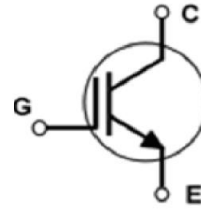


Trench Field-Stop Technology IGBT

Features

- 1200V, 5A
- $V_{CE(sat)(typ.)} = 1.4V @ V_{GE} = 15V, I_C = 5A$
- Low Switching Losses
- $V_{CE(sat)}$ with Positive Temperature Coefficient
- Pb-free Lead Plating; RoHS Compliant



Applications

- Frequency Converters
- Home appliances
- Lighting

Order codes	V_{CE}	I_C	$V_{CEsat}, T_{vj}=25^{\circ}C$	T_{vjmax}	Marking	Package
XD005G120AY1G3	1200V	5A	1.4V	175 $^{\circ}C$	D5G120AY1	TO252-2L

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 ($T_C=25^{\circ}C$)	10	A
	Continuous Collector Current ($T_C=100^{\circ}C$)	5	A
I_{CM}	Pulsed Collector Current (Note 1)	20	A
P_D	Maximum Power Dissipation ($T_C=25^{\circ}C$)	78.9	W
	Maximum Power Dissipation ($T_C=100^{\circ}C$)	39.5	W
T_J	Operating Junction Temperature Range	-40 to 175	$^{\circ}C$
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$

Thermal Data

Symbol	Parameter	Max.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case for IGBT	1.9	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	40	$^{\circ}C/W$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{CES}	Collector-Emitter Breakdown Voltage	$V_{GE}=0V, I_C=1.0mA$	1200	---	---	V
I_{CES}	Collector-Emitter Leakage Current	$V_{CE}=1200V, V_{GE}=0V$	---	---	50	μA
I_{GES}	Gate Leakage Current, Forward	$V_{GE}=20V, V_{CE}=0V$	---	---	200	nA
	Gate Leakage Current, Reverse	$V_{GE}=-20V, V_{CE}=0V$	---	---	-200	nA
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE}=V_{CE}, I_C=600\mu A$	5.2	---	6.8	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE}=15V, I_C=5A$	---	1.4	1.8	V
Q_G	Total Gate Charge	$V_{CC}=960V$	---	23.5	---	nC
Q_{GE}	Gate-Emitter Charge	$V_{GE}=15V$	---	6.67	---	nC
Q_{GC}	Gate-Collector Charge	$I_C=5A$	---	11.68	---	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V$ $V_{GE}=\pm 15V$ $I_C=5A$ $R_G=30\Omega$ Inductive Load $T_c=25^\circ\text{C}$	---	4.8	---	ns
t_r	Turn-on Rise Time		---	19.2	---	ns
$t_{d(off)}$	Turn-off Delay Time		---	85.2	---	ns
t_f	Turn-off Fall Time		---	430	---	ns
E_{on}	Turn-on Switching Loss		---	0.28	---	mJ
E_{off}	Turn-off Switching Loss		---	1.18	---	mJ
E_{ts}	Total Switching Loss		---	1.46	---	mJ
C_{ies}	Input Capacitance	$V_{CE}=25V$	---	592	---	pF
C_{oes}	Output Capacitance	$V_{GE}=0V$	---	36	---	pF
C_{res}	Reverse Transfer Capacitance	$f=1MHz$	---	11	---	pF

