



ON Semiconductor®

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NGTB30N60L2WG

N-Channel IGBT With Low VF Switching Diode 600V, 30A, VCE(sat);1.4V

Features

- IGBT VCE(sat)=1.4V typ. (IC=30A, VGE=15V)
- IGBT IC=100A (Tc=25°C)
- IGBT tf=80ns typ.
- Low switching loss in higher frequency applications
- Maximum junction temperature Tj=175°C
- Diode VF=1.7V typ. (IF=30A)
- Diode trr=70ns typ.
- 5μs short circuit capability
- Pb-free, Halogen-free and RoHS Compliance

Applications

- Power factor correction of white goods appliance

Specifications

Absolute Maximum Ratings at Ta = 25°C, Unless otherwise specified

Parameter	Symbol	Value	Unit	
Collector to Emitter Voltage	V _{CES}	600	V	
Gate to Emitter Voltage	V _{GES}	±20	V	
Collector Current (DC)	I _C *1	@Tc=25°C *2	100	A
Limited by Tjmax		@Tc=100°C *2	30	A
Pulsed collector current, tp=100ms limited by Tjmax	I _{Cpulse}	60	A	
Pulsed collector current, tp=1ms limited by Tjmax	I _{Cpeak}	232	A	
Diode Average Output Current	I _O	30	A	
Power Dissipation Tc=25°C (Our ideal heat dissipation condition) *2	P _D	225	W	
Junction Temperature	T _j	175	°C	
Storage Temperature	T _{stg}	-55 to +175	°C	

Note : *1 Collector Current is calculated from the following formula.

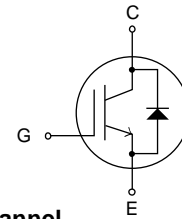
$$I_C(T_c) = \frac{T_{jmax} - T_c}{R_{th(j-c)} \times V_{CE(sat)}(I_C(T_c))}$$

*2 Our condition is radiation from backside.

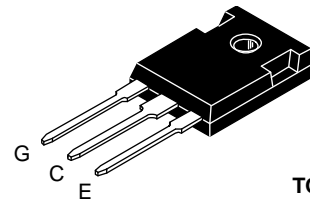
The method is applying silicone grease to the backside of the device and attaching the device to water-cooled radiator made of aluminum.

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.

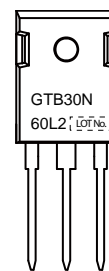
Electrical Connection



N-channel

TO-247
CASE 340AK

Marking



ORDERING INFORMATION

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

NGTB30N60L2WG

Electrical Characteristics at Ta = 25°C, Unless otherwise specified

Parameter	Symbol	Conditions	Value			Unit	
			min	typ	max		
Collector to Emitter Breakdown Voltage	V(BR)CES	IC=500μA, VGE=0V	600			V	
Collector to Emitter Cut off Current	ICES	VCE=600V, VGE=0V			10	μA	
					1	mA	
Gate to Emitter Leakage Current	IGES	VGE=±20V, VCE =0V			±100	nA	
Gate to Emitter Threshold Voltage	VGE(th)	VCE =20V, IC=250μA	4.5		6.5	V	
Collector to Emitter Saturation Voltage	VCE(sat)	VGE=15V, IC=30A		1.4	1.6	V	
					1.7	V	
		VGE=15V, IC=50A		1.65		V	
Diode Forward Voltage	VF	IF=30A		1.7		V	
Input Capacitance	Cies	VCE =20V, f=1MHz		4130		pF	
Output Capacitance	Coes			114		pF	
Reverse Transfer Capacitance	Cres			96		pF	
Turn-ON Delay Time	t _{d(on)}			100		ns	
Rise Time	t _r	VCC=300V, IC=30A RG=30Ω, L=200μH VGE=0V/15V Vclamp=400V See Fig.1, See Fig.2		60		ns	
Turn-ON Time	ton			540		ns	
Turn-OFF Delay Time	t _{d(off)}			390		ns	
Fall Time	t _f			80		ns	
Turn-OFF Time	toff			500		ns	
Turn-ON Energy	Eon			0.31		mJ	
Turn-OFF Energy	Eoff			1.14		mJ	
Turn-ON Delay Time	t _{d(on)}		VCC=300V, IC=50A RG=30Ω, L=200μH VGE=0V/15V Vclamp=400V See Fig.1, See Fig.2		98		ns
Rise Time	t _r				85		ns
Turn-ON Time	ton				650		ns
Turn-OFF Delay Time	t _{d(off)}			380		ns	
Fall Time	t _f			90		ns	
Turn-OFF Time	toff			530		ns	
Turn-ON Energy	Eon			0.638		mJ	
Turn-OFF Energy	Eoff			2.755		mJ	
Total Gate Charge	Qg	VCE =300V, VGE=15V, IC=30A		166		nC	
Gate to Emitter Charge	Qge			40		nC	
Gate to Collector "Miller" Charge	Qgc			70		nC	
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.

