器上。

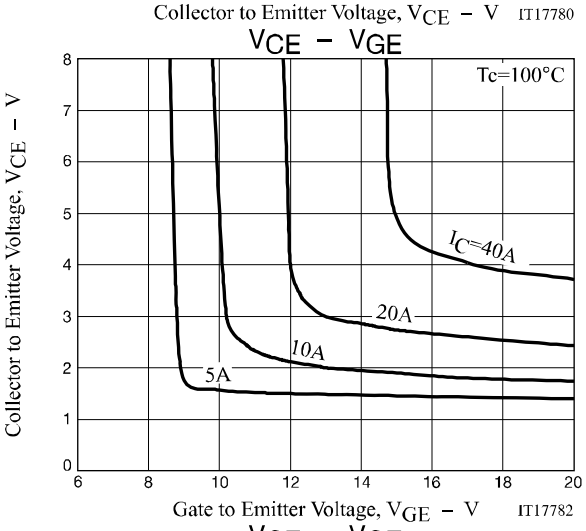

IC – VCE
Tc=25°C
17V
15V
13V
11V
9V
VGE=7V
Collector Current, IC – A
Collector to Emitter Voltage, VCE – V
IT17777

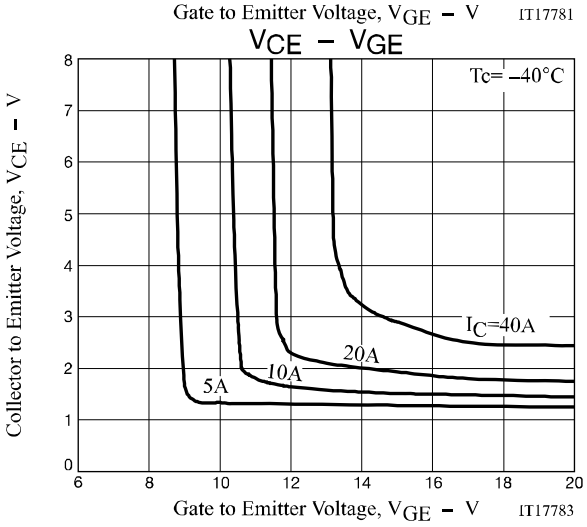

IC – VCE
Tc=100°C
17V
15V
13V
11V
9V
VGE=7V
Collector Current, IC – A
Collector to Emitter Voltage, VCE – V
IT17778

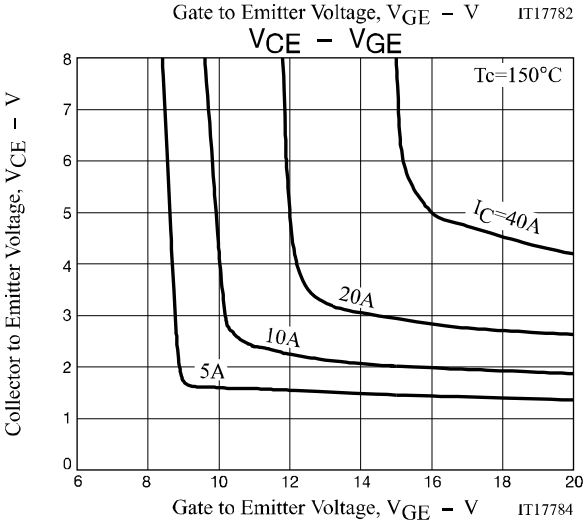

IC – VCE
Tc= –40°C
17V
15V
13V
11V
9V
VGE=7V
Collector Current, IC – A
Collector to Emitter Voltage, VCE – V
IT17779

