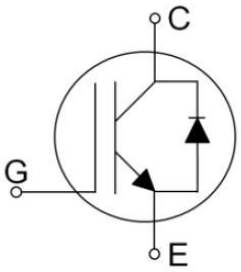
YGQ75N120FP

1200V /75A Trench Field Stop IGBT

V_{CE}	**1200**	**V**
I_C	**75**	**A**
$V_{CE(SAT)}$ I_C=75A	**1.7**	**V**

FEATURES

- High breakdown voltage to 1200V for improved reliability
- Trench-Stop Technology offering :
  - High speed switching
  - High ruggedness, temperature stable
  - Low V_{CEsat}
  - Easy parallel switching capability due to positive temperature coefficient in V_{CEsat}



APPLICATION

- Uninterruptible Power Supplies
- Solar inverter
- Welding
- PFC applications

Product	Package	Packaging
YGQ75N120FP	TO247-PLUS	Tube

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	V_{CE}	1200	V
DC collector current, limited by T_{jmax} T_C = 25°C T_C = 100°C	I_C	150 75	A
Diode Forward current, limited by T_{jmax} T_C = 25°C T_C = 100°C	I_F	150 75	A
Continuous Gate-emitter voltage	V_{GE}	±20	V
Transient Gate-emitter voltage	V_{GE}	±30	V
Turn off safe operating area V_{CE} ≤1200V, T_j ≤ 150°C	-	300	A
Pulsed Collector Current, V_{GE} =15V, t_p limited by T_{jmax}	I_{CM}	300	A
Diode Pulsed Current, t_p limited by T_{jmax}	I_{Fpuls}	300	A
Power dissipation , T_j=25°C	P_{tot}	735	W
Max. Junction Temperature （Under switching conditions）	T_{Jmax}	150	°C
Operating junction temperature	T_{Jop}	-40...+150	°C
Soldering temperature, wave soldering 1.6mm (0.063in.) from case for 10s	-	260	°C

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT thermal resistance, junction - case	R_{θ}(j-c)	0.17	K/W
Diode thermal resistance, junction - case	R_{θ}(j-c)	0.35	K/W
Thermal resistance, junction - ambient	R_{θ}(j-a)	40	K/W

Electrical Characteristics of the IGBT（T_j= 25℃ unless otherwise specified）：

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Collector-Emitter breakdown voltage	BV_{CES} ①	V_{GE}=0V , I_C=250μA	1200	1300	-	V
Gate threshold voltage	$V_{GE(th)}$	V_{GE}=V_{CE}, I_C=250μA	-	5.1	-	V
Collector-Emitter Saturation voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=75A T_j = 25°C T_j = 150°C	- -	1.62 1.94	-	V
Zero gate voltage collector current	I_{CES}	V_{CE} = 1200V, V_{GE} = 0V T_j = 25°C T_j = 150°C	- -	- -	250 2500	μA
Gate-emitter leakage current	I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V	-	-	100	nA
Transconductance	g_{fs}	V_{CE}=20V, I_C=75A	-	67	-	S

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Input capacitance	C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz	-	7655	-	pF
Output capacitance	C_{oes}		-	351	-	
Reverse transfer capacitance	C_{res}		-	39.26	-	
Gate charge	Q_G	V_{CC} = 960V, I_C = 75A, V_{GE} = 15V	-	233.1	-	nC

Note：

① BV_{ces} testing without filter could damage the device. BV_{ces} is guaranteed by Ices@1200V test.

