Ordering number : ENA2308B

NGTB30N60L2WG

ON Semiconductor®

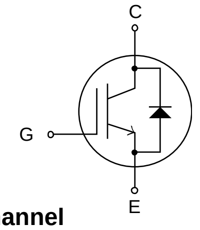
http://onsemi.com

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

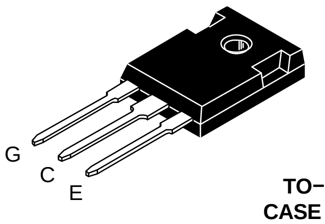
Features

- IGBT V_{CE}(sat)=1.4V typ. (I_C=30A, V_{GE}=15V)
- IGBT I_C=100A (Tc=25°C)
- IGBT t_f=80ns typ.
- Low switching loss in higher frequency applications
- Maximum junction temperature Tj=175°C
- Diode V_F=1.7V typ. (I_F=30A)
- Diode t_{rr}=70ns typ.
- 5μs short circuit capability
- Pb-free, Halogen-free and RoHS Compliance

Electrical Connection



N-channel



TO−247
CASE 340AK

Applications

- Power factor correction of white goods appliance

Specifications

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

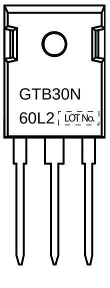
Parameter		Symbol	Value	Unit
Collector to Emitter Voltage		V_{CES}	600	V
Gate to Emitter Voltage		V_{GES}	±20	V
Collector Current (DC) Limited by Tjmax	@Tc=25°C *2	I_C *1	100	A
	@Tc=100°C *2		30	A
Pulsed collector current, tp=100ms limited by Tjmax	@Tc=100°C *2	I_{Cpulse}	60	A
Pulsed collector current, 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		Tj	175	°C
Storage Temperature		Tstg	–55 to +175	°C

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

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

*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.

Marking



ORDERING INFORMATION

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

August, 2014

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

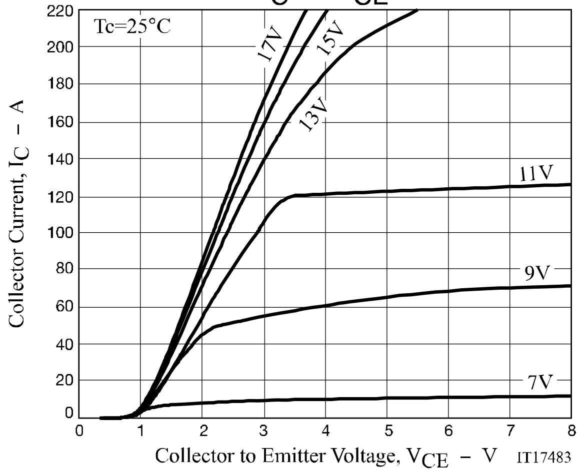
Parameter	Symbol	Conditions		Value			Unit
				min	typ	max	
Collector to Emitter Breakdown Voltage	$V_{(BR)CES}$	I_C=500µA, V_{GE}=0V		600			V
Collector to Emitter Cut off Current	I_{CES}	V_{CE}=600V, V_{GE}=0V	Tc=25°C			10	µA
			Tc=150°C			1	mA
Gate to Emitter Leakage Current	I_{GES}	V_{GE}=±20V, V_{CE} =0V				±100	nA
Gate to Emitter Threshold Voltage	$V_{GE}(th)$	V_{CE} =20V, I_C=250µA		4.5		6.5	V
Collector to Emitter Saturation Voltage	$V_{CE}(sat)$	V_{GE}=15V, I_C=30A	Tc=25°C		1.4	1.6	V
			Tc=150°C		1.7		V
		V_{GE}=15V, I_C=50A	Tc=25°C		1.65		V
Diode Forward Voltage	V_F	I_F=30A			1.7		V
Input Capacitance	Cies	V_{CE} =20V, f=1MHz			4130		pF
Output Capacitance	Coes				114		pF
Reverse Transfer Capacitance	Cres				96		pF
Turn-ON Delay Time	t_d(on)	V_{CC}=300V, I_C=30A R_G=30Ω, L=200µH V_{GE}=0V/15V Vclamp=400V See Fig.1, See Fig.2			100		ns
Rise Time	t_r				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)	V_{CC}=300V, I_C=50A R_G=30Ω, L=200µH V_{GE}=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	V_{CE} =300V, V_{GE}=15V, I_C=30A			166		nC
Gate to Emitter Charge	Qge				40		nC
Gate to Collector “Miller” Charge	Qgc				70		nC
Diode Reverse Recovery Time	t_{rr}	I_F=10A, di/dt=100A/µs, V_{CC}=50V, See Fig.3			70		ns

