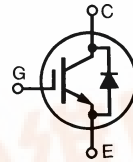


**Low  $V_{CE(sat)}$  IGBT with Diode**  
**High Speed IGBT with Diode**

**IXGH/IXGT 15N120BD1**  
**IXGH/IXGT 15N120CD1**

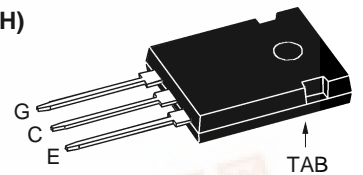
$V_{DSS}$	$I_{C25}$	$V_{CE(sat)}$
1200 V	30 A	3.2 V
1200 V	30 A	3.8 V



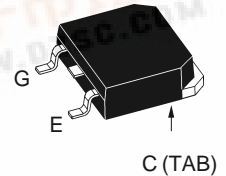
Preliminary data

Symbol	Test Conditions	Maximum Ratings
$V_{CES}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	1200 V
$V_{CGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GE} = 1\text{ M}\Omega$	1200 V
$V_{GES}$	Continuous	$\pm 20$ V
$V_{GEM}$	Transient	$\pm 30$ V
$I_{C25}$	$T_C = 25^\circ\text{C}$	30 A
$I_{C90}$	$T_C = 90^\circ\text{C}$	15 A
$I_{CM}$	$T_C = 25^\circ\text{C}$ , 1 ms	60 A
<b>SSOA (RBSOA)</b>	$V_{GE} = 15\text{ V}$ , $T_J = 125^\circ\text{C}$ , $R_G = 10\ \Omega$ Clamped inductive load	$I_{CM} = 40$ @ $0.8 V_{CES}$ A
$P_C$	$T_C = 25^\circ\text{C}$	150 W
$T_J$		-55 ... +150 $^\circ\text{C}$
$T_{JM}$		150 $^\circ\text{C}$
$T_{stg}$		-55 ... +150 $^\circ\text{C}$
$M_d$	Mounting torque	1.13/10 Nm/lb.in.
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300 $^\circ\text{C}$
Maximum tab temperature soldering SMD devices for 10s		260 $^\circ\text{C}$
<b>Weight</b>	TO-247AD/TO-268	6/4 g

**TO-247AD (IXGH)**



**TO-268 (IXGT)**



G = Gate      C = Collector  
E = Emitter    TAB = Collector

**Features**

- International standard packages: JEDEC TO-247AD & TO-268
- IGBT and anti-parallel FRED in one package
- MOS Gate turn-on
  - drive simplicity
- Fast Recovery Expitaxial Diode (FRED)
  - soft recovery with low  $I_{RM}$

**Applications**

- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies

**Advantages**

- Saves space (two devices in one package)
- Easy to mount with 1 screw (isolated mounting screw hole)
- Reduces assembly time and cost

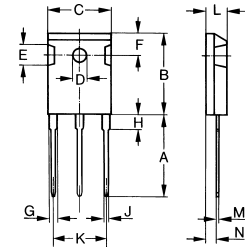
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$BV_{CES}$	$I_C = 1\text{ A}$ , $V_{GE} = 0\text{ V}$	1000		V
$V_{GE(th)}$	$I_C = 250\ \mu\text{A}$ , $V_{CE} = V_{GE}$	2.5		V
$I_{CES}$	$V_{CE} = V_{CES}$ $V_{GE} = 0\text{ V}$		2	500 $\mu\text{A}$ mA
$I_{GES}$	$V_{CE} = 0\text{ V}$ , $V_{GE} = \pm 20\text{ V}$			$\pm 100$ nA
$V_{CE(sat)}$	$I_C = I_{C90}$ , $V_{GE} = 15\text{ V}$ Note 2			15N120BD1: 3.2 V 15N120CD1: 3.8 V