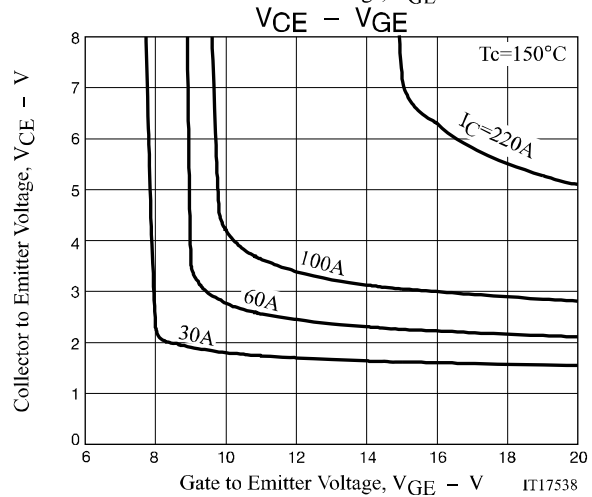
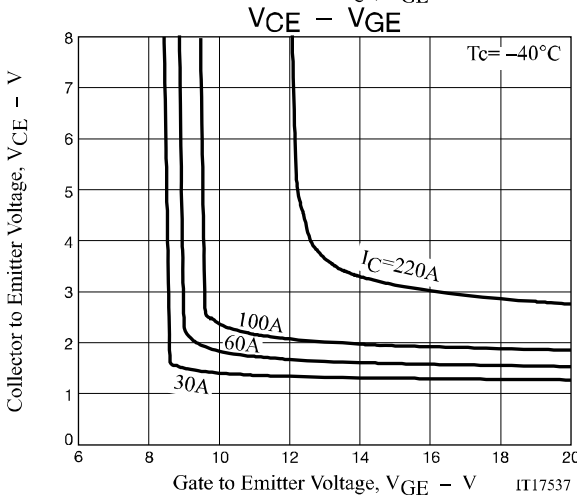
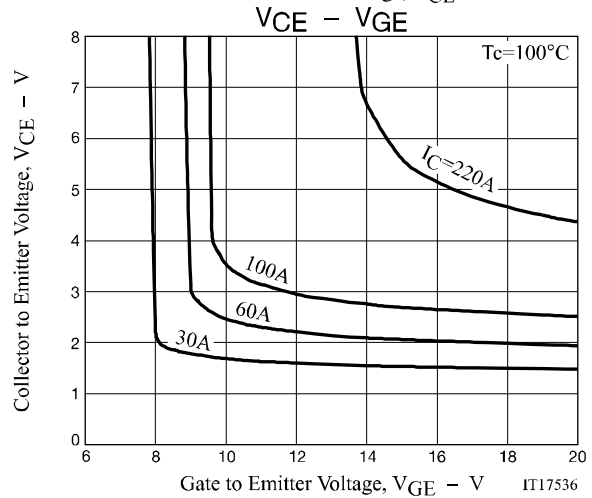
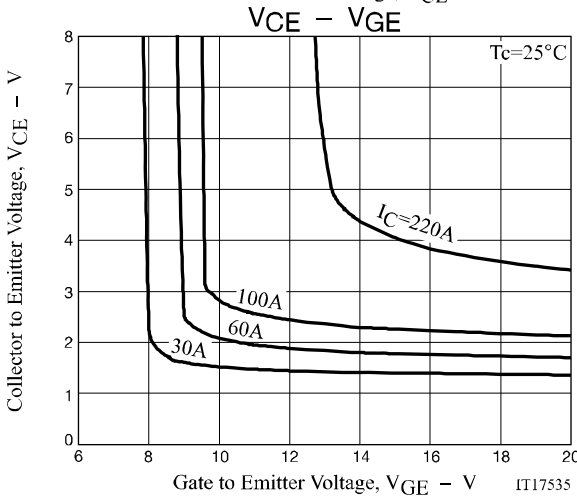
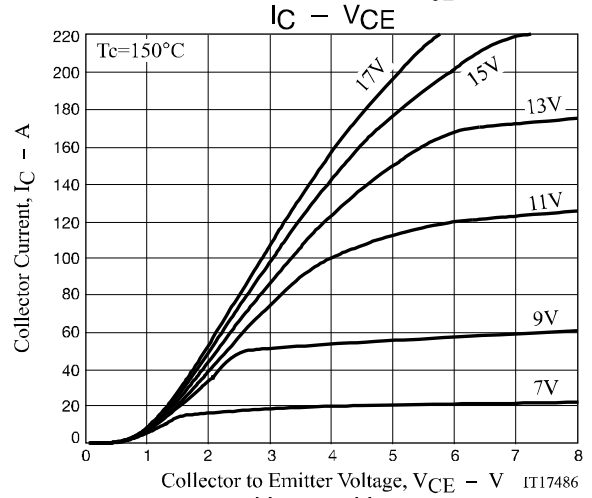
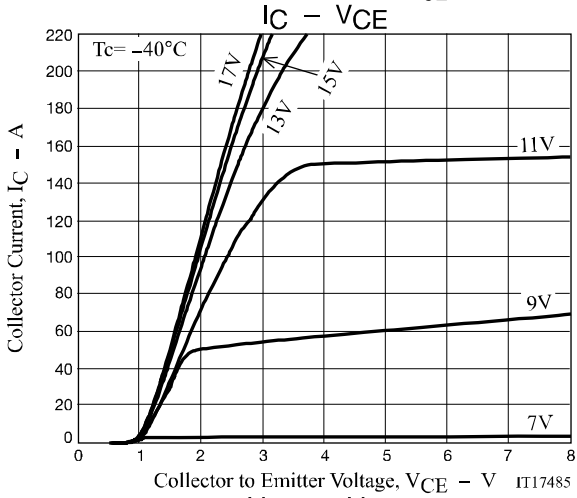
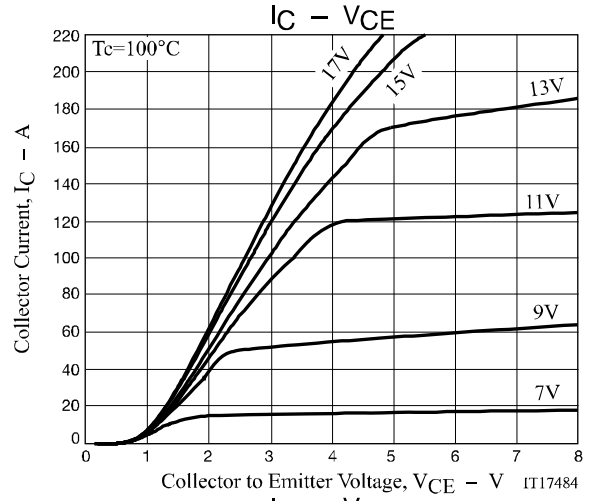
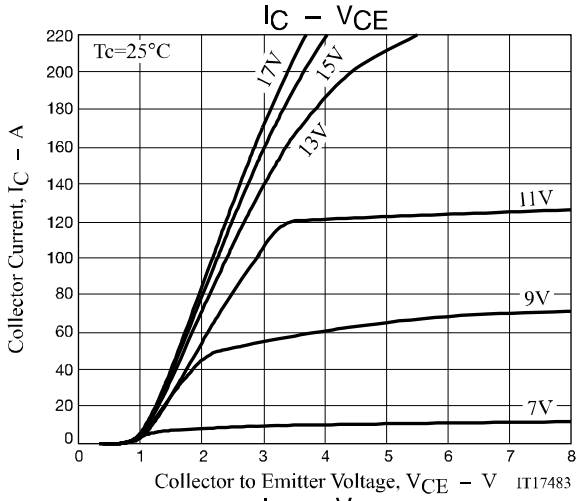
Thermal Characteristics at Ta = 25°C, Unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Thermal Resistance IGBT (Junction to Case)	Rth(j-c) (IGBT)	Tc=25°C (Our ideal heat dissipation condition)*2	0.67	°C /W
Thermal Resistance Diode (Junction to Case)	Rth(j-c) (Diode)	Tc=25°C (Our ideal heat dissipation condition)*2	1.5	°C /W
Thermal Resistance (Junction to Ambient)	Rth(j-a)		41	°C /W