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

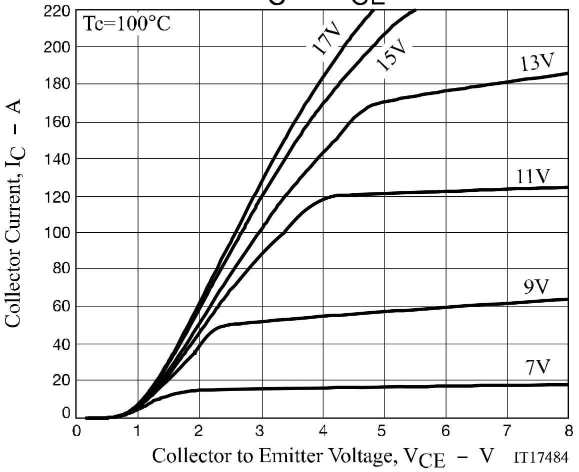
Note : *2 Our condition is radiation from backside.
The method is applying silicone grease to the backside of the device and attaching
the device to water-cooled radiator made of aluminum.

I_C – V_{CE}



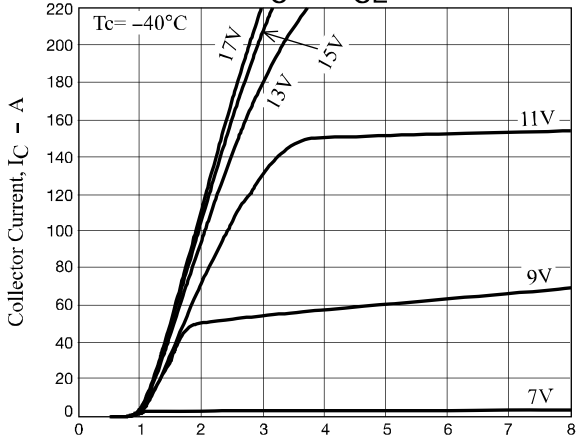
IT17483

I_C – V_{CE}



