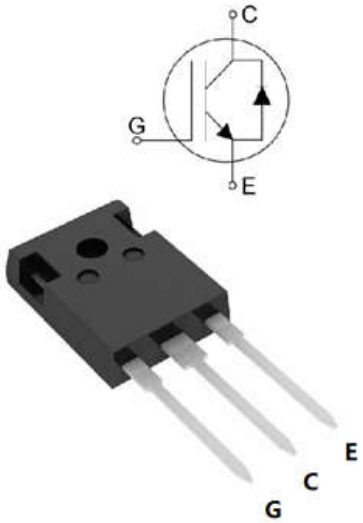
YGW15N120T3

1200V /15A Trench Field Stop IGBT

V_{CE}	**1200**	**V**
I_C	**15**	**A**
$V_{CE(SAT)}$ I_C=15A	**1.7**	**V**

FEATURES

- High breakdown voltage to 1200V for improved reliability
- Trench-Stop Technology offering :
  - Very tight parameter distribution
  - Short circuit withstand time – 10μs
  - High ruggedness, temperature stable
  - Low $V_{CE(SAT)}$
  - Easy parallel switching capability due to positive temperature coefficient in $V_{CE(SAT)}$
- Enhanced avalanche capability



APPLICATION

- Frequency Converters
- Motor Drive

Product	Package	Packaging
YGW15N120T3	TO247	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	30 15	A
Diode Forward current, limited by T_{jmax} T_C = 25°C T_C = 100°C	I_F	30 15	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	-	60	A
Pulsed collector current, V_{GE}= 15V, t_p limited by T_{jmax}	I_{CM}	60	A
Short Circuit Withstand Time, V_{GE}= 15V, V_{CE}≤ 600V	Tsc	10	μs
Power dissipation , Tj=25℃	Ptot	190	W
Operating junction temperature	T_j	-40...+150	°C
Storage temperature	T_s	-55...+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)	0.65	K/W
Diode thermal resistance, junction - case	R_{θ}(j-c)	1.4	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}	V_{GE}=0V , I_C=250μA	1200	-	-	V
Gate threshold voltage	$V_{GE(th)}$	V_{GE}=V_{CE}, I_C=250μA	5.2	6.0	6.8	V
Collector-Emitter Saturation voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=15A T_j = 25°C T_j = 150°C	 - -	 1.7 2.1	 2.1 -	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=15A	-	10	-	S

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Dynamic						
Input capacitance	C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz	-	2700	-	pF
Output capacitance	C_{oes}		-	70	-	
Reverse transfer capacitance	C_{res}		-	40	-	
Gate charge	Q_G	V_{CC} = 960V, I_C = 15A, V_{GE} = 15V	-	115	-	nC
Short circuit collector current	$I_{C(SC)}$	V_{GE}=15V,t_{SC}≤10us V_{CC}=600V, $T_{j,\ start}$=25°C	-	130	-	A

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 = 15A, V_{GE} = 0/15V, R_g=10Ω	-	35	-	ns
Rise time	t_r		-	30	-	ns
Turn-on energy	E_{on}		-	1.75	-	mJ
Turn-off delay time	$td_{(off)}$		-	90	-	ns
Fall time	t_f		-	130	-	ns
Turn-off energy	E_{off}		-	0.40	-	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 = 15A	-	2.7	-	V
Reverse Recovery Time	T_{rr}	I_F= 15A, di/dt= 600A/μs	-	270	-	ns
Reverse Recovery Current	I_{rr}		-	10	-	A
Reverse Recovery Charge	Q_{rr}		-	1800	-	nC