Switching Characteristic, Inductive Load

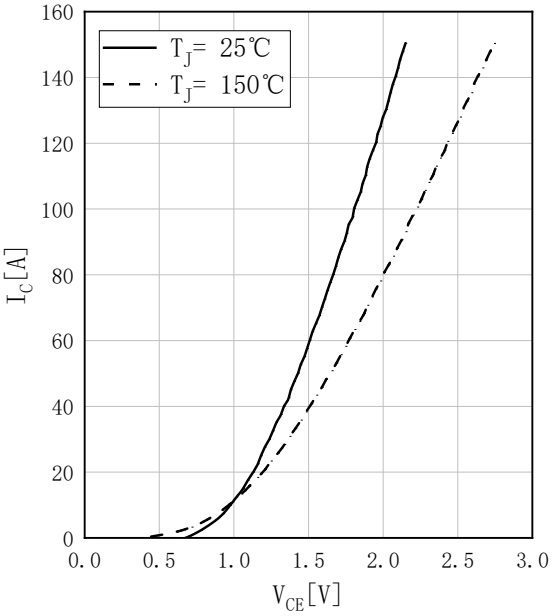
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_j = 25° C						
Turn-on delay time	$td_{(on)}$	V_{CC} = 600V, I_C = 75A, V_{GE} = ±15V, R_g=6.6Ω	-	122	-	ns
Rise time	t_r		-	89	-	ns
Turn-on energy	E_{on}		-	6.6	-	mJ
Turn-off delay time	$td_{(off)}$		-	171	-	ns
Fall time	t_f		-	53	-	ns
Turn-off energy	E_{off}		-	2.9	-	mJ

Electrical Characteristics of the DIODE（T_j= 25℃ unless otherwise specified）

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Diode Forward Voltage	V_{FM}	I_F = 75A	-	2.0	-	V
Reverse Recovery Time	T_{rr}	I_F= 75A, V_R = 600V, di/dt= 600A/μs,	-	298	-	ns
Reverse Recovery Current	I_{rr}		-	26.6	-	A
Reverse Recovery Charge	Q_{rr}		-	4.34	-	nC