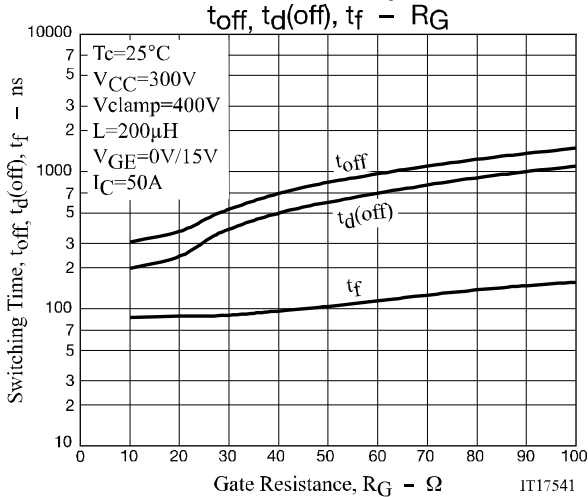
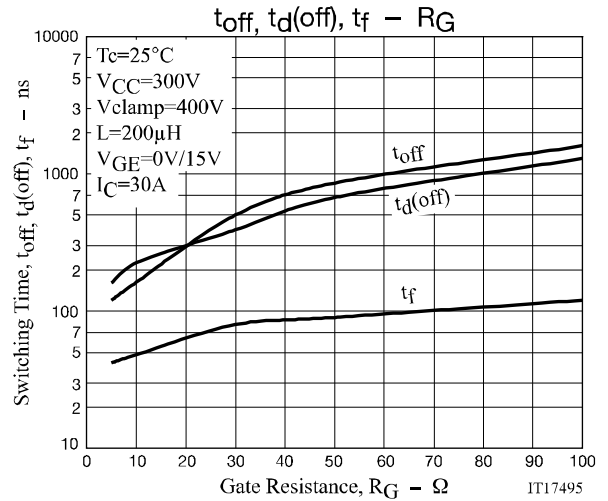
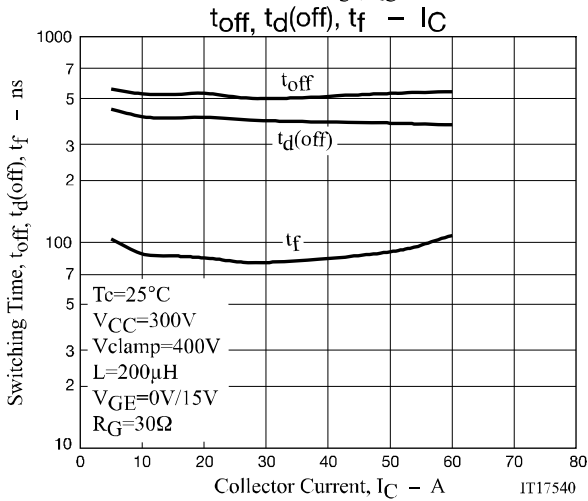
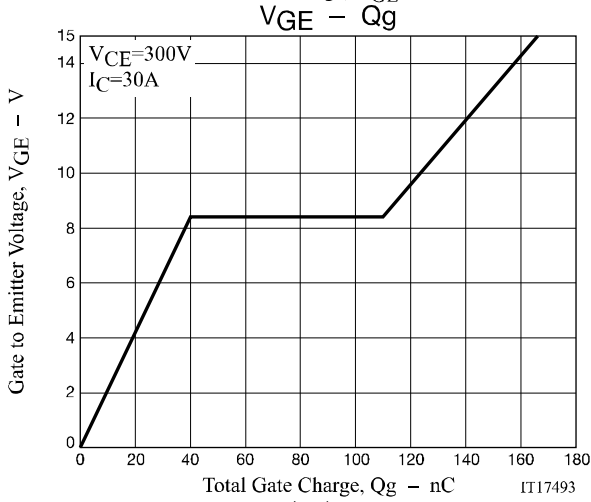
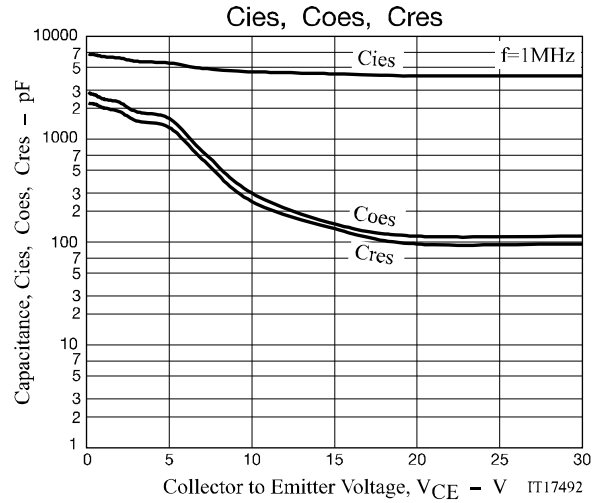
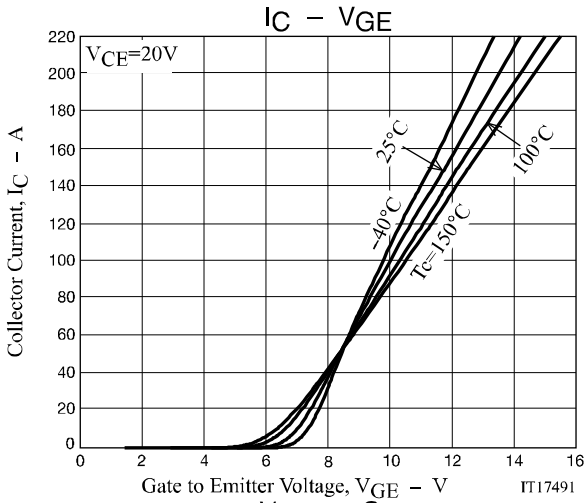
Note : *2 Our condition is radiation from backside.