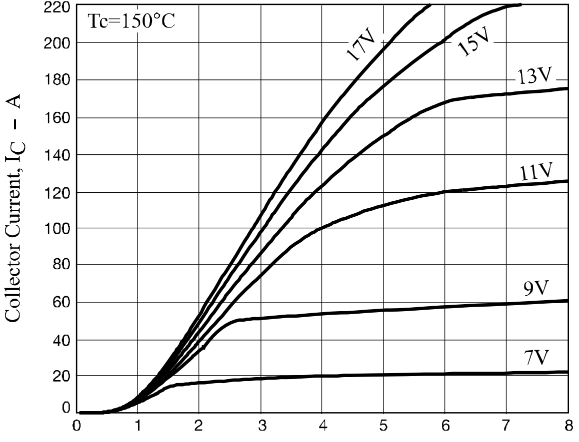
IT17484

I_C – V_{CE}



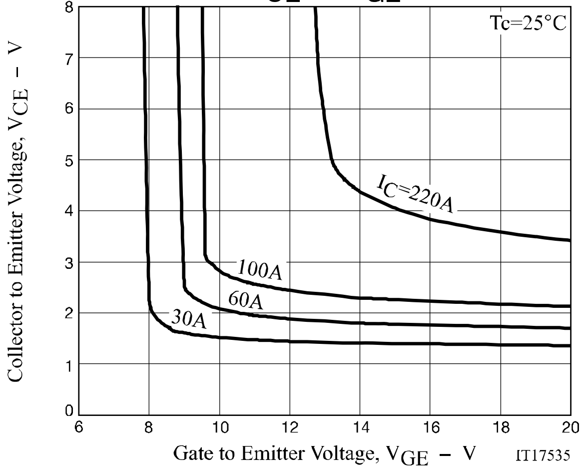
IT17485

I_C – V_{CE}



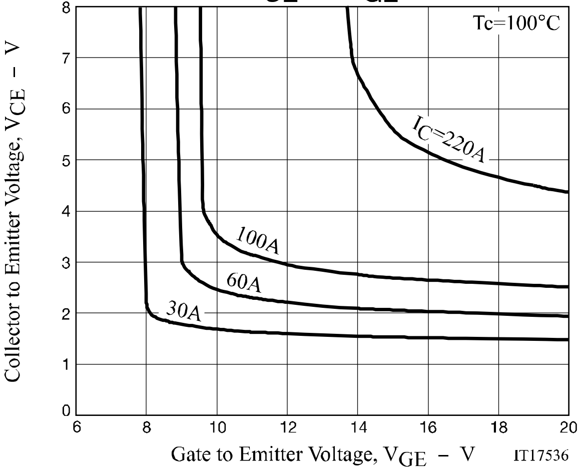
IT17486

V_{CE} – V_{GE}



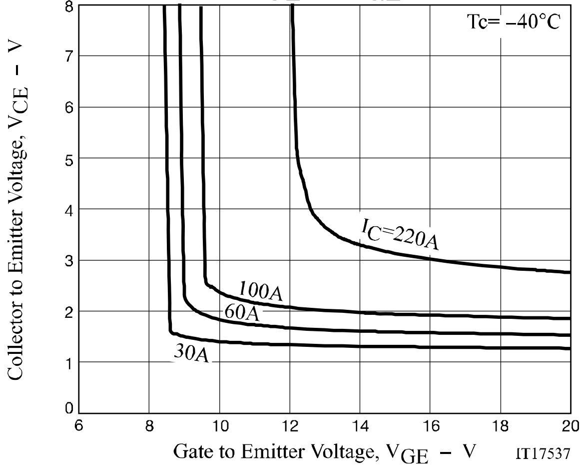
IT17535

V_{CE} – V_{GE}



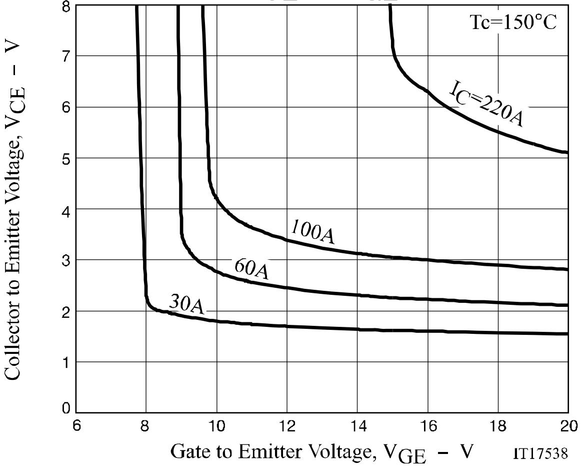
IT17536

V_{CE} – V_{GE}

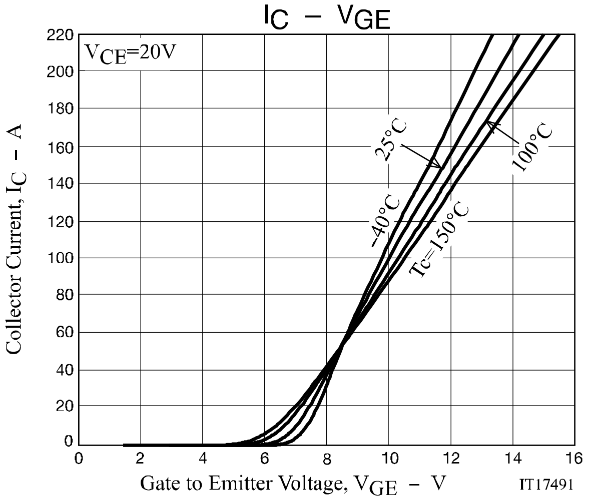


