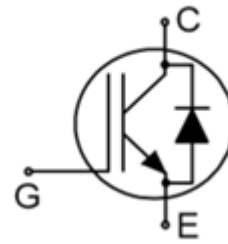


Trench Field-Stop Technology IGBT

Features

- 1200V, 15A
- $V_{CE(sat)(typ.)} = 1.8V @ V_{GE} = 15V, I_C = 15A$
- 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	$V_{CEsat}, T_{vj}=25^{\circ}C$	T_{vjmax}	Marking	Package
XD015H120AY1S3	1200V	15A	1.8V	150°C	D15H120AY1	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 ($T_C=25^{\circ}C$)	30	A
	Continuous Collector Current ($T_C=100^{\circ}C$)	15	A
I_{CM}	Pulsed Collector Current (Note 1)	45	A
P_D	Maximum Power Dissipation ($T_C=25^{\circ}C$)	200	W
T_J	Operating Junction Temperature Range	-55 to 150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Max.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case for IGBT	0.6	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient for IGBT	40	°C/W

Electrical Characteristics ($T_c=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{CES}	Collector-Emitter Breakdown Voltage	$V_{GE}=0V, I_C=500\mu A$	1200	---	---	V
I_{CES}	Collector-Emitter Leakage Current	$V_{CE}=1200V, V_{GE}=0V$	---	---	200	μA
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	$V_{GE}=V_{CE}, I_C=0.6mA$	4.5	---	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE}=15V, I_C=15A$	---	1.8	2.4	V
Q_G	Total Gate Charge	$V_{CC}=600V, V_{GE}=15V$ $I_C=15A$	---	100	---	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V$ $I_C=15A$ $R_G=10\Omega$ Inductive Load $T_c=25^\circ\text{C}$	---	80	---	ns
t_r	Turn-on Rise Time		---	65	---	ns
$t_{d(off)}$	Turn-off Delay Time		---	180	---	ns
t_f	Turn-off Fall Time		---	80	---	ns
E_{on}	Turn-on Switching Loss		---	2.0	---	mJ
E_{off}	Turn-off Switching Loss		---	0.9	---	mJ
E_{total}	Total switching energy		---	2.9	---	mJ
C_{ies}	Input Capacitance	$V_{CE}=25V$	---	1330	2000	pF
C_{oes}	Output Capacitance	$V_{GE}=0V$	---	100	160	pF
C_{res}	Reverse Transfer Capacitance	$f=1MHz$	---	70	110	pF

Diode Characteristics ($T_c=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	$I_F=15A$	---	1.6	2.9	V
t_{rr}	Diode Reverse Recovery Time	$V_R=800V, I_F=15A$ $di_F/dt=750A/\mu s$	---	200	---	ns
Q_{rr}	Diode Reverse Recovery Charge		---	1.1	---	μC