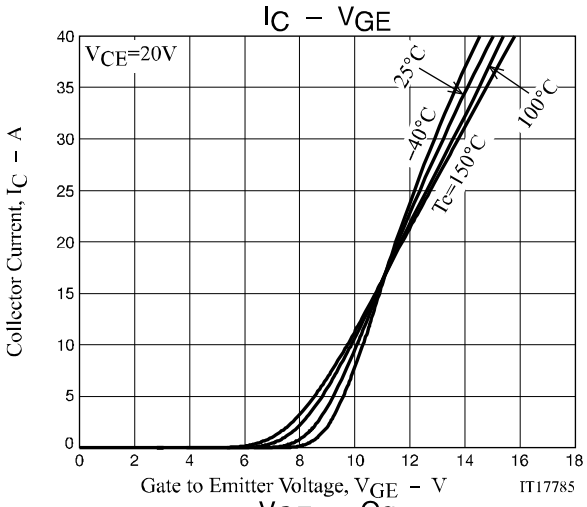

IC – VCE
Tc=150°C
17V
15V
13V
11V
9V
VGE=7V
Collector Current, IC – A
Collector to Emitter Voltage, VCE – V
IT17780

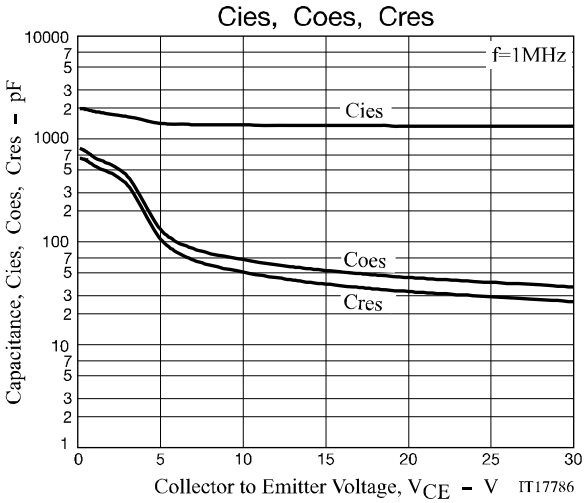

VCE – VGE
Tc=25°C
IC=40A
20A
10A
5A
Collector to Emitter Voltage, VCE – V
Gate to Emitter Voltage, VGE – V
IT17781

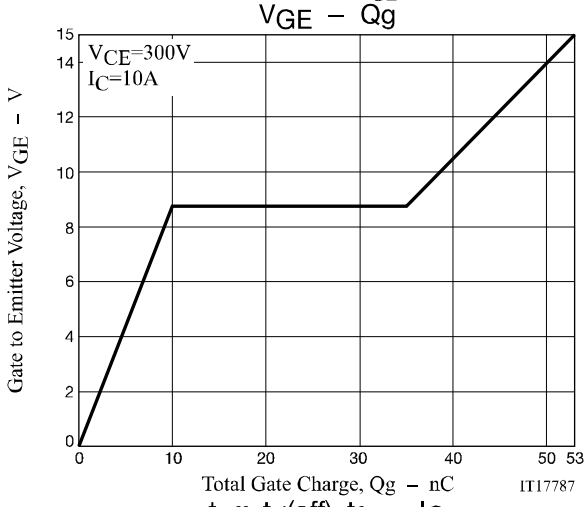

VCE – VGE
Tc=100°C
IC=40A
20A
10A
5A
Collector to Emitter Voltage, VCE – V
Gate to Emitter Voltage, VGE – V
IT17782

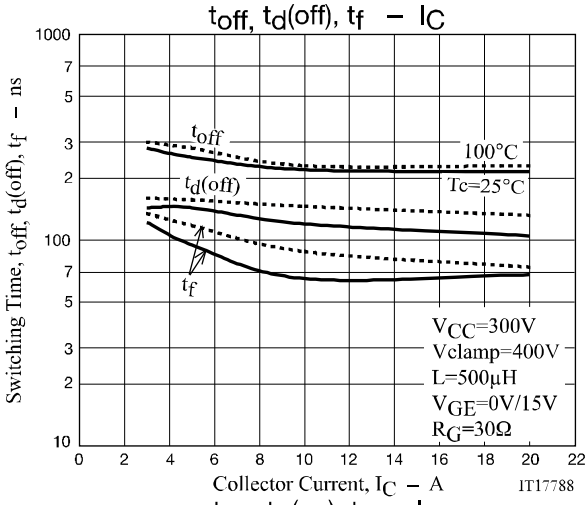

VCE – VGE
Tc= –40°C
IC=40A
20A
10A
5A
Collector to Emitter Voltage, VCE – V
Gate to Emitter Voltage, VGE – V
IT17783