The method is applying silicone grease to the backside of the device and attaching the device to water-cooled radiator made of aluminum.

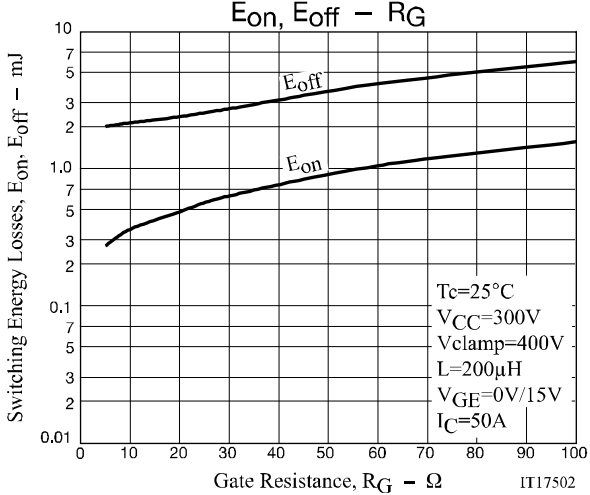
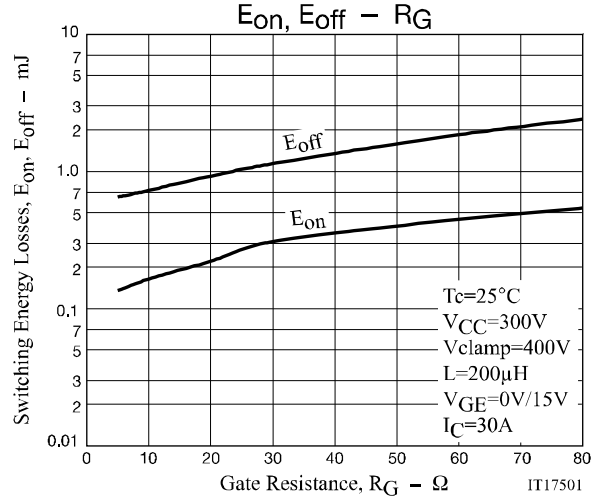
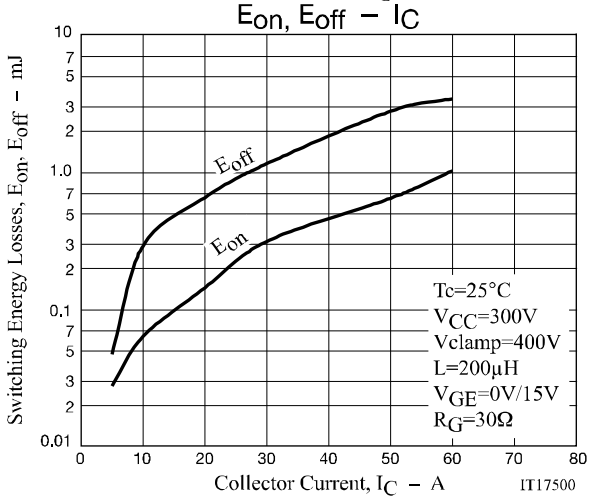
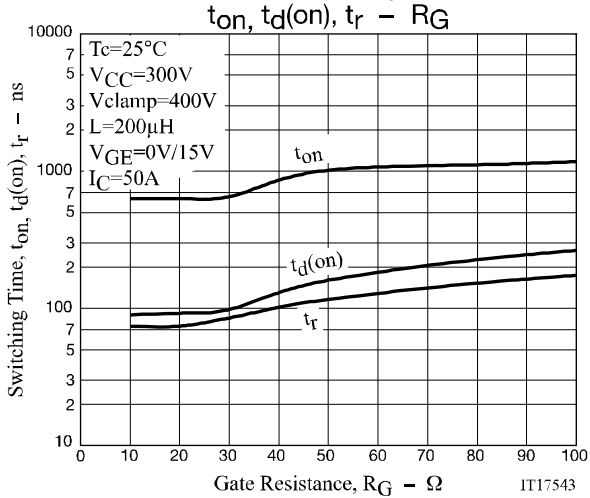
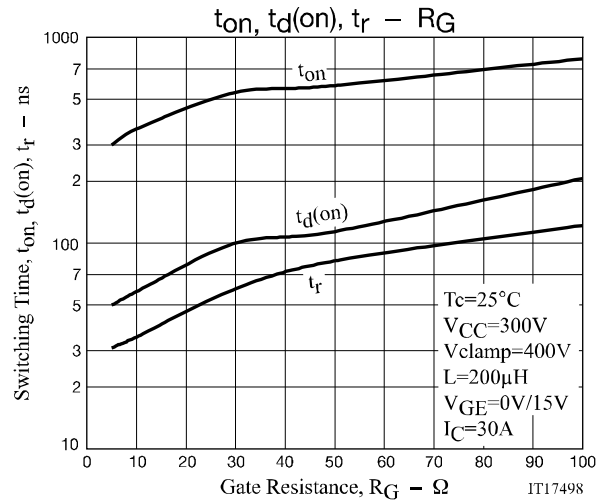
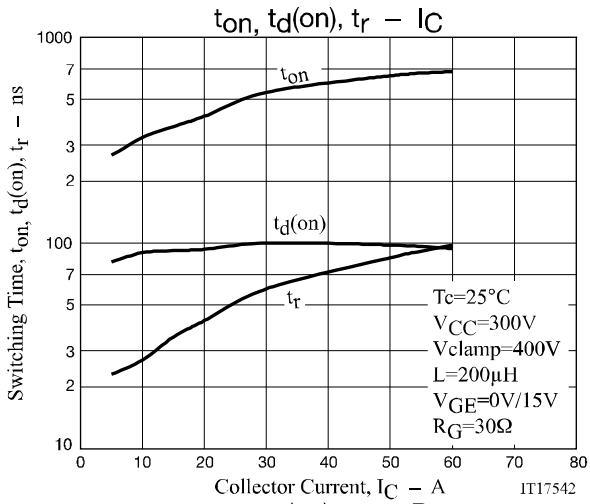
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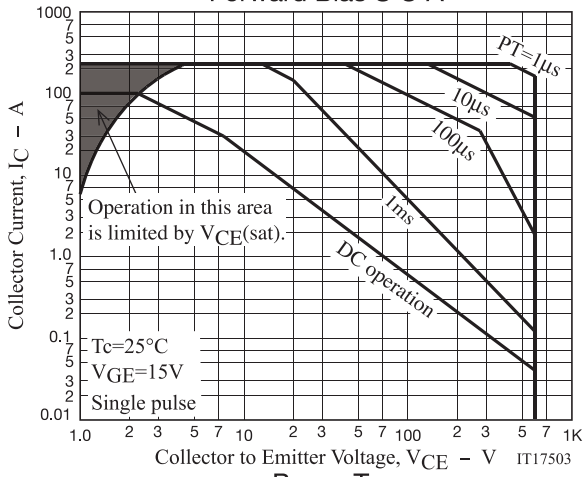