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

Typical Characteristics

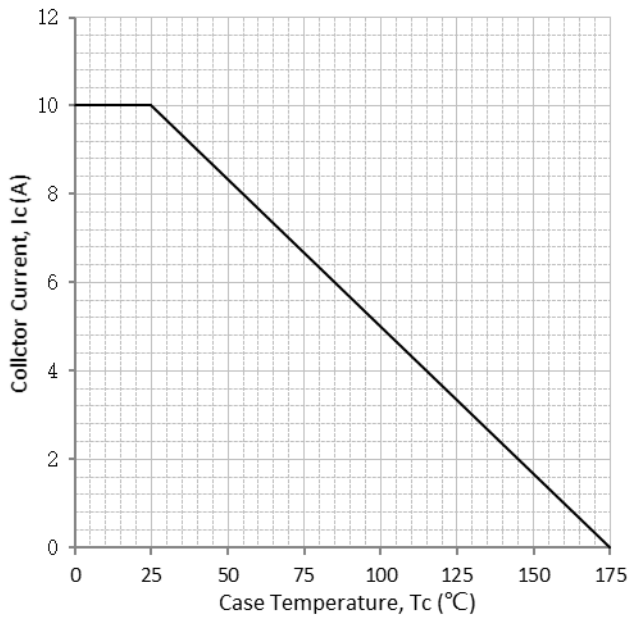


Fig. 1 Maximum DC Collector Current vs. Case Temperature

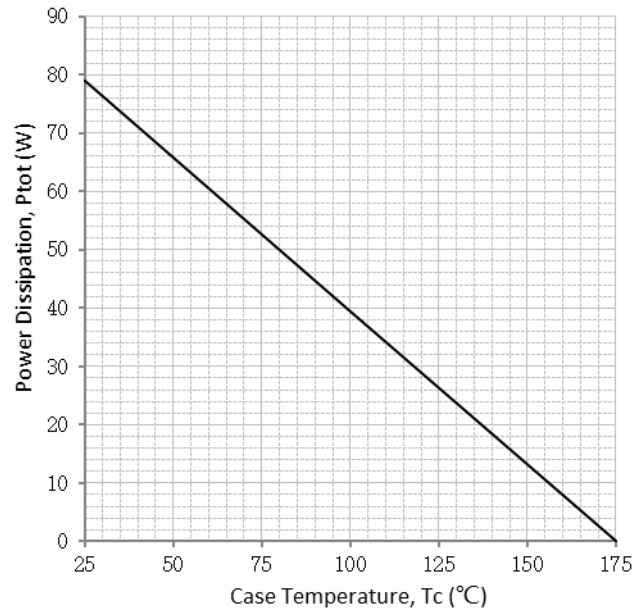


Fig. 2 Power Dissipation vs. Case Temperature

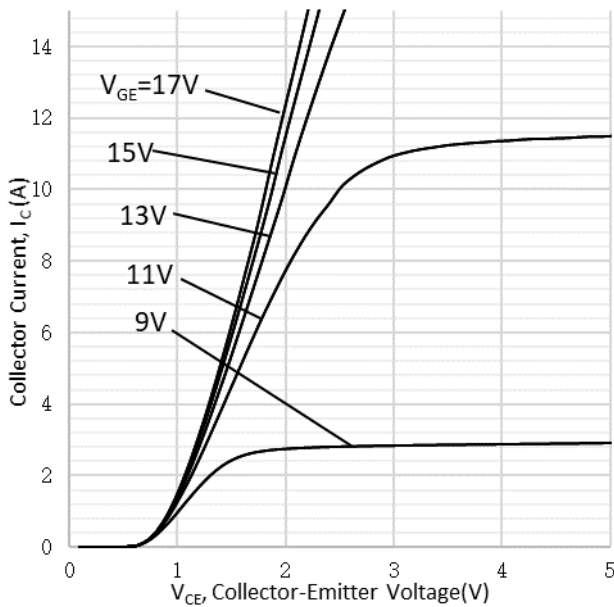