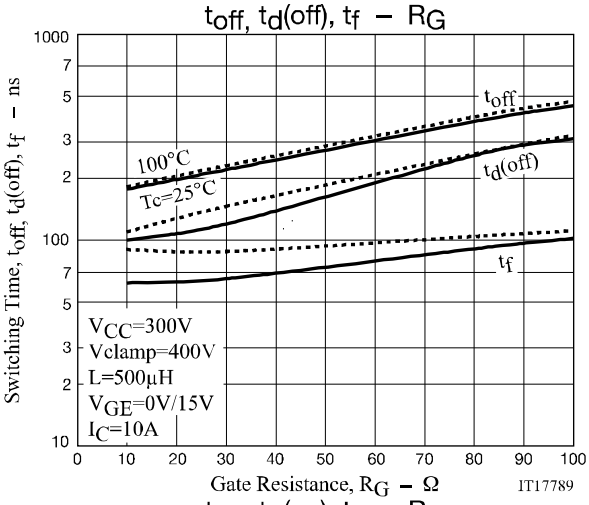

VCE – VGE
Tc=150°C
IC=40A
20A
10A
5A
Collector to Emitter Voltage, VCE – V
Gate to Emitter Voltage, VGE – V
IT17784

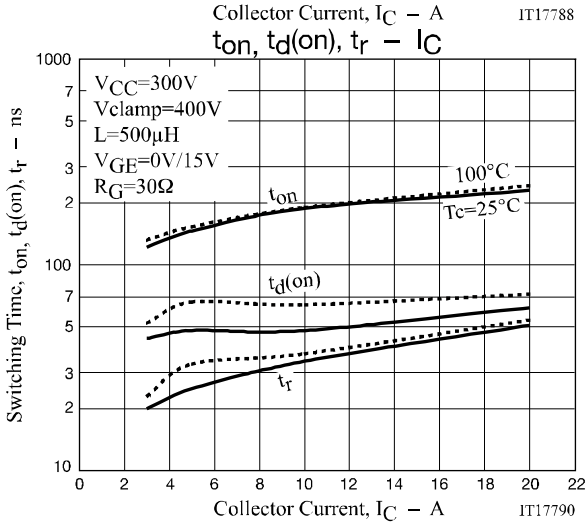

IC – VGE
VCE=20V
25°C
–40°C
100°C
Tc=150°C
Collector Current, IC – A
Gate to Emitter Voltage, VGE – V
IT17785

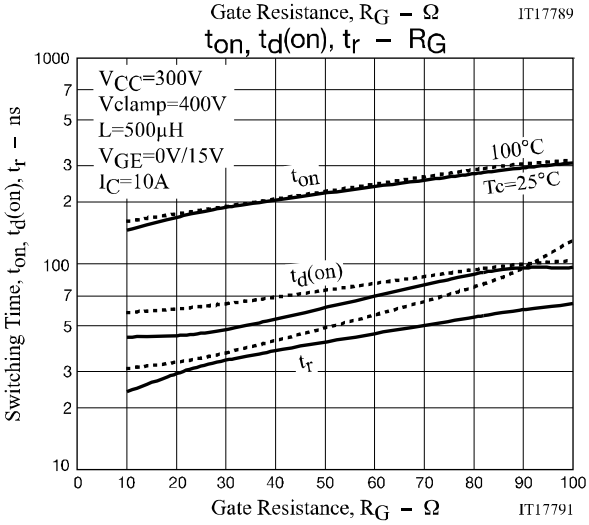

Cies, Coes, Cres
f=1MHz
Cies
Coes
Cres
Capacitance, Cies, Coes, Cres – pF
Collector to Emitter Voltage, VCE – V
IT17786