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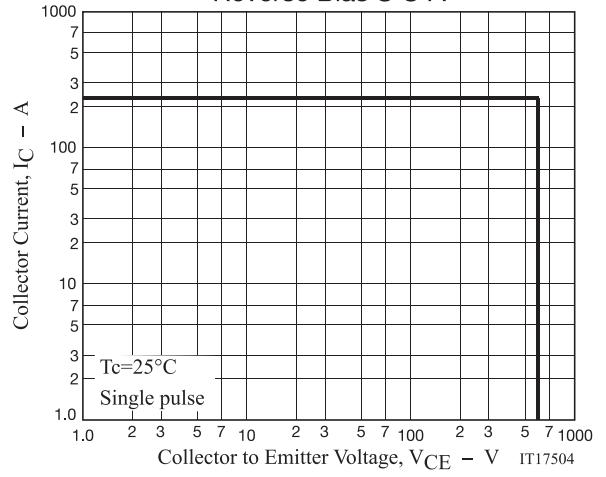


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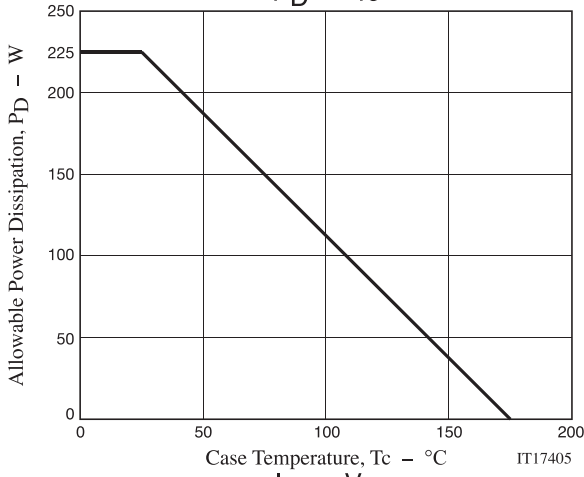
Forward Bias S O A