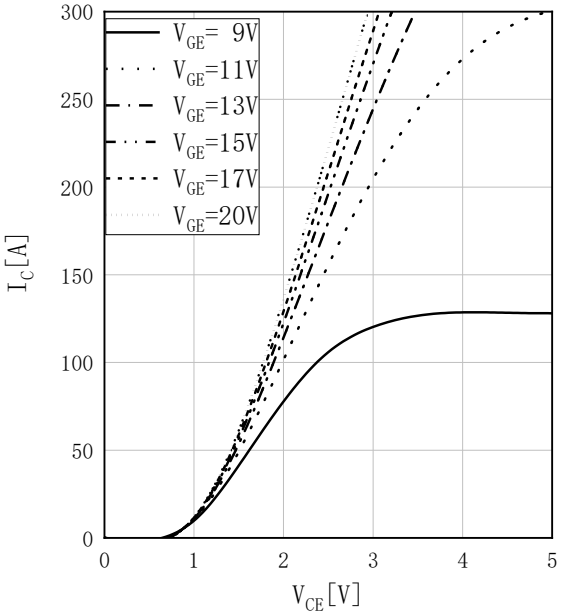
Saturation voltage characteristics

$I_C=f(V_{CE})$
$V_{GE}=15V$



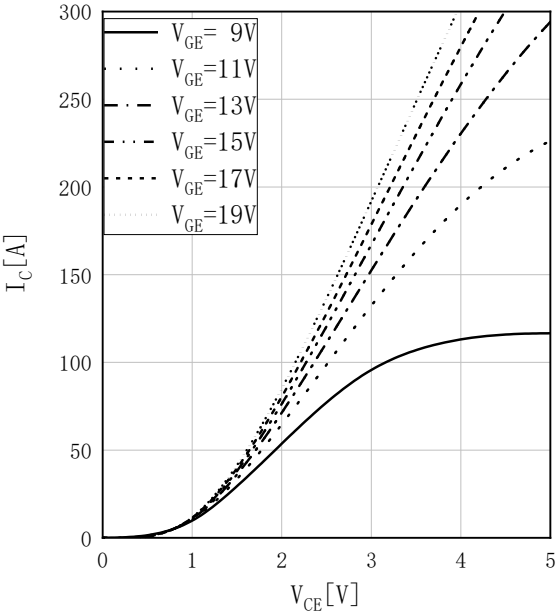
Output characteristics

$I_C=f(V_{CE})$
$T_J=25℃$



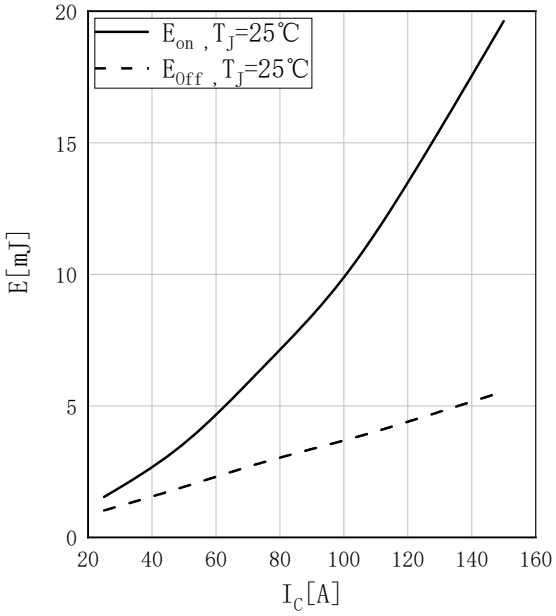
Output characteristics

$I_C=f(V_{CE})$
$T_J=150℃$



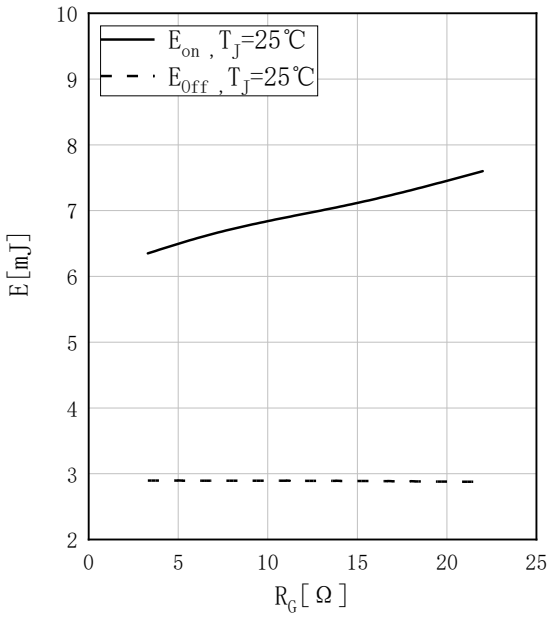
Switching losses IGBT

$E_{on}=f(I_C)$, $E_{off}=f(I_C)$
$V_{GE}=\pm15V, R_G=6.6\Omega$, $V_{CE}=600V$



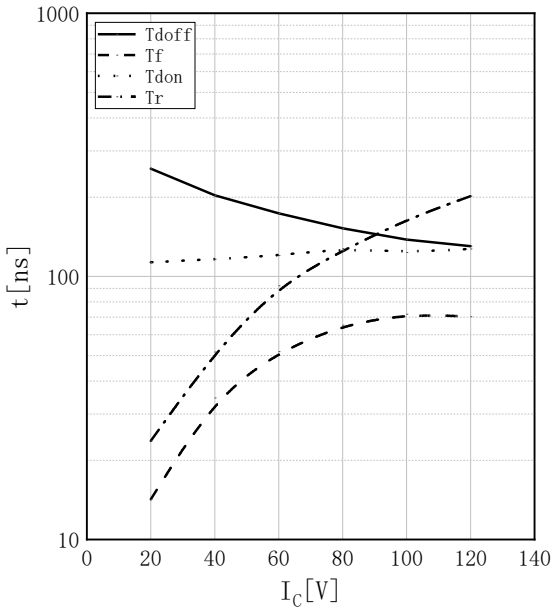