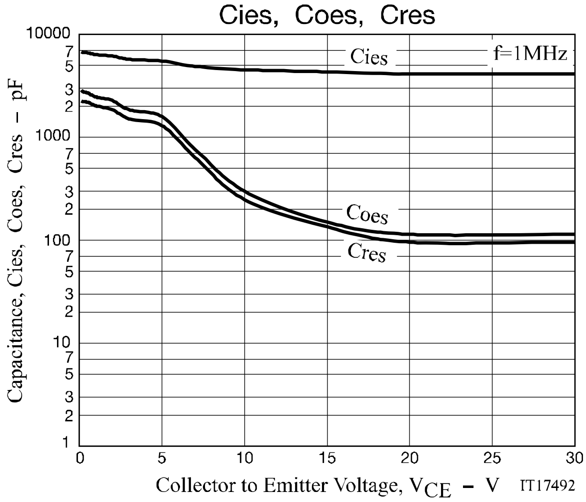
IT17537

V_{CE} – V_{GE}



IT17538


I_C – V_{GE}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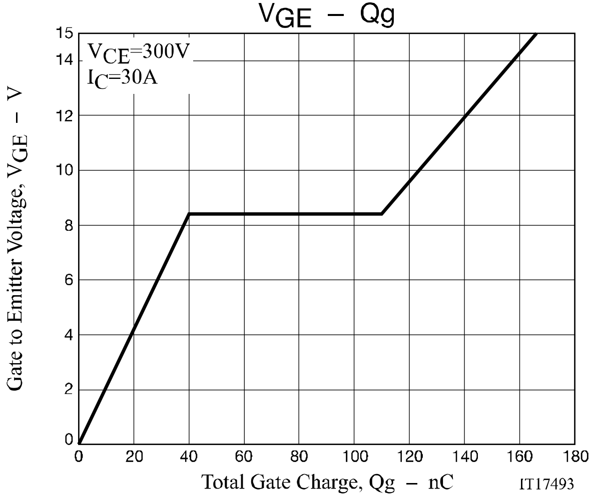
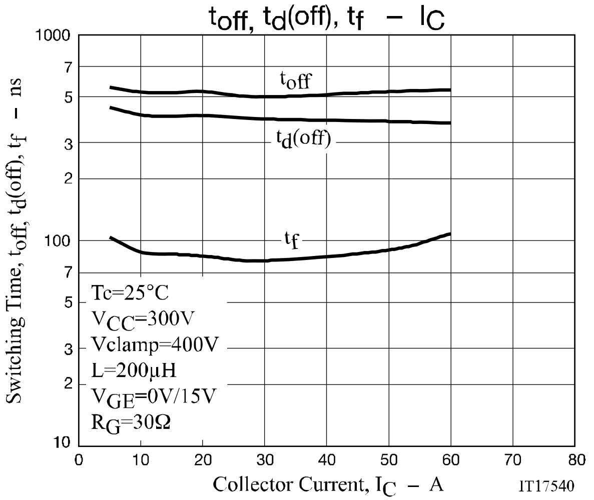
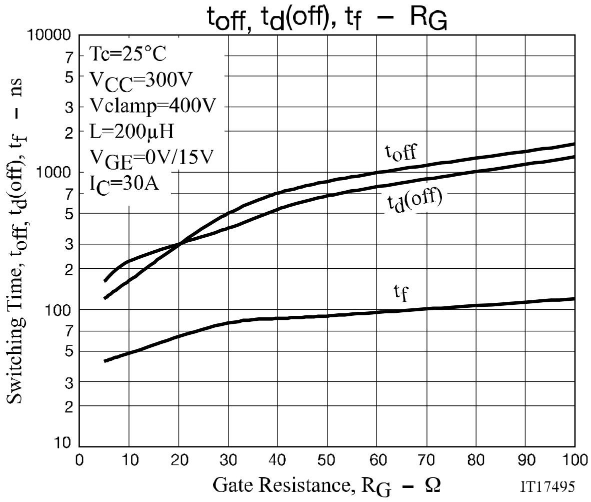
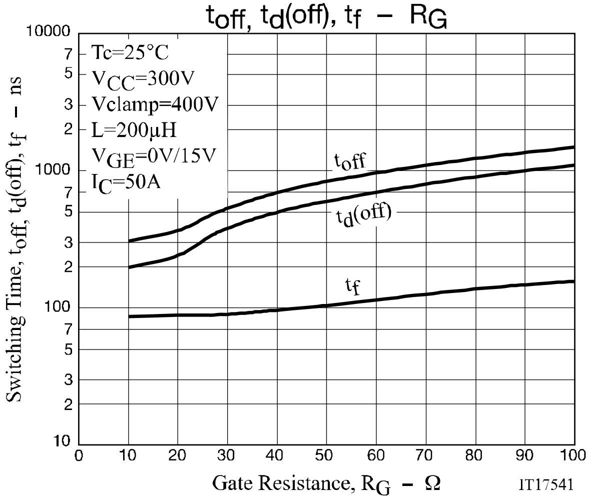
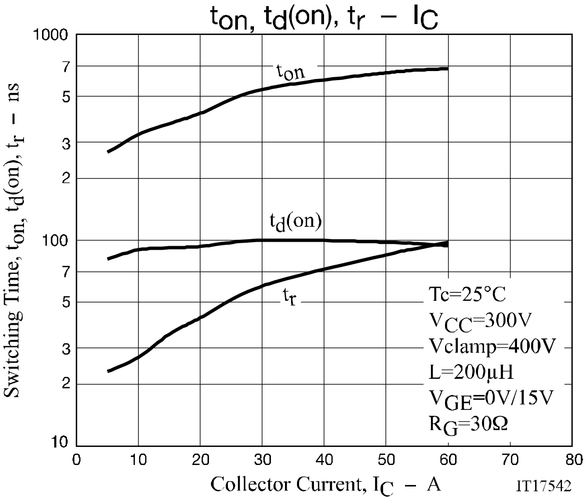