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

Typical Characteristics

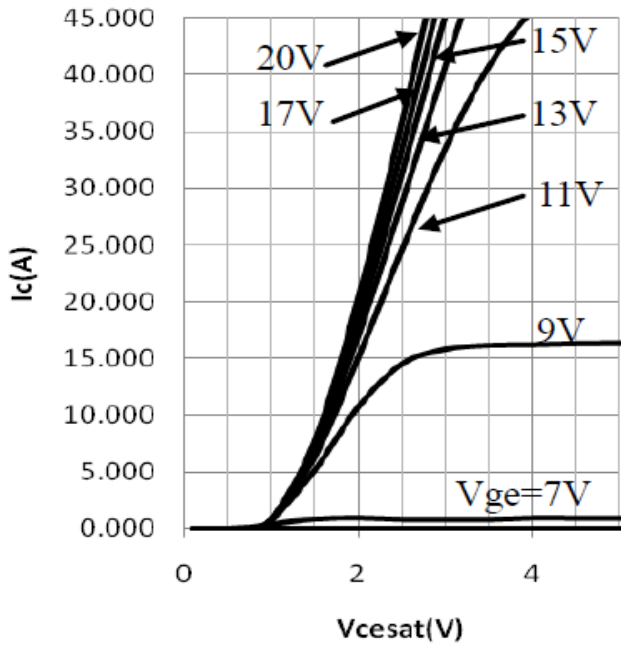


Fig. 1 Typical IGBT Output Characteristics at $T_j=25^\circ\text{C}$

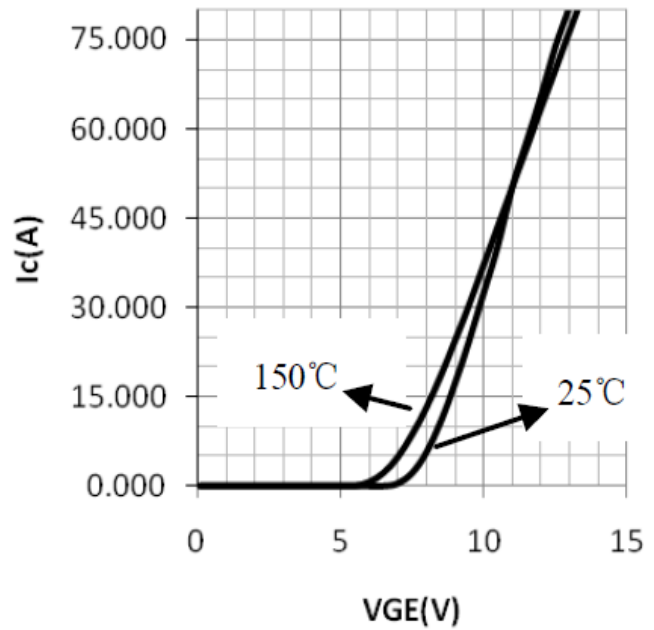


Fig. 2 Typical Transfer Characteristics at $V_{CE}=20\text{V}$

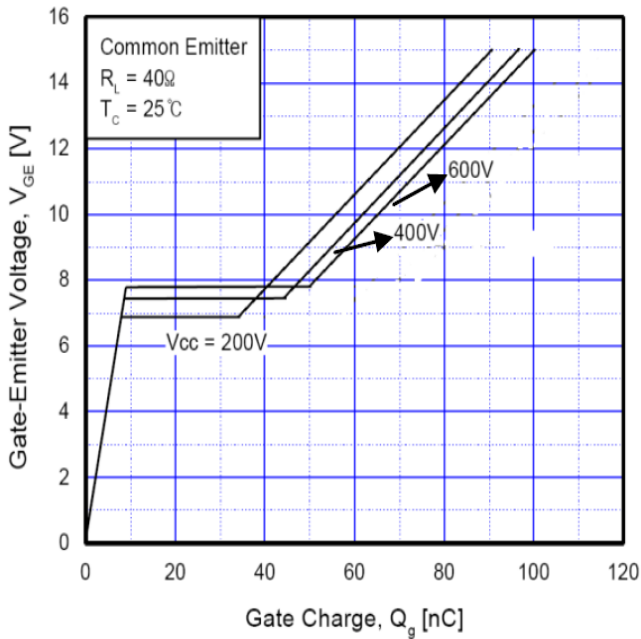