Switching losses IGBT

$E_{on}=f(R_G)$, $E_{off}=f(R_G)$
$V_{GE}=\pm15V, I_C=75A, V_{CE}=600V$



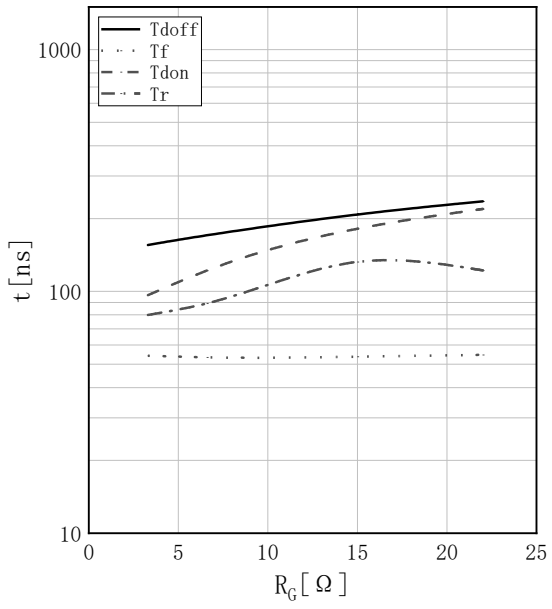
Switching times IGBT

$T_{don}=f(I_C)$, $T_r=f(I_C)$, $T_{doff}=f(I_C)$, $T_f=f(I_C)$
$V_{GE}=\pm15V, R_G=6.6\Omega, V_{CE}=600V$, $T_J=25℃$



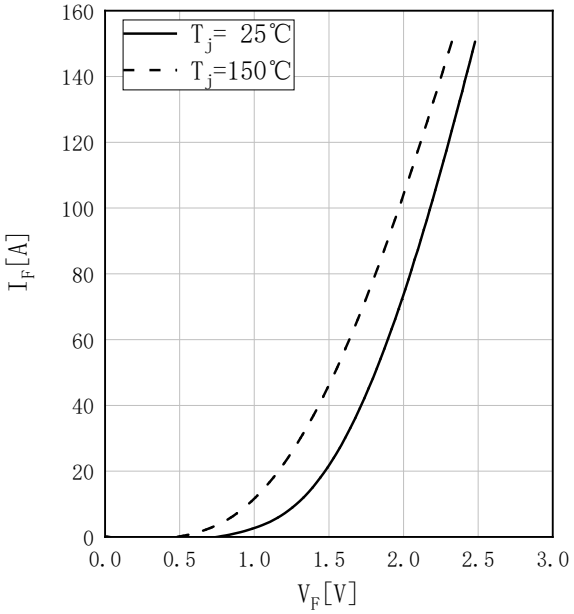
Switching times IGBT

$T_{don}=f(R_G)$, $T_r=f(R_G)$, $T_{doff}=f(R_G)$, $T_f=f(R_G)$
$V_{GE}=\pm15V, I_C=75A, V_{CE}=600V$, $T_J=25℃$