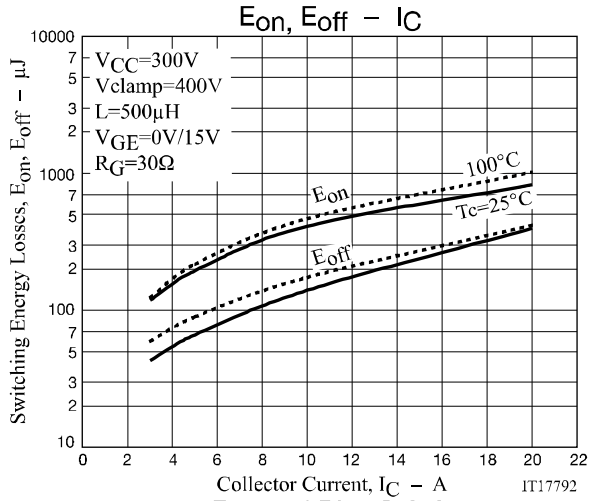

VGE – Qg
VCE=300V
IC=10A
Gate to Emitter Voltage, VGE – V
Total Gate Charge, Qg – nC
IT17787

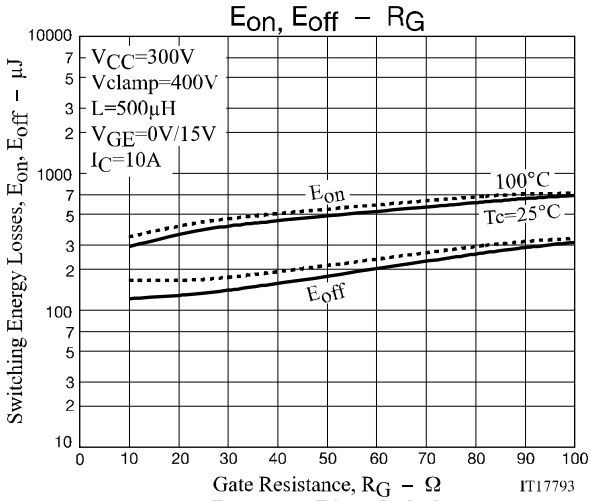

toff, td(off), tf – IC
toff
td(off)
tf
100°C
Tc=25°C
VCC=300V
Vclamp=400V
L=500µH
VGE=0V/15V
RG=30Ω
Switching Time, toff, td(off), tf – ns
Collector Current, IC – A
IT17788

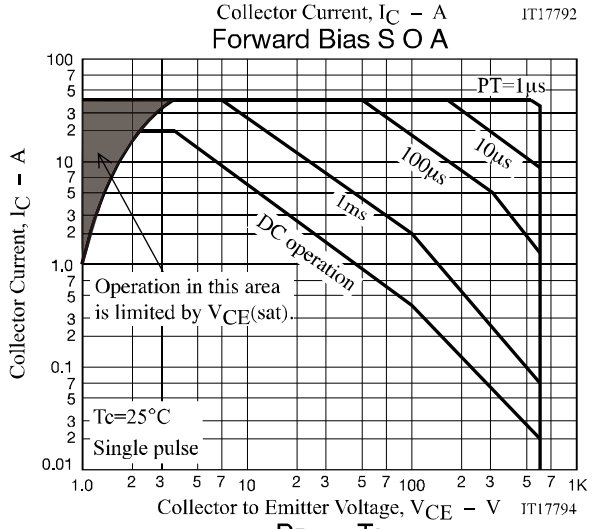

toff, td(off), tf – RG
toff
td(off)
tf
100°C
Tc=25°C
VCC=300V
Vclamp=400V
L=500µH
VGE=0V/15V
IC=10A
Switching Time, toff, td(off), tf – ns
Gate Resistance, RG – Ω
IT17789