V_{GE} – Qg


t_{off}, t_d(off), t_f – I_C

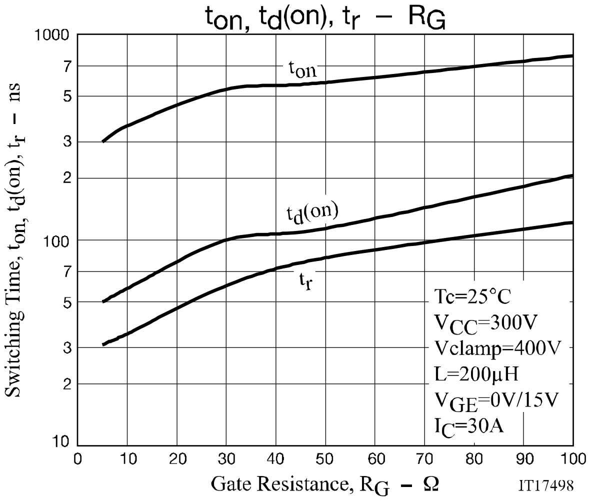

t_{off}, t_d(off), t_f – R_G


t_{off}, t_d(off), t_f – R_G

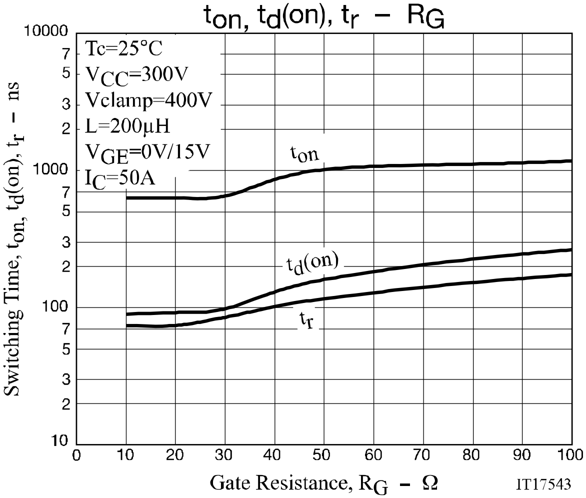
t_{on}, $t_d(on)$, t_r – I_C



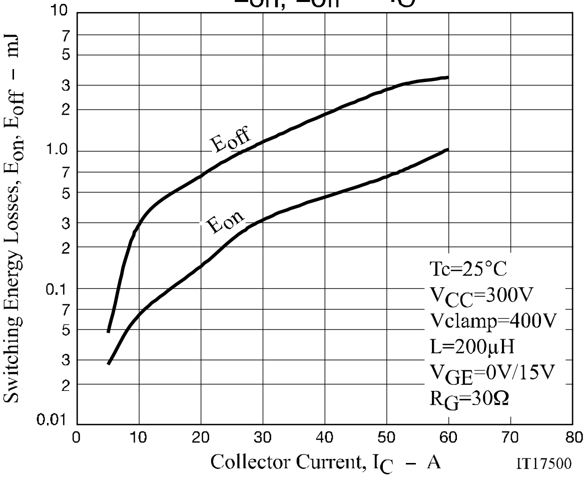
t_{on}, $t_d(on)$, t_r – R_G



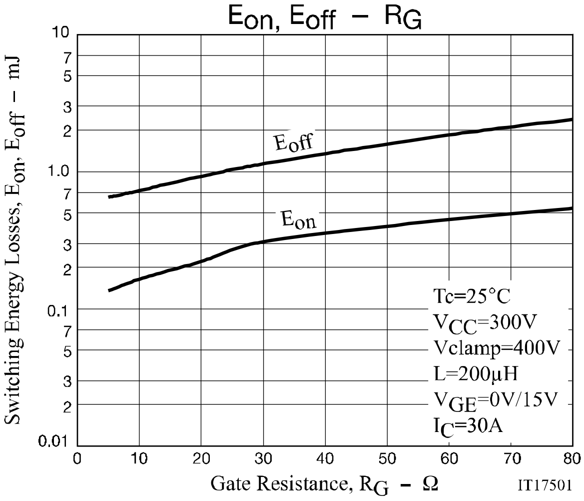
t_{on}, $t_d(on)$, t_r – R_G