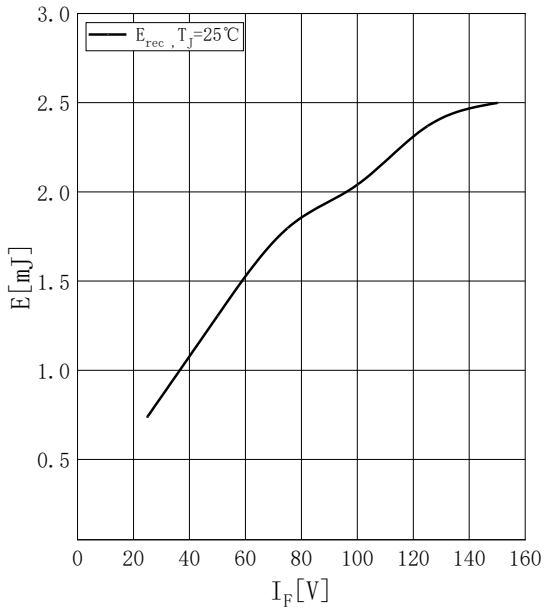
Forward characteristic of Diode

$I_F=f(V_F)$



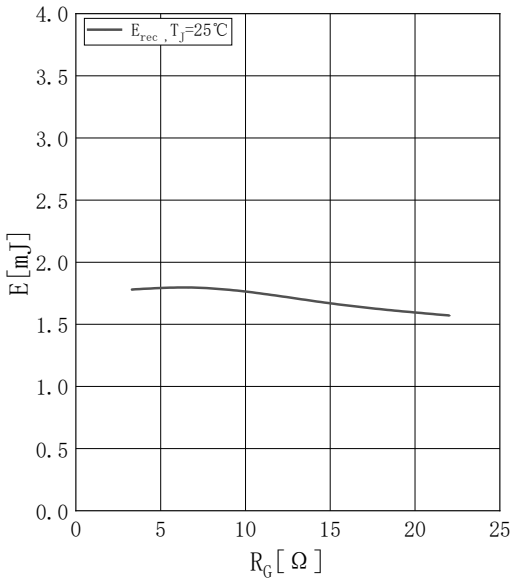
Switching losses Diode

$E_{rec}=f(I_F)$
$R_{Gon}=6.6\Omega, V_{CE}=600V$



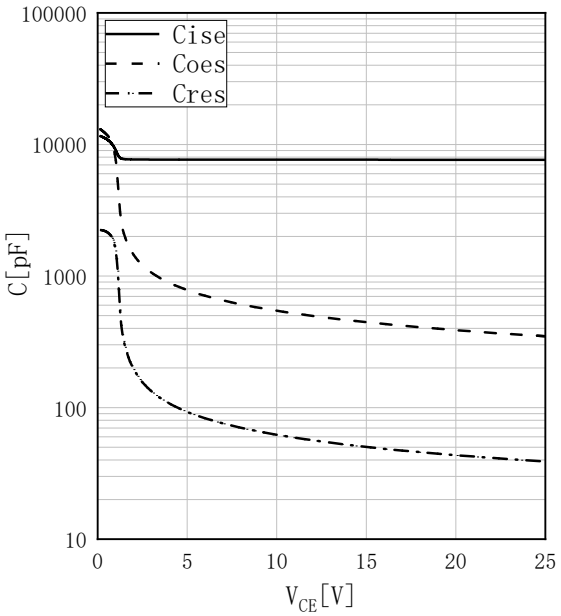
Switching losses Diode

$E_{rec}=f(R_G)$
$I_F=75A, V_{CE}=600V$

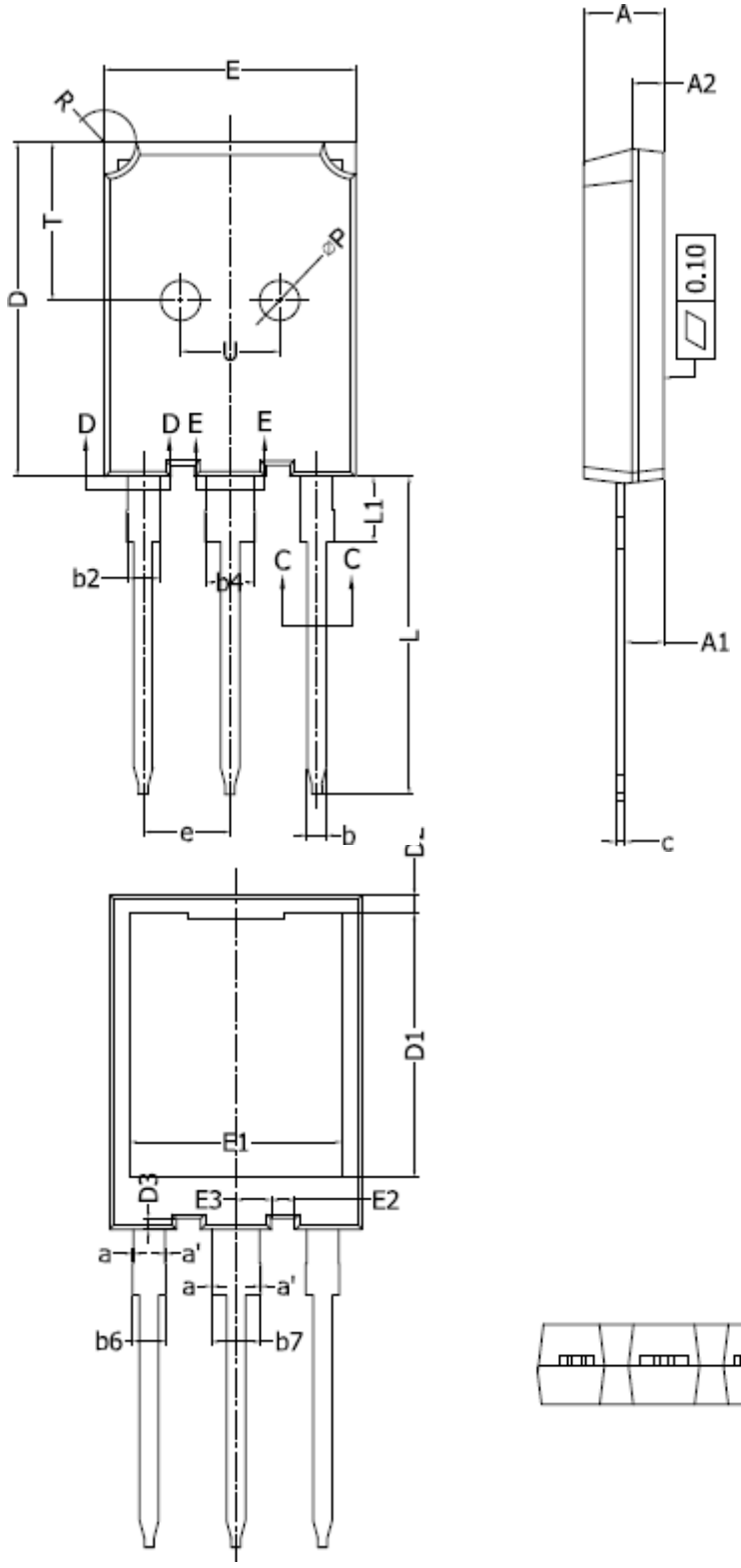


Capacitance characteristics

$C_{ies}=f(V_{CE})$,$C_{oes}=f(V_{CE})$, $C_{res}=f(V_{CE})$

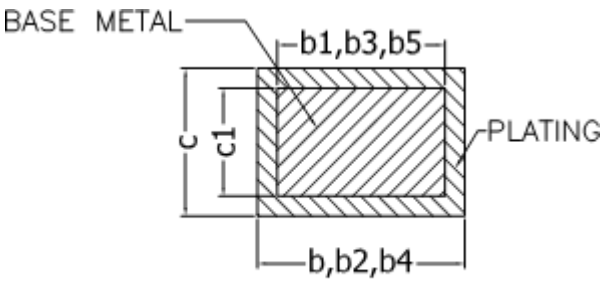


TO247-PLUS package information



COMMON DIMENSIONS
(UNITS OF MEASURE =MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
a	0	—	0.15
a'	0	—	0.15
b	1.16	—	1.26
b1	1.15	1.2	1.22
b2	1.96	—	2.06
b3	1.95	2.00	2.02
b4	2.96	—	3.06
b5	2.96	3.00	3.02
b6	—	—	2.25
b7	—	—	3.25
c	0.59	—	0.66
c1	0.59	0.60	0.66
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.17	1.35
D3	0.58	—	0.78
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	1.40	1.50	1.60
E3	2.12	2.22	2.32
e	5.436 BSC		
L	19.80	19.95	20.10
L1	—	—	4.30
P	2.40	2.50	2.60
R	1.90	—	2.10
T	9.80	—	10.20
U	6.00	—	6.40



SECTION C-C,D-D & E-E