Fig. 1 Output characteristics

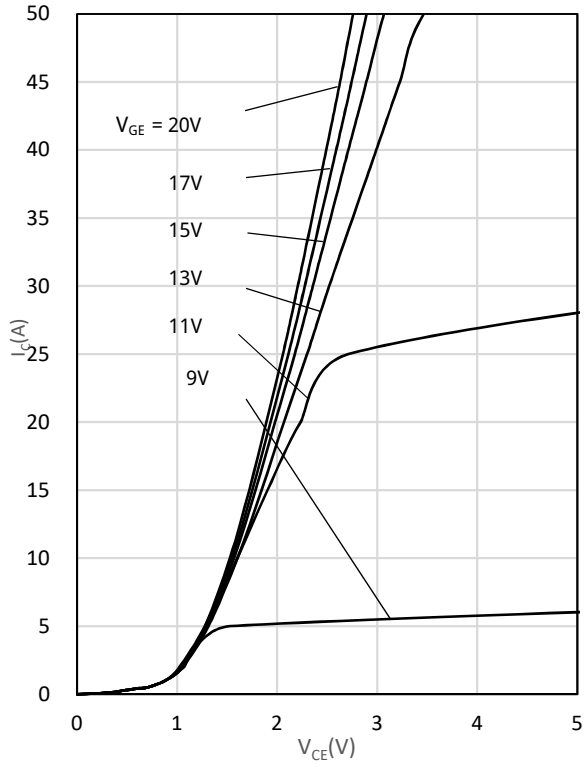


Fig. 2 Saturation voltage characteristics

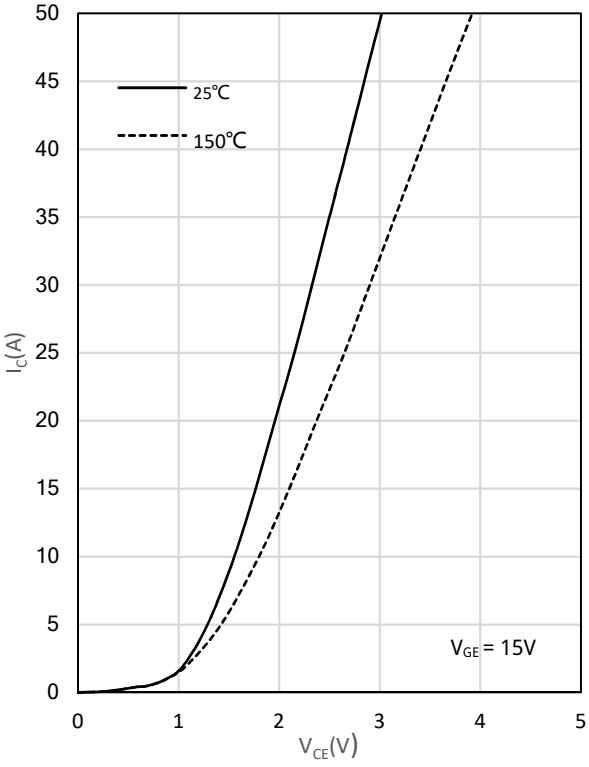


Fig. 3 Switching times vs. gate resistor

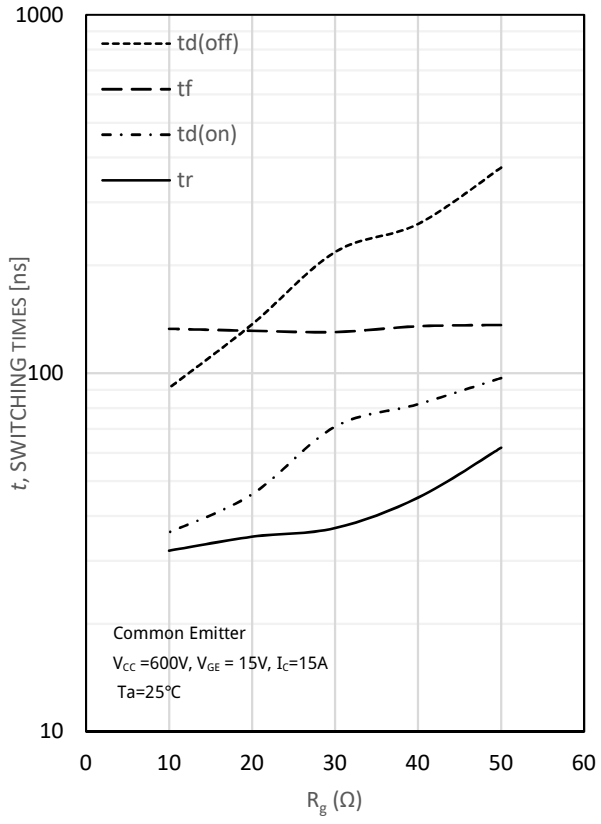


Fig. 4 Switching times vs. collector current

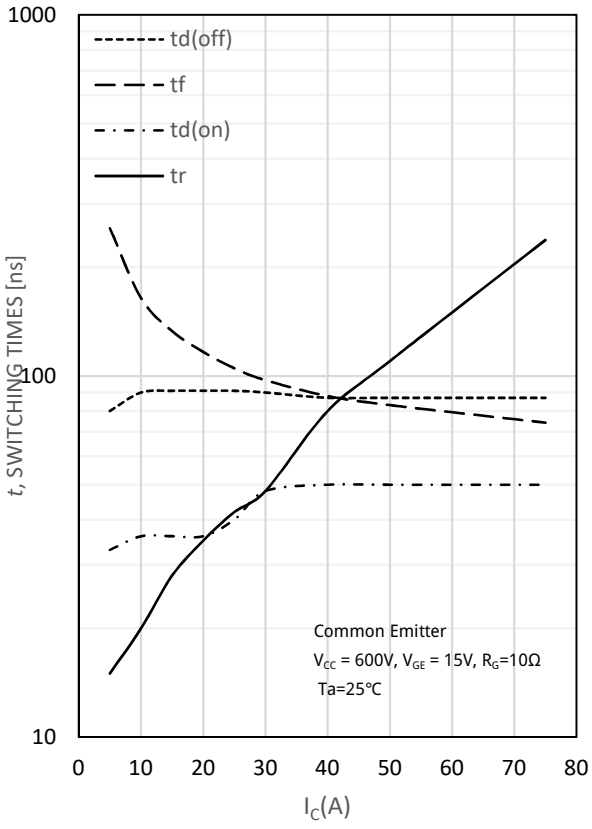