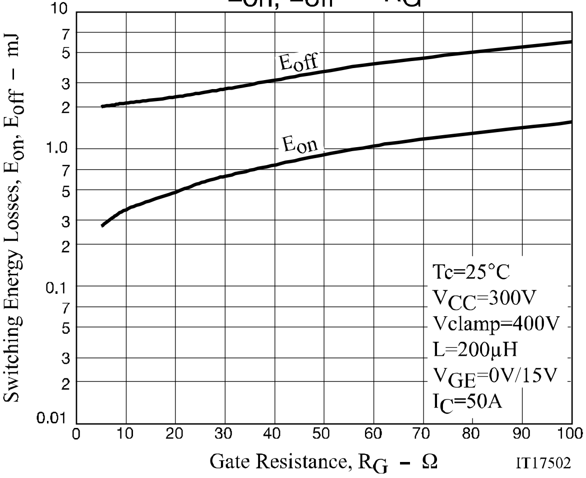
E_{on}, E_{off} – I_C



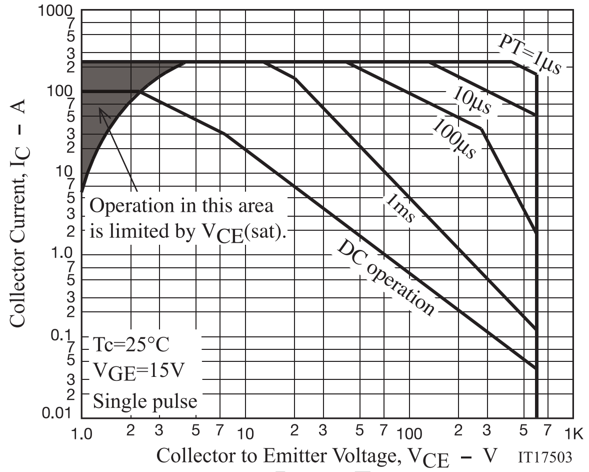
E_{on}, E_{off} – R_G



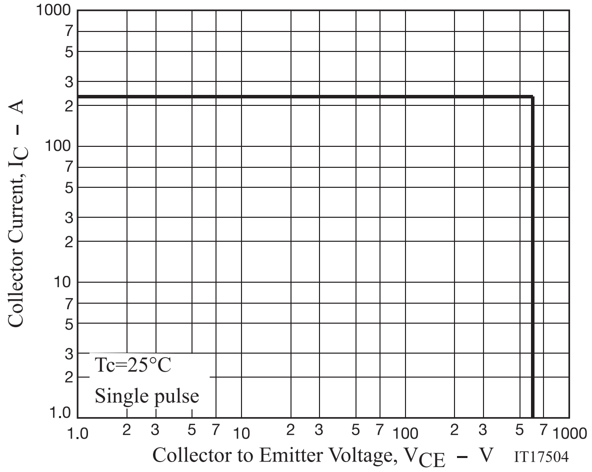
E_{on}, E_{off} – R_G



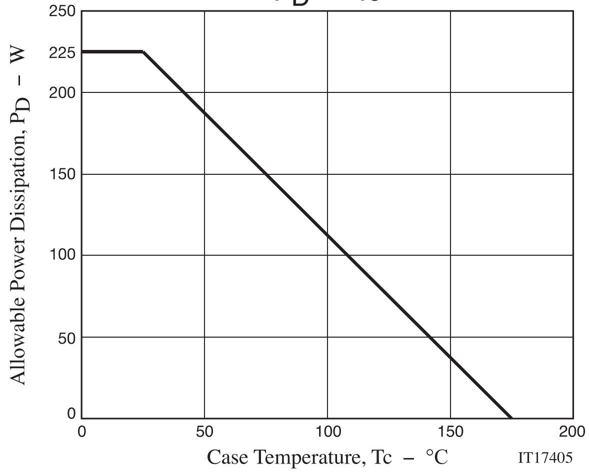
Forward Bias S O A



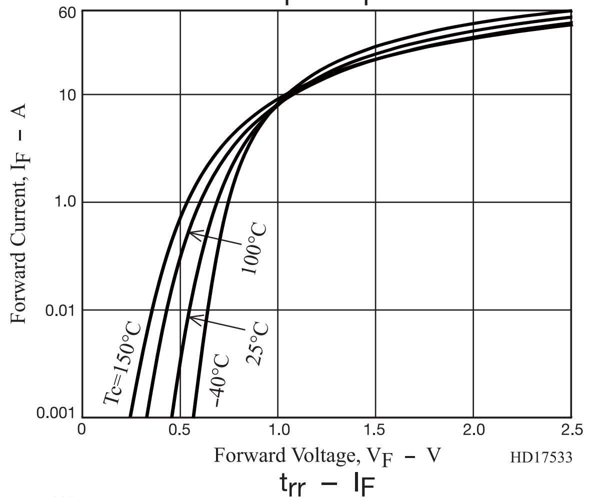
Reverse Bias S O A



