

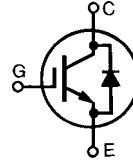
# IGBT with Diode

## IXSR 35N120BD1

### ISOPLUS 247™

(Electrically Isolated Backside)

Short Circuit SOA Capability



$$V_{CES} = 1200 \text{ V}$$

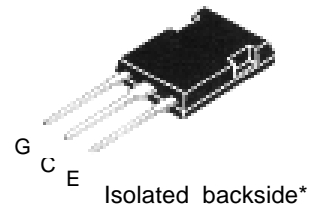
$$I_{C25} = 70 \text{ A}$$

$$V_{CE(sat)} = 3.6 \text{ V}$$

$$t_{fi(typ)} = 180 \text{ ns}$$

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
$I_{C90}$	$T_C = 90^\circ\text{C}$	30	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, $L = 30 \mu\text{H}$	$I_{CM} = 90$ @ $0.8 V_{CES}$	A
<b><math>t_{SC}</math> (SCSOA)</b>	$V_{GE} = 15 \text{ V}$ , $V_{CE} = 720 \text{ V}$ , $T_J = 125^\circ\text{C}$ $R_G = 22 \Omega$ , non repetitive	10	$\mu\text{s}$
<b><math>P_C</math></b>	$T_C = 25^\circ\text{C}$	IGBT	250 W
		Diode	150 W
<b><math>T_J</math></b>		-55 ... +150	$^\circ\text{C}$
<b><math>T_{JM}</math></b>		150	$^\circ\text{C}$
<b><math>T_{stg}</math></b>		-55 ... +150	$^\circ\text{C}$
<b><math>V_{ISOL}</math></b>	50/60 Hz, RMS $t = 1 \text{ min}$ leads-to housing	2500	V~
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$
<b>Weight</b>		5	g

ISOPLUS247™  
E 153432



G = Gate, C = Collector,  
E = Emitter

\* Patent pending

#### Features

- DCB Isolated mounting tab
- Meets TO-247AD package outline
- High current handling capability
- Latest generation HDMOS™ process
- MOS Gate turn-on - drive simplicity

#### Applications

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

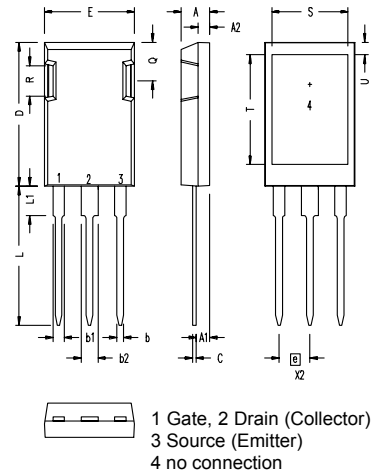
#### Advantages

- Easy assembly
- High power density

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
<b><math>BV_{CES}</math></b>	$I_C = 3 \text{ mA}$ , $V_{GE} = 0 \text{ V}$	1200		V
<b><math>V_{GE(th)}</math></b>	$I_C = 250 \mu\text{A}$ , $V_{CE} = V_{GE}$	3		6 V
<b><math>I_{CES}</math></b>	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0 \text{ V}$	$T_J = 25^\circ\text{C}$		1 mA
		$T_J = 150^\circ\text{C}$		3 mA
<b><math>I_{GES}</math></b>	$V_{CE} = 0 \text{ V}$ , $V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
<b><math>V_{CE(sat)}</math></b>	$I_C = I_T$ , $V_{GE} = 15 \text{ V}$			3.6 V

① Device must be heatsunk for high temperature measurements to avoid thermal runaway.  
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.	
$g_{fs}$	$I_C = I_T, V_{CE} = 10\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $\leq 2\%$	16	23	S	
$C_{iss}$	} $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		3600	pF	
$C_{oss}$			315	pF	
$C_{rss}$			75	pF	
$Q_g$	} $I_C = I_T, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$		120	nC	
$Q_{ge}$			33	nC	
$Q_{gc}$			49	nC	
$t_{d(on)}$	} <b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b> $I_C = I_T, V_{GE} = 15\text{ V}, L = 100\ \mu\text{H}$ , $V_{CE} = 0.8 V_{CES}, R_G = 2.7\ \Omega$ Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$		36	ns	
$t_{ri}$			27	ns	
$t_{d(off)}$			160	300	ns
$t_{fi}$			180	300	ns
$E_{off}$			5	9	mJ
$t_{d(on)}$	} <b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b> $I_C = I_T, V_{GE} = 15\text{ V}, L = 100\ \mu\text{H}$ $V_{CE} = 0.8 V_{CES}, R_G = 2.7\ \Omega$ Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$		38	ns	
$t_{ri}$			29	ns	
$E_{on}$			6	mJ	
$t_{d(off)}$			240	ns	
$t_{fi}$			340	ns	
$E_{off}$			9	mJ	
$R_{thJC}$				0.5 K/W	
$R_{thCK}$		0.15		K/W	

**ISOPLUS 247 OUTLINE**


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	.190	.205
A <sub>1</sub>	2.29	2.54	.090	.100
A <sub>2</sub>	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b <sub>1</sub>	1.91	2.13	.075	.084
b <sub>2</sub>	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	.244
R	4.32	4.83	.170	.190

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_F$	$I_F = I_T, V_{GE} = 0\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$			2.75 V 1.85
$I_{RM}$	} $I_F = I_T, V_{GE} = 0\text{ V}, -di_F/dt = 100\text{ A}/\mu\text{s}$ $V_R = 100\text{ V}$ $I_F = 1\text{ A}; -di/dt = 200\text{ A}/\mu\text{s}; V_R = 30\text{ V}$		7	14.3 A
$t_{rr}$			40	ns
$R_{thJC}$				0.83 K/W

 Note: 1.  $I_T = 35\text{ A}$ 

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