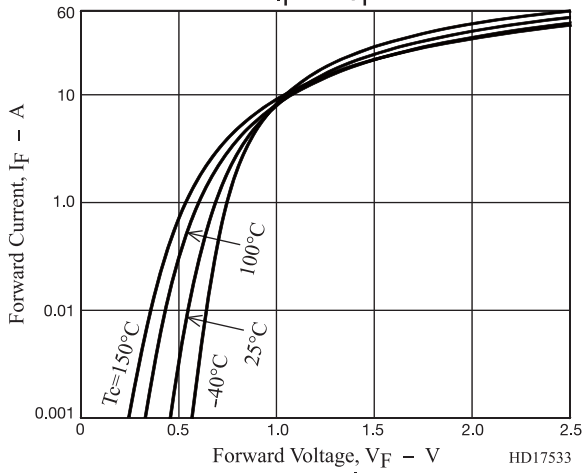
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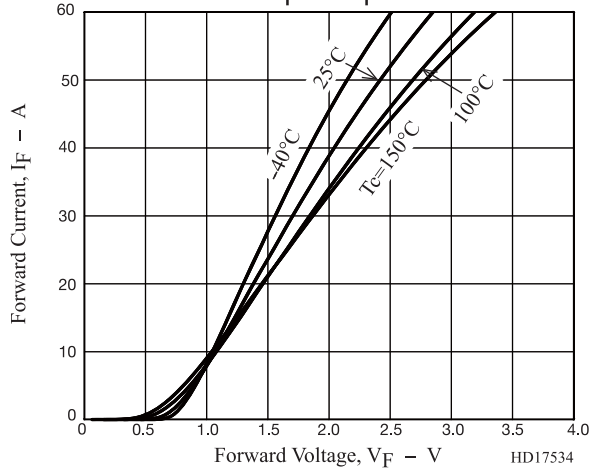
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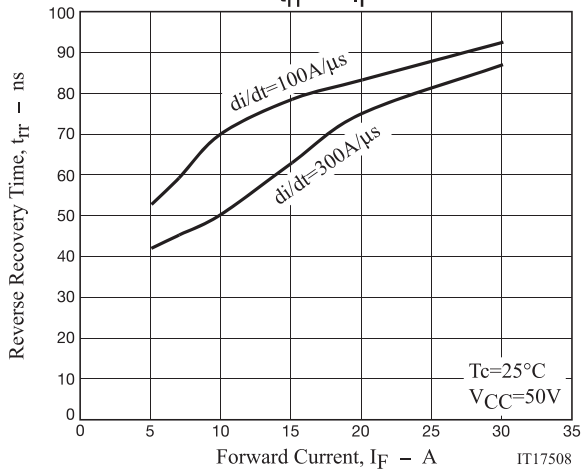
IF - VF



IF - VF



trr - IF



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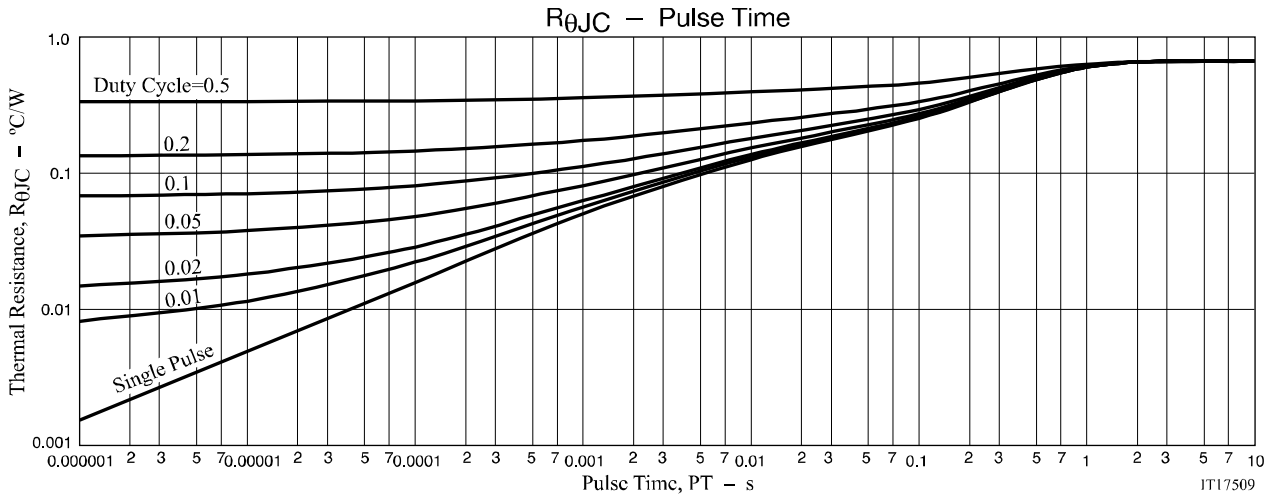


