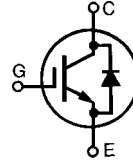


IGBT with Diode ISOPLUS 247™ (Electrically Isolated Backside)

IXSR 50N60BU1 $V_{CES} = 600 \text{ V}$
 $I_{C25} = 70 \text{ A}$
 $V_{CE(sat)} = 2.6 \text{ V}$
 $t_{fi(typ)} = 150 \text{ ns}$

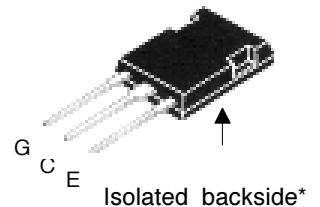
Short Circuit SOA Capability

Preliminary Data Sheet



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	600	V
V_{CGR}	$T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ M}\Omega$	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	70	A
I_{C90}	$T_C = 90^\circ\text{C}$	45	A
I_{CM}	$T_C = 25^\circ\text{C}, 1 \text{ ms}$	150	A
SSOA (RBSOA)	$V_{GE} = 15 \text{ V}, T_{VJ} = 125^\circ\text{C}, R_G = 22 \Omega$ Clamped inductive load	$I_{CM} = 100$ @ $0.8 V_{CES}$	A
t_{SC} (SCSOA)	$V_{GE} = 15 \text{ V}, V_{CE} = 360 \text{ V}, T_J = 125^\circ\text{C}$ $R_G = 22 \Omega$, non repetitive	10	μs
P_C	$T_C = 25^\circ\text{C}$	250	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
V_{ISOL}	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	$^\circ\text{C}$
Weight		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

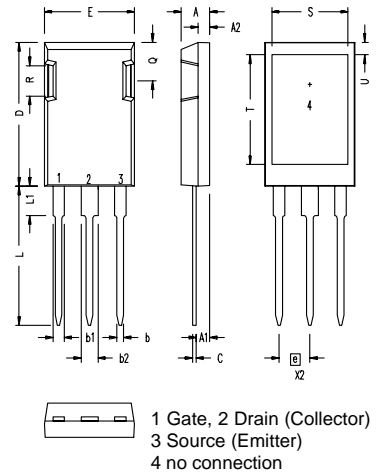
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- AC motor speed control
- DC servo and robot drives
- DC choppers

Advantages

- Easy assembly
- High power density
- Very fast switching speeds for high frequency applications

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
BV_{CES}	$I_C = 3 \text{ mA}, V_{GE} = 0 \text{ V}$	600		V
$V_{GE(th)}$	$I_C = 4 \text{ mA}, V_{CE} = V_{GE}$	4		8 V
I_{CES}	$V_{CE} = 0.8 V_{CES}$ $V_{GE} = 0 \text{ V}$			$T_J = 25^\circ\text{C}$ $T_J = 150^\circ\text{C}$ 350 μA 5 mA
I_{GES}	$V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$I_C = I_T, V_{GE} = 15 \text{ V}$			2.6 V

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
g_{fs}	$I_C = I_T, V_{CE} = 10\text{ V}$,	16	23	S
$I_{C(ON)}$	$V_{GE} = 15\text{ V}, V_{CE} = 10\text{ V}$		210	A
C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		3850	pF
C_{oss}		440	pF	
C_{rss}		50	pF	
Q_g	$I_C = I_T, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$		167	nC
Q_{ge}		45	nC	
Q_{gc}		88	nC	
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$		70	ns
t_{ri}	$I_C = I_T, V_{GE} = 15\text{ V}$		70	ns
$t_{d(off)}$	$V_{CE} = 0.8 V_{CES}, R_G = 2.7\ \Omega$		150	300 ns
t_{fi}	Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 V_{CES}$, higher T_J or increased R_G		150	300 ns
E_{off}			3.3	6.0 mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$		70	ns
t_{ri}	$I_C = I_T, V_{GE} = 15\text{ V}$		70	ns
E_{on}	$V_{CE} = 0.8 V_{CES}, R_G = 2.7\ \Omega$		2.5	mJ
$t_{d(off)}$	Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 V_{CES}$, higher T_J or increased R_G		230	ns
t_{fi}			230	ns
E_{off}			4.8	mJ
R_{thJC}				0.50 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 ₁	2.29	2.54	.090	.100
A ₂	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b ₁	1.91	2.13	.075	.084
b ₂	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

See IXSK50N60BD1 data sheet for characteristic curves.

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 $d \leq 2\%$			1.8 V
I_{RM}	$I_F = I_T, V_{GE} = 0\text{ V}, -di_F/dt = 480\text{ A}/\mu\text{s}$ $V_R = 360\text{ V}$ $I_F = 1\text{ A}; -di/dt = 200\text{ A}/\mu\text{s}; V_R = 30\text{ V}$		19	33 A
t_{rr}			35	50 ns
R_{thJC}				0.75 K/W

Note: 1. $I_T = 50\text{ A}$

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