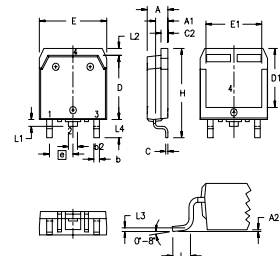
Symbol	Test Conditions	Characteristic Values			
		(T <sub>J</sub> = 25°C, unless otherwise specified)			
		min.	typ.	max.	
<b>g<sub>fs</sub></b>	I <sub>C</sub> = I <sub>C90</sub> ; V <sub>CE</sub> = 10 V, Note 2.	12	15	S	
<b>C<sub>ies</sub></b>	V <sub>CE</sub> = 25 V, V <sub>GE</sub> = 0 V, f = 1 MHz		1700	pF	
<b>C<sub>oes</sub></b>		155	pF		
<b>C<sub>res</sub></b>		38	pF		
<b>Q<sub>g</sub></b>	I <sub>C</sub> = I <sub>C90</sub> ; V <sub>GE</sub> = 15 V, V <sub>CE</sub> = 0.5 V <sub>CES</sub>		69	nC	
<b>Q<sub>ge</sub></b>		13	nC		
<b>Q<sub>gc</sub></b>		26	nC		
<b>t<sub>d(on)</sub></b>	<b>Inductive load, T<sub>J</sub> = 25°C</b> I <sub>C</sub> = I <sub>C90</sub> ; V <sub>GE</sub> = 15 V V <sub>CE</sub> = 0.8 V <sub>CES</sub> ; R <sub>G</sub> = R <sub>off</sub> = 10 Ω Note 1.		25	ns	
<b>t<sub>ri</sub></b>		15	ns		
<b>t<sub>d(off)</sub></b>		150	280	ns	
<b>t<sub>fi</sub></b>		15N120BD1	160	320	ns
		15N120CD1	115	190	ns
		15N120BD1	1.75	3.0	mJ
<b>E<sub>off</sub></b>	15N120CD1	1.05	1.6	mJ	
<b>t<sub>d(on)</sub></b>	<b>Inductive load, T<sub>J</sub> = 125°C</b> I <sub>C</sub> = I <sub>C90</sub> ; V <sub>GE</sub> = 15 V V <sub>CE</sub> = 0.8 V <sub>CES</sub> ; R <sub>G</sub> = R <sub>off</sub> = 10 Ω Note 1.		25	ns	
<b>t<sub>ri</sub></b>		18	ns		
<b>E<sub>on</sub></b>		1.5	mJ		
<b>t<sub>d(off)</sub></b>		270	ns		
<b>t<sub>fi</sub></b>		15N120BD1	360	ns	
		15N120CD1	250	mJ	
<b>E<sub>off</sub></b>	15N120BD1	3.5	mJ		
	15N120CD1	2.1	mJ		
<b>R<sub>thJC</sub></b>	TO-247		0.25	0.83 K/W	
<b>R<sub>thCK</sub></b>				K/W	

Symbol	Test Conditions	Characteristic Values		
		(T <sub>J</sub> = 25°C, unless otherwise specified)		
		min.	typ.	max.
<b>V<sub>F</sub></b>	I <sub>F</sub> = 20 A, V <sub>GE</sub> = 0 V I <sub>F</sub> = 20 A, V <sub>GE</sub> = 0 V, T <sub>J</sub> = 125°C	2.6	2.8	V
<b>I<sub>F</sub></b>	T <sub>C</sub> = 25°C T <sub>C</sub> = 90°C		33	V
			20	V
<b>I<sub>RM</sub></b>	I <sub>F</sub> = 20 A; -di <sub>F</sub> /dt = 400 A/μs, V <sub>R</sub> = 600 V	15		A
<b>t<sub>rr</sub></b>	V <sub>GE</sub> = 0 V; T <sub>J</sub> = 125°C	200		ns
<b>t<sub>rr</sub></b>	I <sub>F</sub> = 1 A; -di <sub>F</sub> /dt = 100 A/μs; V <sub>R</sub> = 30 V, V <sub>GE</sub> = 0 V	40		ns
<b>R<sub>thJC</sub></b>				1.6 K/W

- Notes:
- Switching times may increase for V<sub>CE</sub> (Clamp) > 0.8 • V<sub>CES</sub>, higher T<sub>J</sub> or increased R<sub>G</sub>.
  - Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %

**TO-247 AD (IXGH) Outline**


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	19.81	20.32	0.780	0.800
B	20.80	21.46	0.819	0.845
C	15.75	16.26	0.610	0.640
D	3.55	3.65	0.140	0.144
E	4.32	5.49	0.170	0.216
F	5.4	6.2	0.212	0.244
G	1.65	2.13	0.065	0.084
H	-	4.5	-	0.177
J	1.0	1.4	0.040	0.055
K	10.8	11.0	0.426	0.433
L	4.7	5.3	0.185	0.209
M	0.4	0.8	0.016	0.031
N	1.5	2.49	0.087	0.102

**TO-268AA (D<sup>3</sup> PAK)**


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.9	5.1	.193	.201
A <sub>1</sub>	2.7	2.9	.106	.114
A <sub>2</sub>	.02	.25	.001	.010
b	1.15	1.45	.045	.057
b <sub>2</sub>	1.9	2.1	.75	.83
C	.4	.65	.016	.026
D	13.80	14.00	.543	.551
E	15.85	16.05	.624	.632
E <sub>1</sub>	13.3	13.6	.524	.535
e	5.45 BSC		.215 BSC	
H	18.70	19.10	.736	.752
L	2.40	2.70	.094	.106
L <sub>1</sub>	1.20	1.40	.047	.055
L <sub>2</sub>	1.00	1.15	.039	.045
L <sub>3</sub>	0.25 BSC		.010 BSC	
L <sub>4</sub>	3.80	4.10	.150	.161

Min. Recommended Footprint