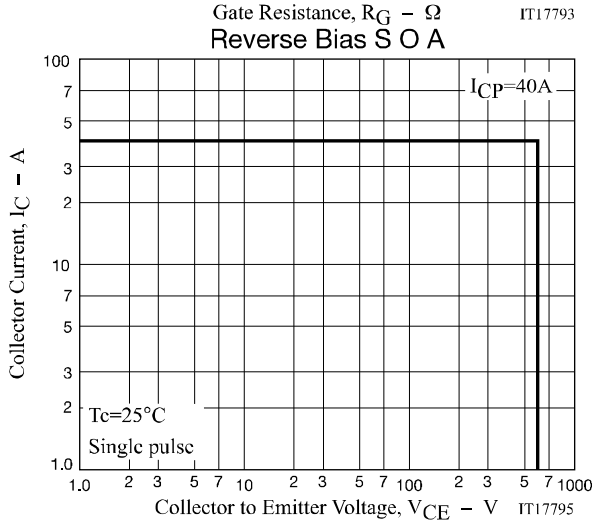

ton, td(on), tr – IC
VCC=300V
Vclamp=400V
L=500µH
VGE=0V/15V
RG=30Ω
ton
td(on)
tr
100°C
Tc=25°C
Switching Time, ton, td(on), tr – ns
Collector Current, IC – A
IT17790

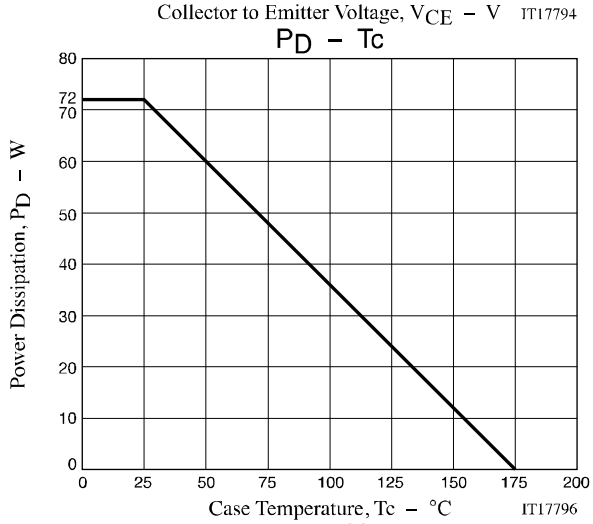

ton, td(on), tr – RG
VCC=300V
Vclamp=400V
L=500µH
VGE=0V/15V
IC=10A
ton
td(on)
tr
100°C
Tc=25°C
Switching Time, ton, td(on), tr – ns
Gate Resistance, RG – Ω
IT17791

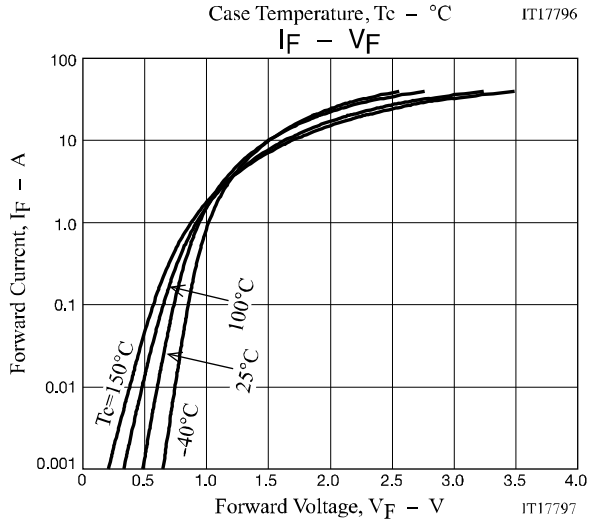

Eon, Eoff − IC
VCC=300V
Vclamp=400V
L=500μH
VGE=0V/15V
RG=30Ω
100°C
Tc=25°C
Eon
Eoff
Switching Energy Losses, Eon, Eoff − μJ
Collector Current, IC − A
IT17792