Fig. 3 Gate Charge

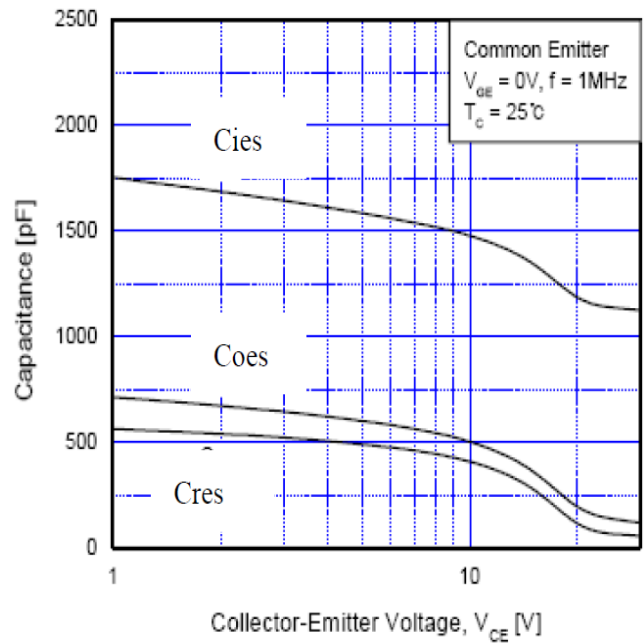


Fig. 4 Capacitance

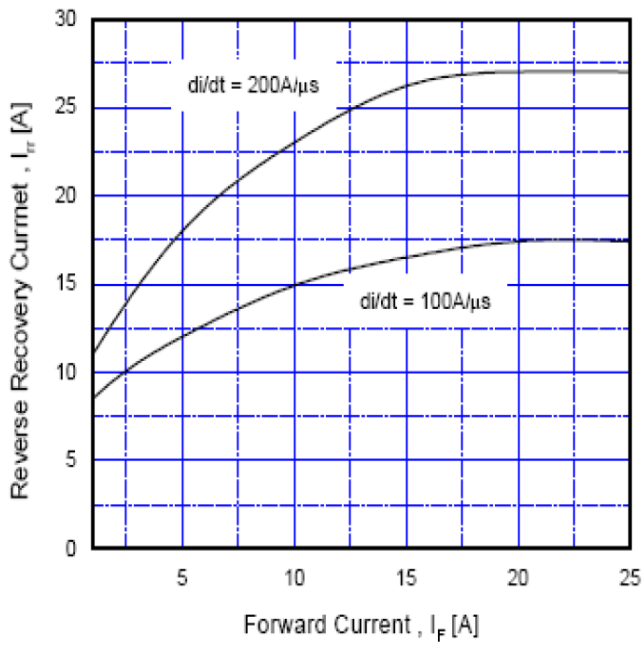


Fig. 5 Reverse Recovery Current

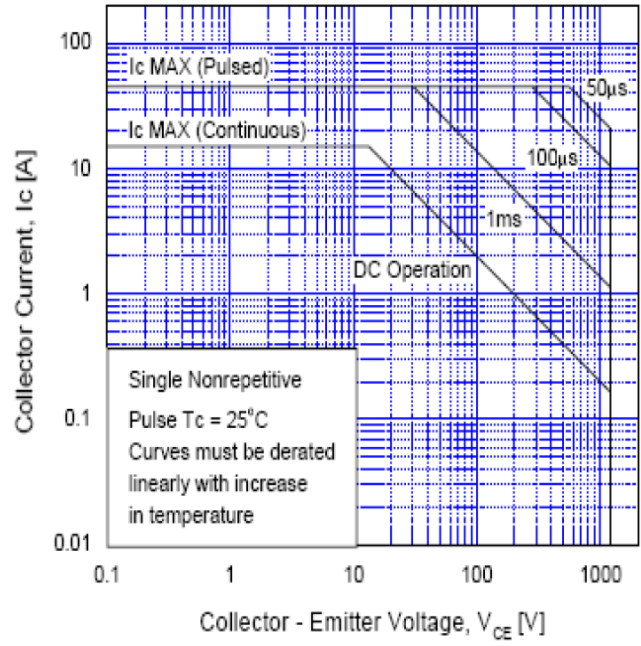
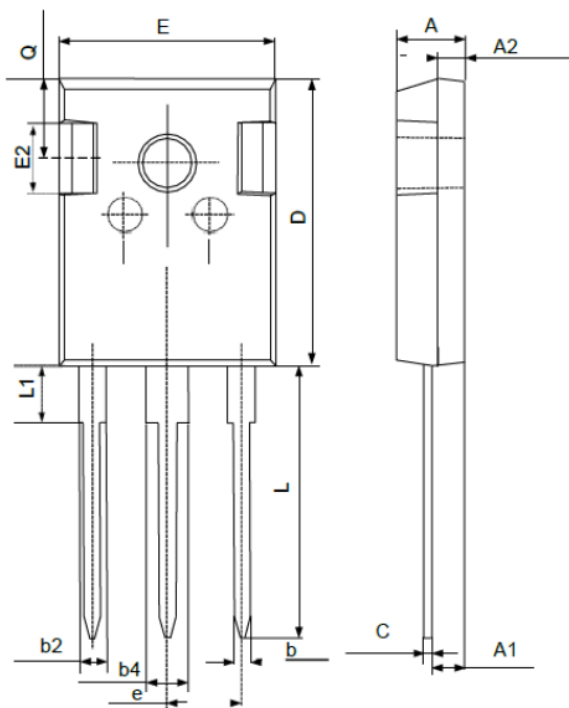


Fig. 6 SOA Characteristics

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