Fig. 3 Typical IGBT Output Characteristics at $T_j = 25^\circ\text{C}$

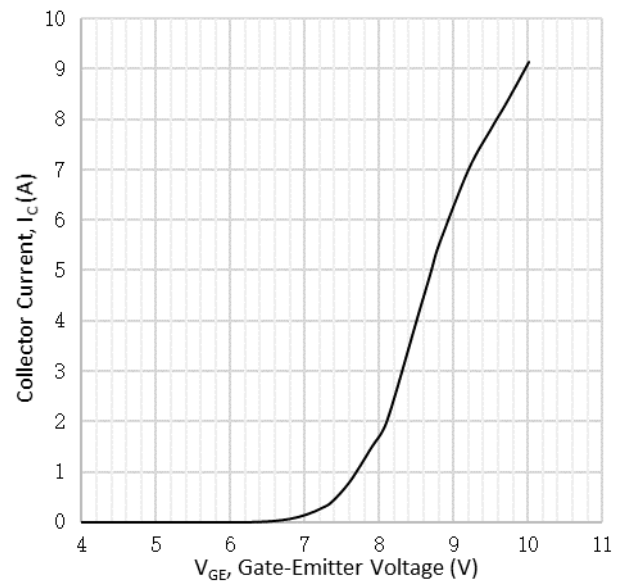


Fig. 4 Typical Transfer Characteristics at $V_{CE} = 20\text{V}$

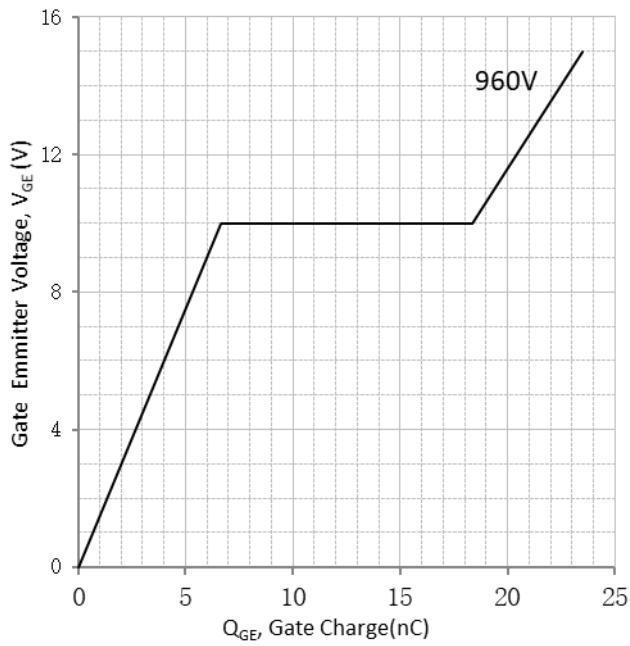


Fig. 5 Typical Gate Charge vs. V_{GE} at $I_C=5A$

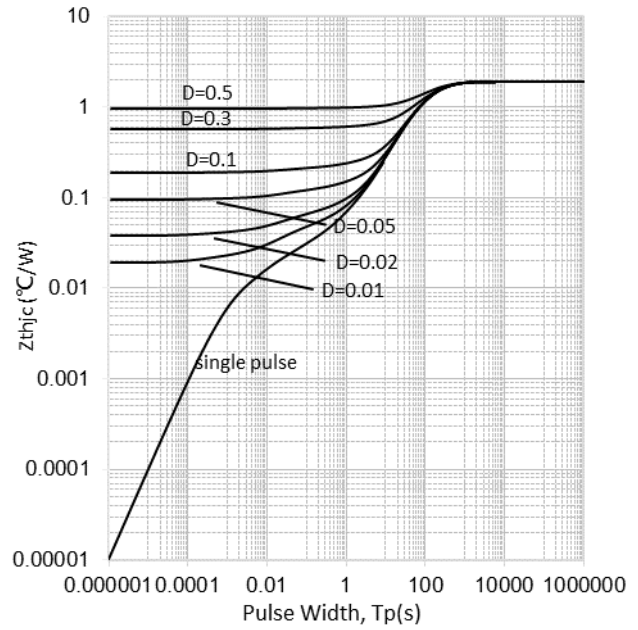


Fig. 6 IGBT Transient Thermal Resistance
($D=t_p / T$)