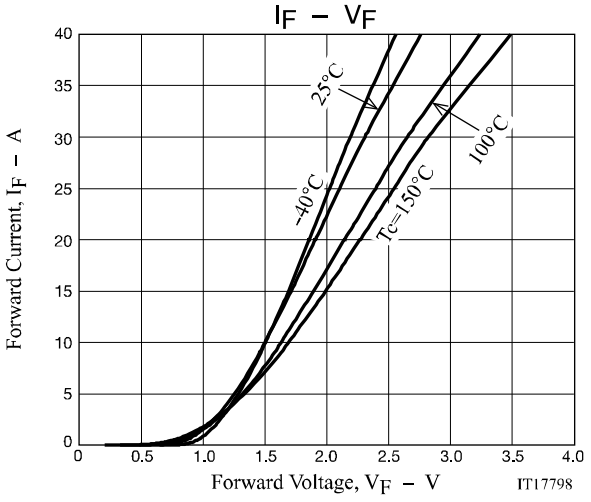

Eon, Eoff − RG
VCC=300V
Vclamp=400V
L=500μH
VGE=0V/15V
IC=10A
100°C
Tc=25°C
Eon
Eoff
Switching Energy Losses, Eon, Eoff − μJ
Gate Resistance, RG − Ω
IT17793

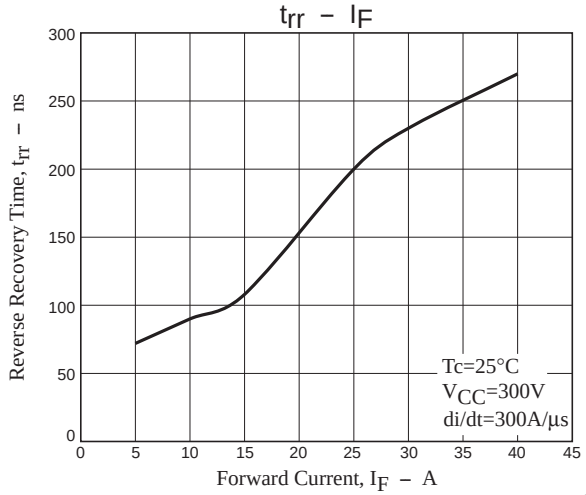

Forward Bias S O A
PT=1μs
10μs
100μs
1ms
DC operation
Operation in this area
is limited by VCE(sat).
Tc=25°C
Single pulse
Collector Current, IC − A
Collector to Emitter Voltage, VCE − V
IT17794


Reverse Bias S O A
ICP=40A
Tc=25°C
Single pulse
Collector Current, IC − A
Collector to Emitter Voltage, VCE − V
IT17795


PD − Tc
Power Dissipation, PD − W
Case Temperature, Tc − °C
IT17796


IF − VF
Tc=150°C
100°C
25°C
−40°C
Forward Current, IF − A
Forward Voltage, VF − V
IT17797


IF − VF
25°C
−40°C
100°C
Tc=150°C
Forward Current, IF − A
Forward Voltage, VF − V
IT17798



