

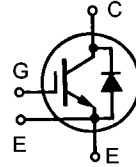
# High Voltage IGBT with Diode

## IXDN 50N120AU1

$V_{CES} = 1200 \text{ V}$   
 $I_{C25} = 70 \text{ A}$   
 $V_{CE(sat) \text{ typ}} = 2.5 \text{ V}$

### Short Circuit SOA Capability

Preliminary Data

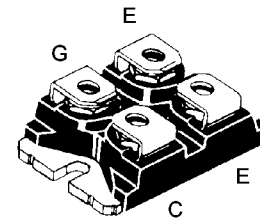


Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	1200	V
$V_{CGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GE} = 1 \text{ M}\Omega$	1200	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ\text{C}$	70	A
$I_{C90}$	$T_C = 90^\circ\text{C}$	44	A
$I_{CM}$	$T_C = 25^\circ\text{C}$ , 1 ms	140	A
<b>SSOA (RBSOA)</b>	$V_{GE} = 15 \text{ V}$ , $T_{VJ} = 125^\circ\text{C}$ , $R_G = 22 \Omega$ Clamped inductive load, $L = 30 \mu\text{H}$	$I_{CM} = 100$ @ $V_{CES}$	A
<b><math>t_{SC}</math> (SCSOA)</b>	$V_{GE} = 15 \text{ V}$ , $V_{CE} = V_{CES}$ , $T_J = 125^\circ\text{C}$ $R_G = 22 \Omega$ , non repetitive	10	$\mu\text{s}$
$P_C$	$T_C = 25^\circ\text{C}$	IGBT	350 W
$P_D$		Diode	165 W
$V_{ISOL}$	50/60 Hz $I_{ISOL} \leq 1 \text{ mA}$	$t = 1 \text{ min}$ $t = 1 \text{ s}$	2500 V~ 3000 V~
$T_J$		-40 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-40 ... +150	$^\circ\text{C}$
$M_d$	Mounting torque Terminal connection torque (M4)	1.5/13	Nm/lb.in. Nm/lb.in.
<b>Weight</b>		30	g

miniBLOC, SOT-227 B



E153432



E = Emitter \*, C = Collector  
G = Gate, E = Emitter \*

\* Either Emitter terminal can be used as Main or Kelvin Emitter

### Features

- Square RBSOA
- International standard package miniBLOC
- Isolation voltage 3000 V~
- Low  $V_{CE(sat)}$ 
  - for minimum on-state conduction losses
- Fast Recovery Epitaxial Diode
  - short  $t_{tr}$  and  $I_{RM}$
- Low collector-to-case capacitance (< 50 pF)
  - reduced RFI
- Low package inductance (< 10 nH)
  - easy to drive and to protect

### Applications

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

### Advantages

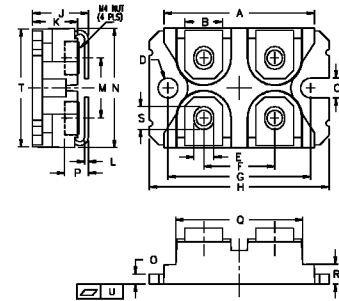
- Space savings
- Easy to mount with 2 screws
- High power density

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$BV_{CES}$	$I_C = 5 \text{ mA}$ , $V_{GE} = 0 \text{ V}$	1200		V
$V_{GE(th)}$	$I_C = 4 \text{ mA}$ , $V_{CE} = V_{GE}$	4	5.5	V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0 \text{ V}$			500 $\mu\text{A}$ 17 mA
$I_{GES}$	$V_{CE} = 0 \text{ V}$ , $V_{GE} = \pm 20 \text{ V}$			$\pm 500 \text{ nA}$
$V_{CE(sat)}$	$I_C = 50$ , $V_{GE} = 15 \text{ V}$		2.5	3 V

IXYS reserves the right to change limits, test conditions and dimensions.

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)			
		min.	typ.	max.	
$C_{ies}$	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$		3300	pF	
$C_{oes}$			500	pF	
$C_{res}$			220	pF	
$Q_g$	$I_C = 50\text{ A}, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$		240	nC	
$Q_{ge}$			TBD	nC	
$Q_{gc}$			TBD	nC	
$t_{d(on)}$	<b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b> $I_C = 50\text{ A}, V_{GE} = 15\text{ V},$ $V_{CE} = 600\text{ V}, R_{on/off} = 22\ \Omega$ Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$		45	100	ns
$t_{ri}$			60	100	ns
$t_{d(off)}$			380	500	ns
$t_{fi}$			70	100	ns
$E_{on}$			TBD		mJ
$E_{off}$			4.5		mJ
$R_{thJC}$				0.35	K/W
$R_{thCK}$			0.1		K/W

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)			
		min.	typ.	max.	
$V_F$	$I_F = 50\text{ A}, V_{GE} = 0\text{ V},$ Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$			2.1	V
$I_{RM}$	$I_F = 50\text{ A}, V_{GE} = 0\text{ V}, -di_F/dt = 200\text{ A}/\mu\text{s}$ $V_R = 600\text{ V}$ $T_J = 100^\circ\text{C}$		25	30	A
$t_{rr}$	$I_F = 50\text{ A}, V_{GE} = 0\text{ V}, -di_F/dt = 200\text{ A}/\mu\text{s}$ $V_R = 600\text{ V}$ $T_J = 100^\circ\text{C}$		250		ns
	$I_F = 1\text{ A}; -di/dt = 200\text{ A}/\mu\text{s}; V_R = 30\text{ V}$ $T_J = 25^\circ\text{C}$		40	60	ns
$R_{thJC}$				0.75	K/W

**miniBLOC, SOT-227 B**


M4 screws (4x) supplied

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	31.5	31.7	1.241	1.249
B	7.8	8.2	0.307	0.323
C	4.0	-	0.158	-
D	4.1	4.3	0.162	0.169
E	4.1	4.3	0.162	0.169
F	14.9	15.1	0.587	0.595
G	30.1	30.3	1.186	1.193
H	38.0	38.2	1.497	1.505
J	11.8	12.2	0.465	0.481
K	8.9	9.7	0.351	0.382
L	0.75	0.85	0.030	0.033
M	12.6	12.8	0.496	0.504
N	25.2	25.4	0.993	1.001
O	1.95	2.05	0.077	0.081
P	-	5.0	-	0.197