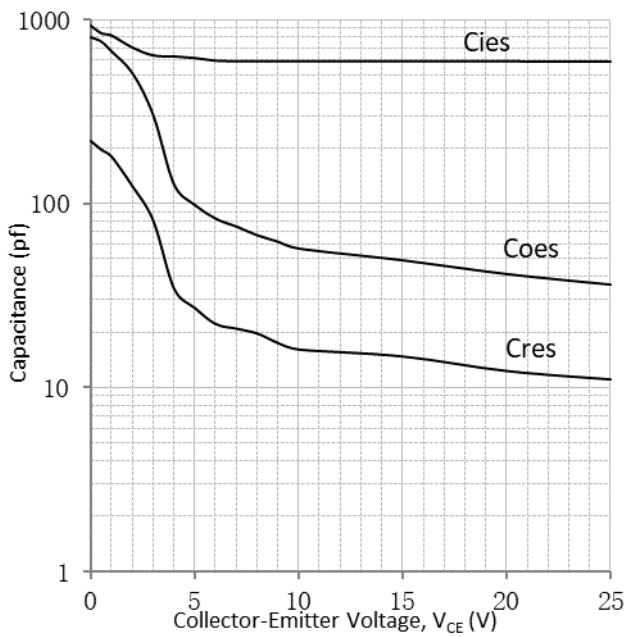
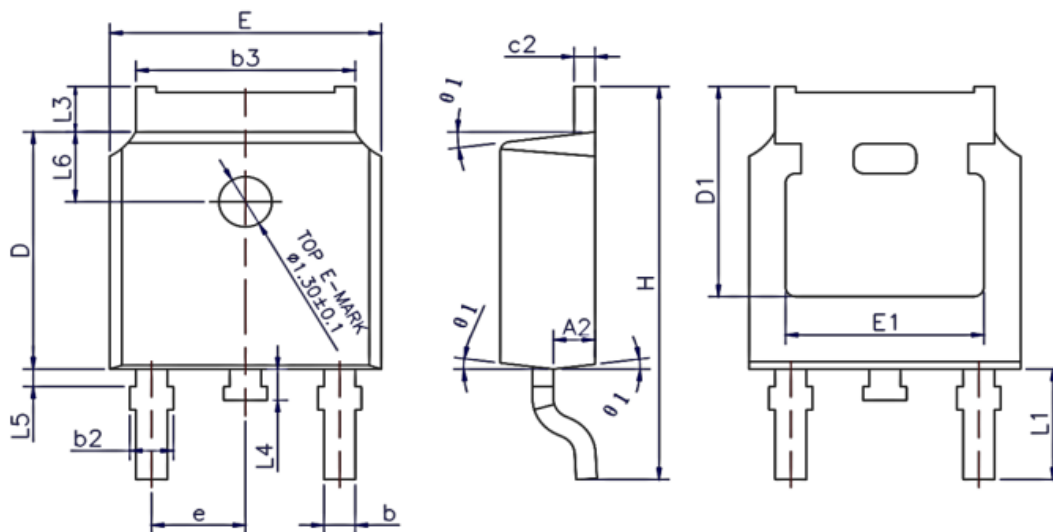


Fig. 7 Typical Capacitance vs. V_{CE} at $V_{GE}=0V$ and $f=1MHz$

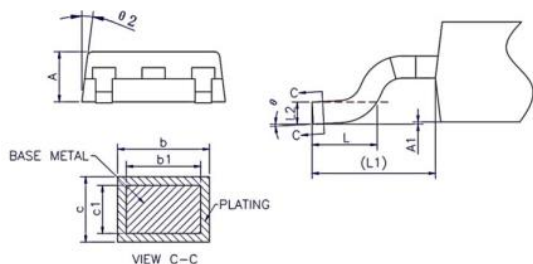
Package Information

TO-252-2L



COMMON DIMENSIONS
(UNITS OF MEASURE =MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0	---	0.10
A2	0.90	1.01	1.10
b	0.72	---	0.85
b1	0.71	0.76	0.81
b2	0.72	---	0.90
b3	5.13	5.33	5.46
c	0.47	---	0.60
c1	0.46	0.51	0.56
c2	0.47	---	0.60
D	6.00	6.10	6.20
D1	5.25	---	---
E	6.50	6.60	6.70
E1	4.70	---	---
e	2.186	2.286	2.386
H	9.80	10.10	10.40
L	1.40	1.50	1.70
L1	2.90 REF		
L2	0.508 BSC		
L3	0.90	---	1.25
L4	0.60	0.80	1.00
L5	0.15	---	0.75
L6	1.80 REF		
θ	0°	---	8°
θ1	5°	7°	9°
θ2	5°	7°	9°



NOTES:
ALL DIMENSIONS REFER TO JEDEC STANDARD TO-252 AA DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS