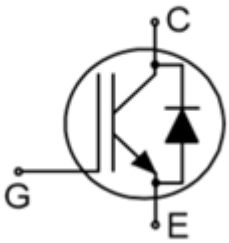
Trench Field-Stop Technology IGBT



Features

- 1200V, 25A
- $V_{CE(sat)(typ.)}$ =2.0V@V_{GE}=15V, I_C=25A
- Low Switching Losses
- $V_{CE(sat)}$ with Positive Temperature Coefficient
- Pb-free Lead Plating; RoHS Compliant

Applications

- General purpose inverters
- Uninterrupted Power Supply
- Induction heating

Order codes	V_{CE}	I_C	V_{CEsat}, T_{vj}=25℃	T_{vjmax}	Marking	Package
XD025H120AY1S3	1200V	25A	2.0V	150℃	D25H120AY1	TO247-3

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	±20	V
I_C	Continuous Collector Current (T_C=25℃)	50	A
	Continuous Collector Current (T_C=100℃)	25	A
I_{CM}	Pulsed Collector Current (Note 1)	75	A
t_{SC}	Short Circuit Withstand Time	10	us
P_D	Maximum Power Dissipation (T_C=25℃)	200	W
T_J	Operating Junction Temperature Range	-55 to 150	℃
T_{STG}	Storage Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Max.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case for IGBT	0.62	℃/W
$R_{\theta JC}$	Thermal Resistance, Junction to Ambient for IGBT	40	℃/W

Electrical Characteristics (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{GE}=0V, I_C=500uA	1200	---	---	V
I_{CES}	Collector-Emitter Leakage Current	V_{CE}=1200V, V_{GE}=0V	---	---	200	uA
I_{GES}	Gate Leakage Current, Forward	V_{GE}=20V, V_{CE}=0V	---	---	100	nA
	Gate Leakage Current, Reverse	V_{GE}=-20V, V_{CE}=0V	---	---	-100	nA
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE}=V_{CE}, I_C=0.6mA	5.5	6.0	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C=25A	---	2.0	2.4	V
Q_G	Total Gate Charge	V_{CC}=600V,V_{GE}=15V I_C=25A	---	100	---	nC
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V I_C=25A R_G=10Ω Inductive Load T_C=25℃	---	82	---	ns
t_r	Turn-on Rise Time		---	67	---	ns
$t_{d(off)}$	Turn-off Delay Time		---	181	---	ns
t_f	Turn-off Fall Time		---	81	---	ns
E_{on}	Turn-on Switching Loss		---	2.1	---	mJ
E_{off}	Turn-off Switching Loss		---	0.9	---	mJ
E_{total}	Total switching energy		---	3	---	mJ
C_{ies}	Input Capacitance	V_{CE}=25V V_{GE}=0V f =1MHz	---	1337	2010	pF
C_{oes}	Output Capacitance		---	102	164	pF
C_{res}	Reverse Transfer Capacitance		---	71	117	pF

Diode Characteristics (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F=25A	---	2.2	2.9	V
t_{rr}	Diode Reverse Recovery Time	V_R=800V,I_F=25A dI$_F$/dt=750A/us	---	205	---	ns
Q_{rr}	Diode Reverse Recovery Charge		---	1.1	---	uC

Note 1：Repetitive Rating: Pulse width limited by maximum junction temperature

Typical Characteristics

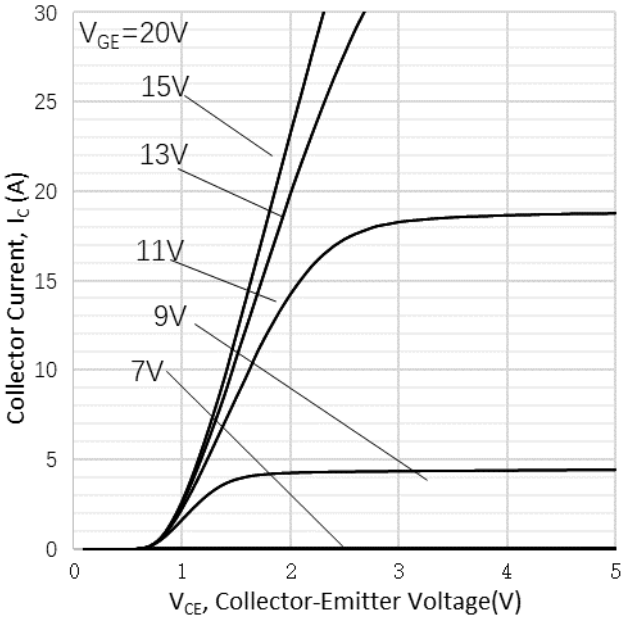


Fig. 1 Typical IGBT Output Characteristics at T_J=25℃

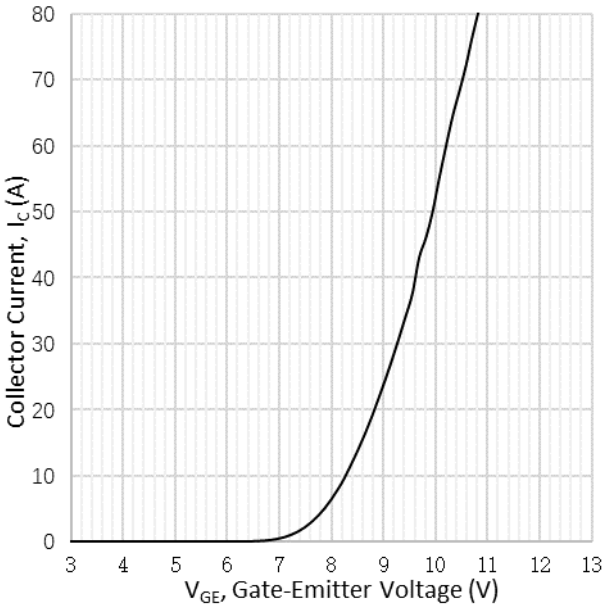


Fig. 2 Typical Transfer Characteristics at V_{CE}=20V

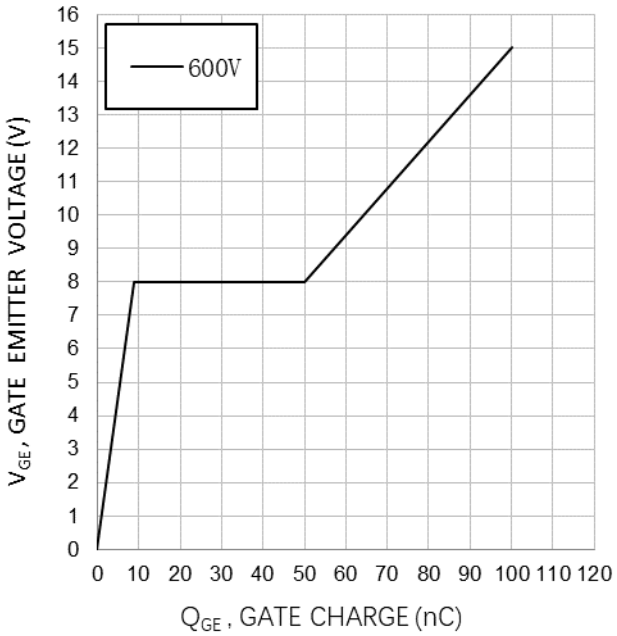


Fig. 3 Typical gate charge (I_C=25A)

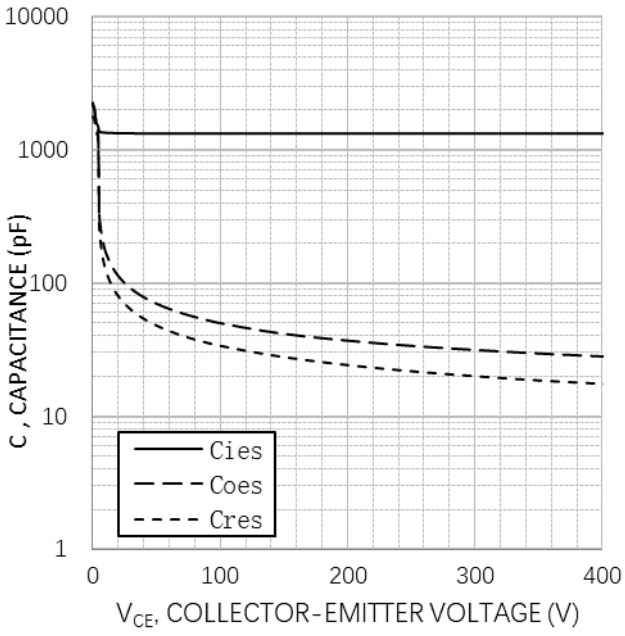


Fig. 4 Typical capacitance as a function of collector-emitter voltage (V_{GE}=0V, f=1MHz)

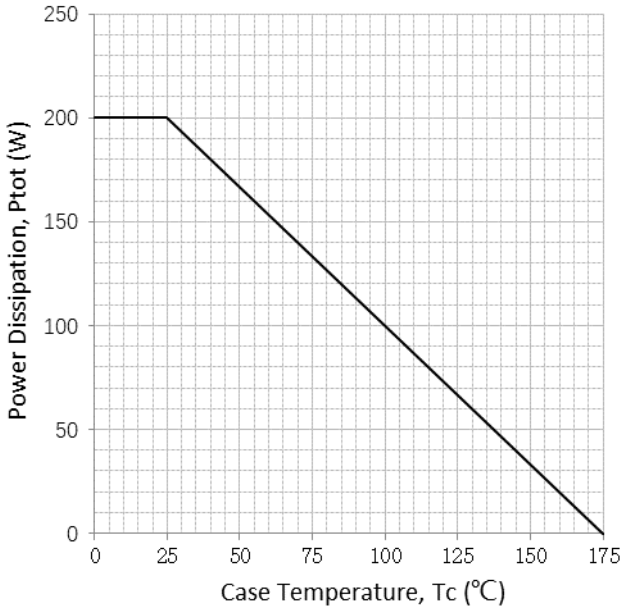


Fig. 5 Power dissipation as a function of case temperature (T_{vj}≤175℃)

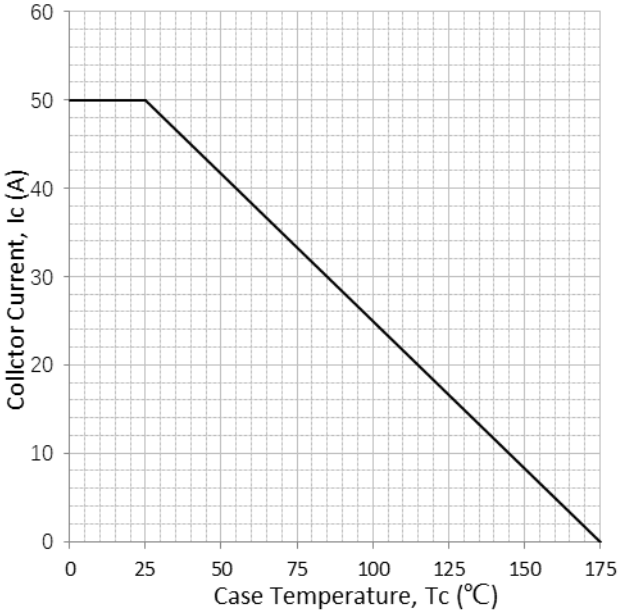
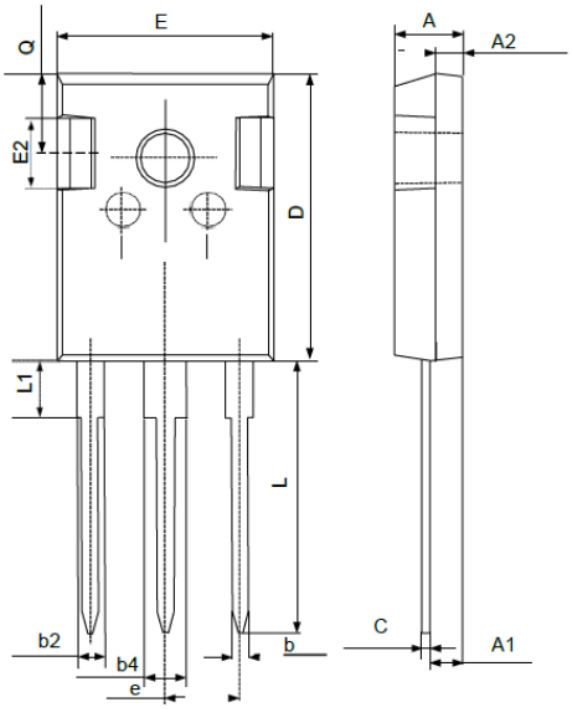


Fig. 6 Collector current as a function of case temperature (V_{GE}≥15V,T_{vj}≤175℃)

Package Information

TO-247



SYMBOL	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	---	1.36
b2	1.91	---	2.25
b4	2.91	---	3.25
c	0.51	---	0.75
D	20.80	21.00	21.30
E	15.50	15.80	16.10
E2	4.40	5.00	5.20
e		5.44 BSC	
L	19.72	19.92	20.22
L1	---	---	4.30
Q	5.60	5.80	6.00