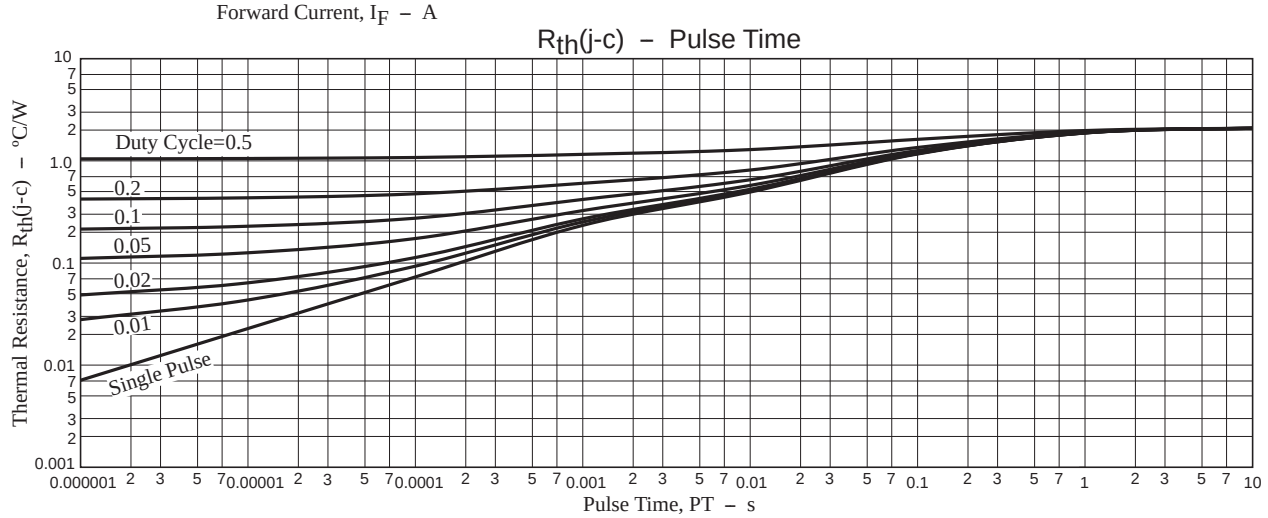


图 1: 开关时间测试电路

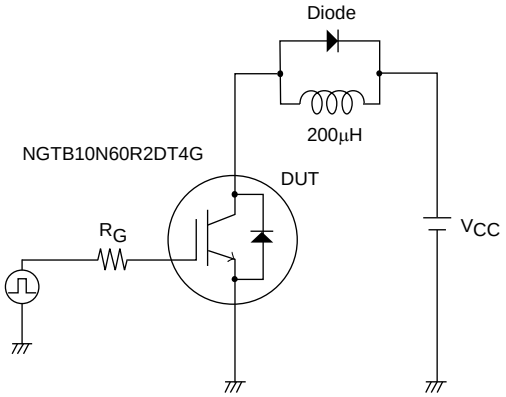


图 2: 时间图

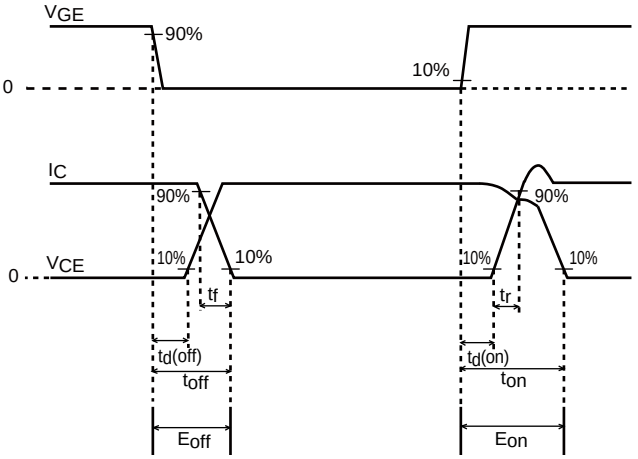
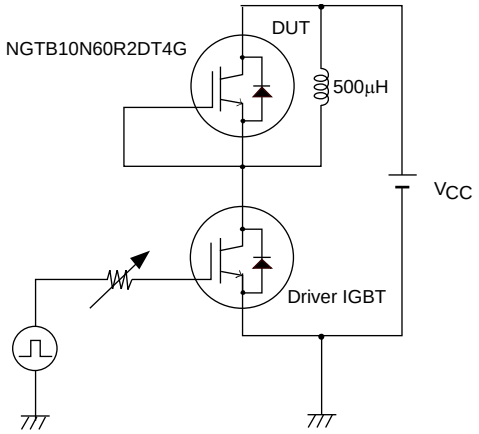
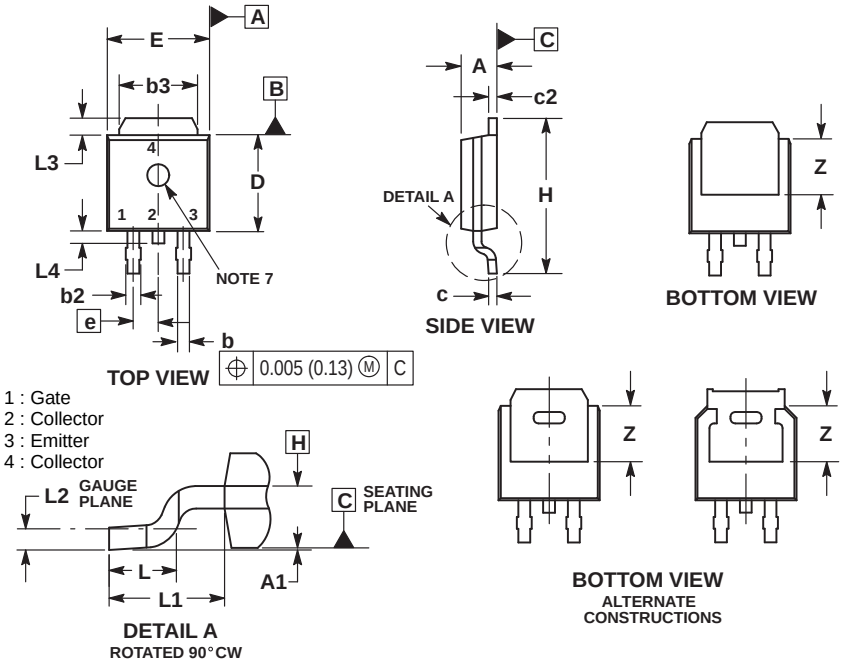