Fig. 5 Switching loss vs. gate resistor

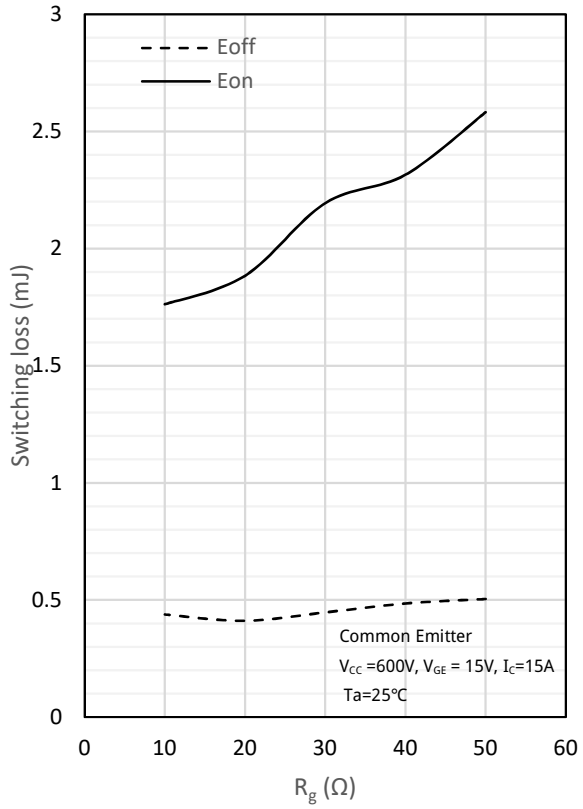


Fig. 6 Switching loss vs. collector current

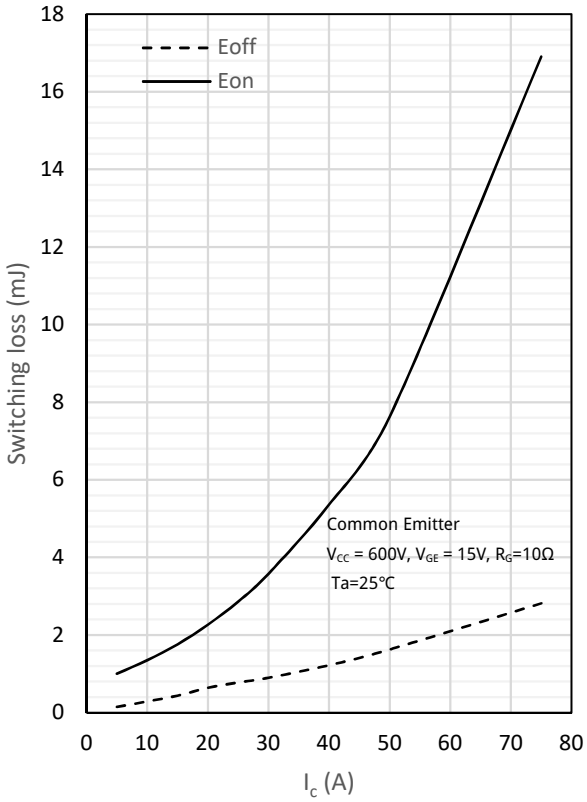


Fig. 7 Gate charge characteristics

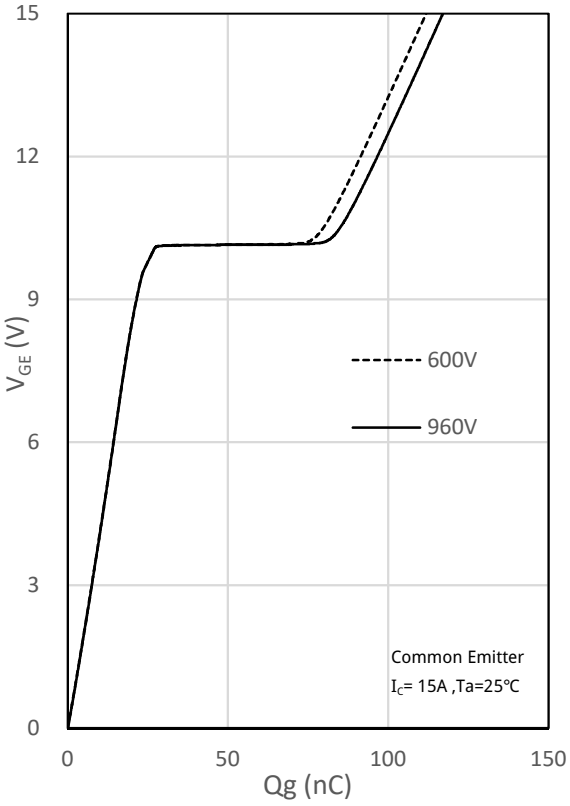
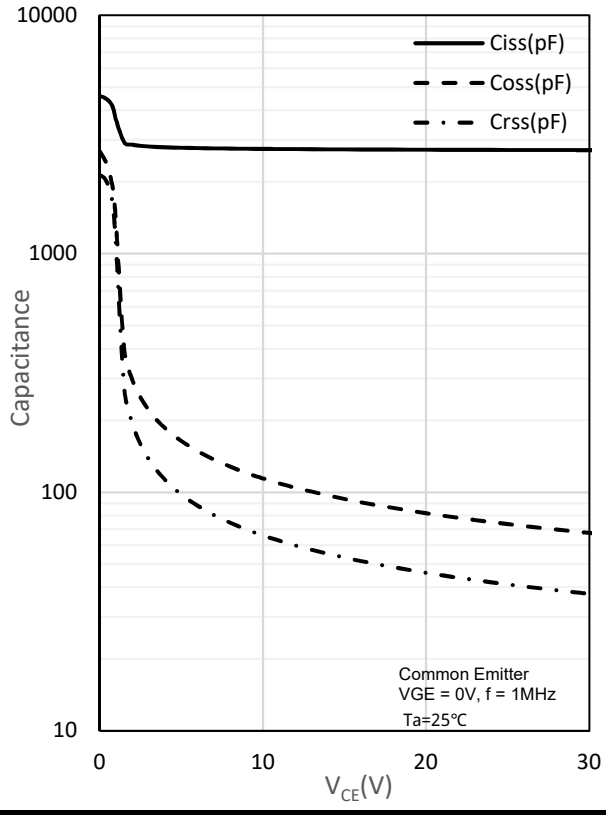
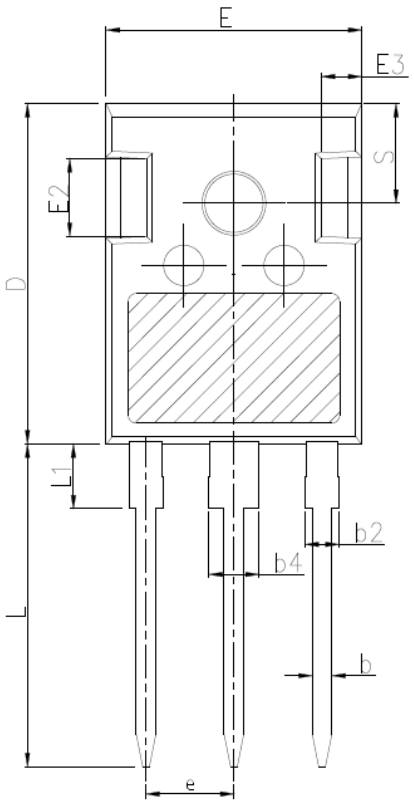