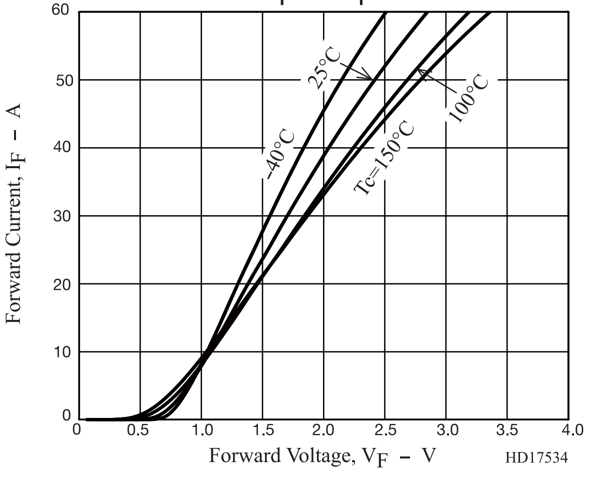
P$_D$ – Tc



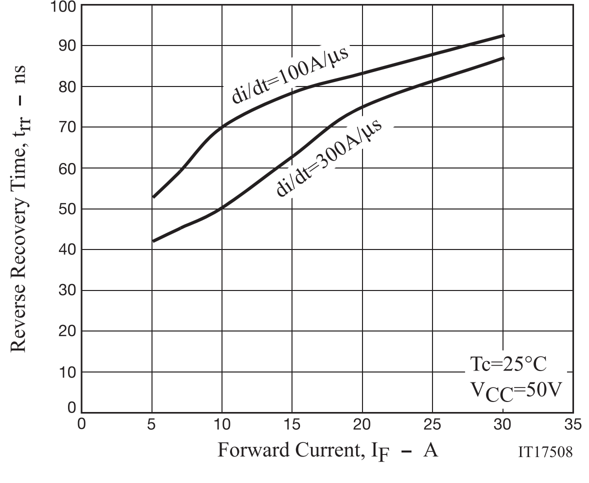
I$_F$ – V$_F$



I$_F$ – V$_F$



t$_{rr}$ – I$_F$



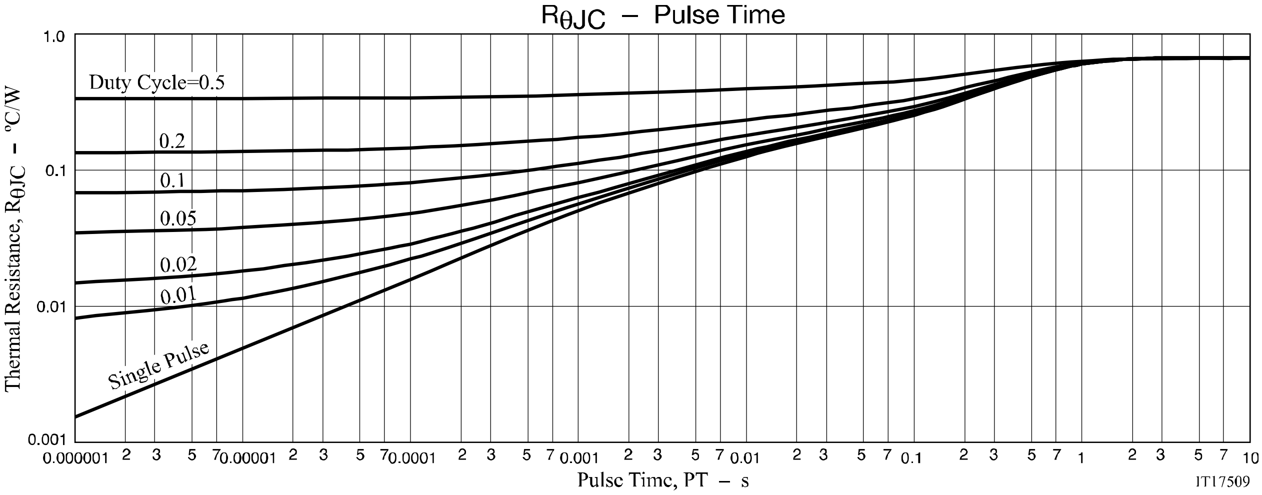


Fig.1 Switching Time Test Circuit

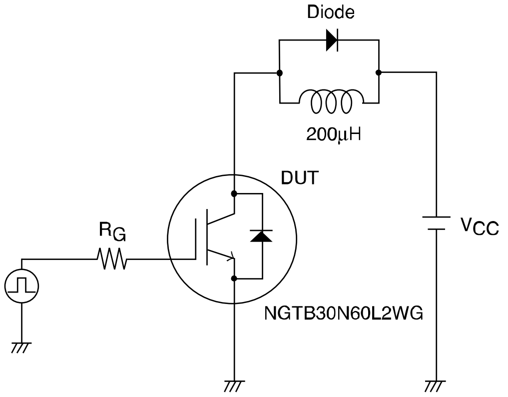


Fig.2 Timing Chart

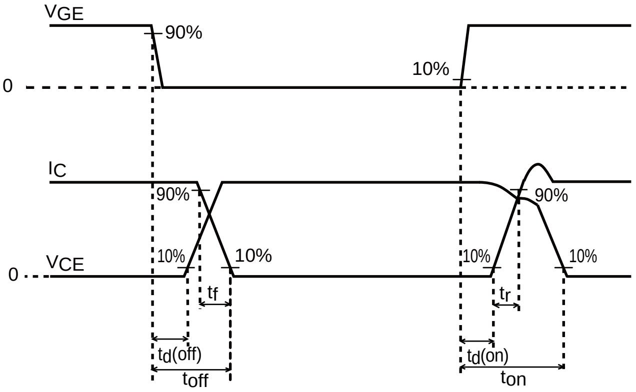
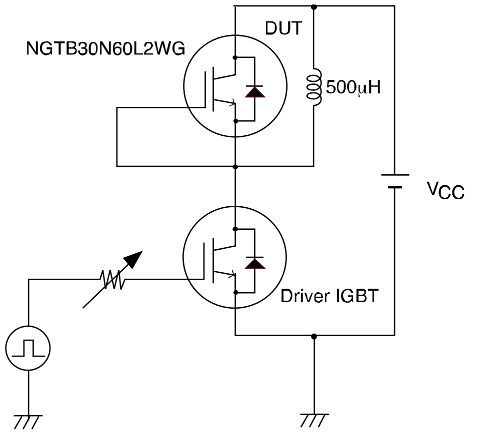