图 3:反向恢复时间测试电路



封装尺寸

DPAK (SINGLE GAUGE)
CASE 369C
ISSUE F



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3 and Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.006 INCHES PER SIDE.
5. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.
7. OPTIONAL MOLD FEATURE.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.086	0.094	2.18	2.38
A1	0.000	0.005	0.00	0.13
b	0.025	0.035	0.63	0.89
b2	0.028	0.045	0.72	1.14
b3	0.180	0.215	4.57	5.46
c	0.018	0.024	0.46	0.61
c2	0.018	0.024	0.46	0.61
D	0.235	0.245	5.97	6.22
E	0.250	0.265	6.35	6.73
e	0.090 BSC		2.29 BSC	
H	0.370	0.410	9.40	10.41
L	0.055	0.070	1.40	1.78
L1	0.114 REF		2.90 REF	
L2	0.020 BSC		0.51 BSC	
L3	0.035	0.050	0.89	1.27
L4	---	0.040	---	1.01
Z	0.155	---	3.93	---

STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 2:
PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN

STYLE 3:
PIN 1. ANODE
2. CATHODE
3. ANODE
4. CATHODE

STYLE 4:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE

STYLE 5:
PIN 1. GATE
2. ANODE
3. CATHODE
4. ANODE

STYLE 6:
PIN 1. MT1
2. MT2
3. GATE
4. MT2

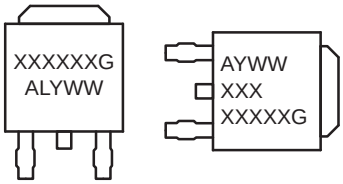
STYLE 7:
PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 8:
PIN 1. N/C
2. CATHODE
3. ANODE
4. CATHODE

STYLE 9:
PIN 1. ANODE
2. CATHODE
3. RESISTOR ADJUST
4. CATHODE

STYLE 10:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. ANODE

GENERIC MARKING DIAGRAM*

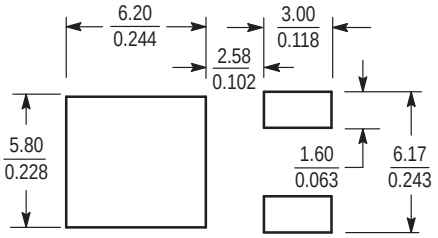


IC Discrete

XXXXXX = Device Code
A = Assembly Location
L = Wafer Lot
Y = Year
WW = Work Week
G = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking.

SOLDERING FOOTPRINT*



SCALE 3:1 (mm / inches)

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

订单情况

器件名称	封装	出货包装	注解
NGTB10N60R2DT4G	DPAK	2500 pcs. / reel	不含铅和卤

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