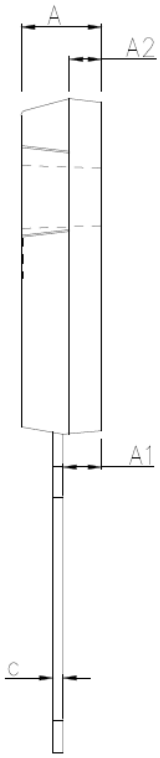


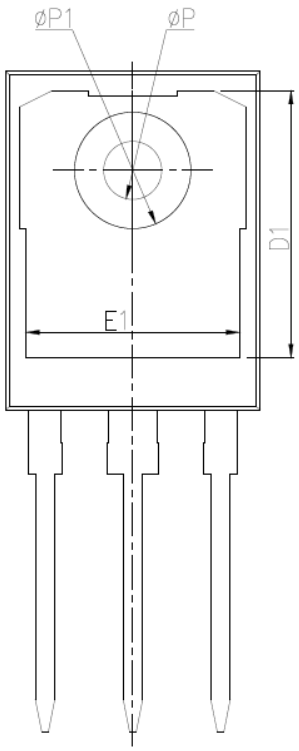
Fig. 8 Capacitance characteristics



TO247 package information







COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.80	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.82	19.92	20.22
L1	–	–	4.30
ΦP	3.40	3.60	3.80
ΦP1	–	–	7.30
S	6.15BSC		