Fig.3 Reverse Recovery Time Test Circuit



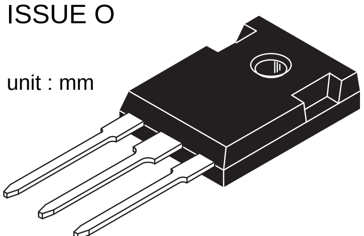
Package Dimensions

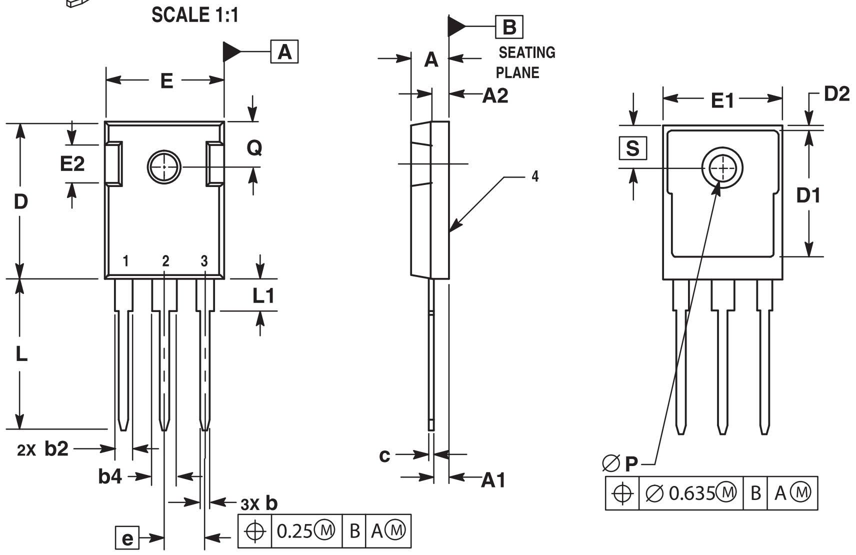
NGTB30N60L2WG

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.

	MILLIMETERS		INCHES	
DIM	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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