Fig.1 Switching Time Test Circuit

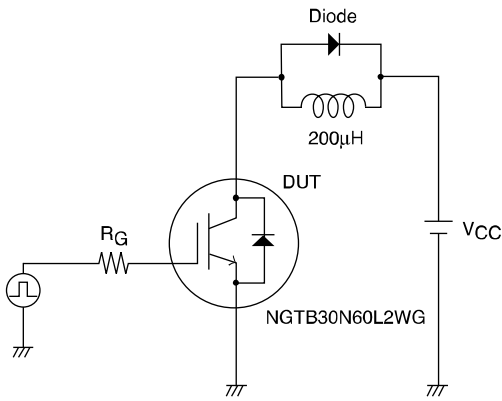


Fig.2 Timing Chart

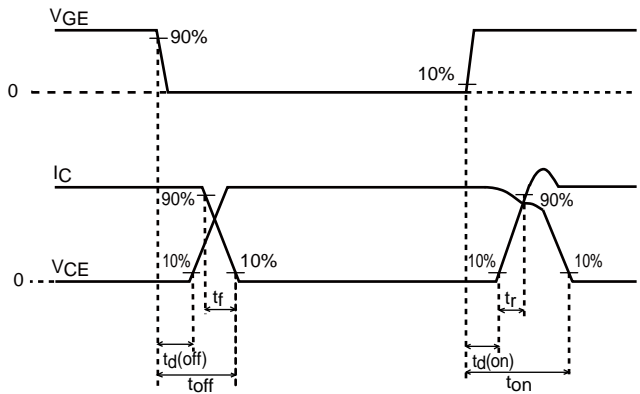
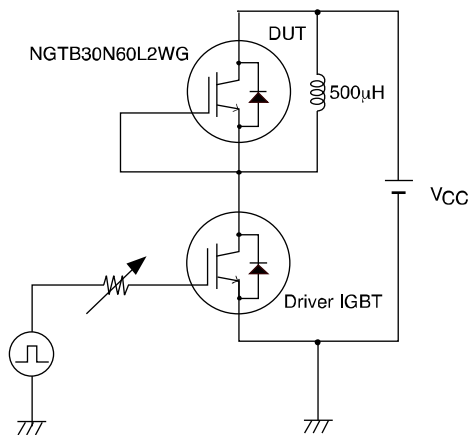


Fig.3 Reverse Recovery Time Test Circuit



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Package Dimensions

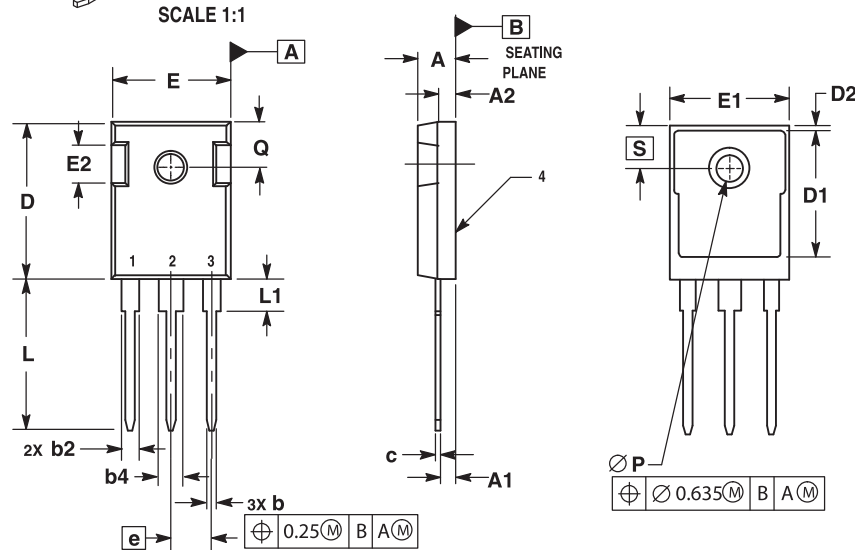
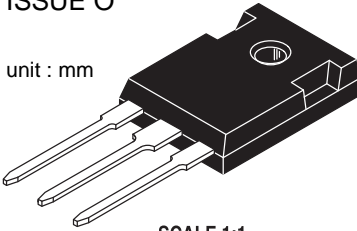
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TO-247

CASE 340AK

ISSUE O

unit : mm



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.13 PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREME OF THE PLASTIC BODY.
4. SLOT REQUIRED, NOTCH MAY BE ROUNDED.
5. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS D1 AND E1.
6. LEAD FINISH UNCONTROLLED WITHIN L1.
7. ⌀P TO HAVE A MAXIMUM DRAFT ANGLE OF 1.5° TO THE TOP OF THE PART WITH A MAXIMUM DIAMETER OF 3.91.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.70	5.31	0.185	0.209
A1	2.21	2.59	0.087	0.102
A2	1.50	2.49	0.059	0.098
b	1.00	1.40	0.039	0.055
b2	1.65	2.39	0.065	0.094
b4	2.59	3.43	0.102	0.135
c	0.38	0.89	0.015	0.035
D	20.80	21.46	0.819	0.845
D1	13.08	---	0.515	---
D2	0.51	1.35	0.020	0.053
E	15.49	16.26	0.610	0.640
E1	13.46	---	0.53	---
E2	4.32	5.49	0.170	0.216
e	5.46 BSC	---	0.215 BSC	---
L	19.81	20.32	0.780	0.800
L1	---	4.50	---	0.177
P	3.56	3.66	0.140	0.144
Q	5.38	6.20	0.212	0.244
S	6.15 BSC	---	0.242 BSC	---

Ordering & Package Information

Device	Package	Shipping	note
NGTB30N60L2WG	TO-247-3L	30 pcs. / tube	Pb-Free and Halogen Free

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