IXYS

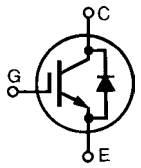
IGBT with Diode
ISOPLUS 247™
(Electrically Isolated Backside)

IXSR 40N60BD1

V_{CES} = 600 V
I_{C25} = 70 A
$V_{CE(sat)}$ = 2.2 V
$t_{fi(typ)}$ = 120 ns

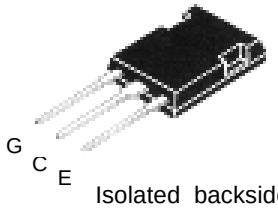
Short Circuit SOA Capability

Preliminary Data Sheet



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	600	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ	600	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	70	A
I_{C90}	T_C = 90°C	40	A
I_{CM}	T_C = 25°C, 1 ms	150	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 22 Ω Clamped inductive load, L = 30 µH	I_{CM} = 80 @ 0.8 V_{CES}	A
t_{SC} **(SCSOA)**	V_{GE} = 15 V, V_{CE} = 360 V, T_J = 125°C R_G = 22 Ω, non repetitive	10	µs
P_C	T_C = 25°C	170	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
V_{ISOL}	50/60 Hz, RMS t = 1 min leads-to housing	2500	V~
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C
Weight		5	g

ISOPLUS 247™
E 153432



Isolated backside*

G = Gate, C = Collector,
E = Emitter

* Patent pending

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
BV_{CES}	I_C = 1 mA, V_{GE} = 0 V		600			V
$V_{GE(th)}$	I_C = 4 mA, V_{CE} = V_{GE}		4		7	V
I_{CES}	V_{CE} = 0.8 • V_{CES} V_{GE} = 0 V	T_J = 25°C T_J = 150°C			650 5	µA mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	nA
$V_{CE(sat)}$	I_C = I_T, V_{GE} = 15 V				2.2	V

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

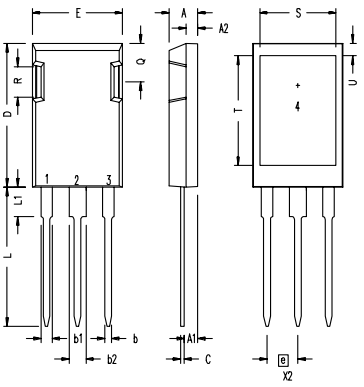
Advantages

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

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Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	min.	typ.	max.	
g_{fs}	$I_C = I_T$; V_{CE} = 10 V, Pulse test, t ≤ 300 µs, duty cycle ≤ 2 %	16	23		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		3700		pF
C_{oss}			440		pF
C_{rss}			60		pF
Q_g	$I_C = I_T$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		190		nC
Q_{ge}			45		nC
Q_{gc}			88		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		50		ns
t_{ri}	$I_C = I_T$, V_{GE} = 15 V, L = 100 µH,		50		ns
$t_{d(off)}$	V_{CE} = 0.8 V_{CES}, R_G = 2.7 Ω		110	200	ns
t_{fi}	Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G		120	200	ns
E_{off}			1.8	2.6	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		50		ns
t_{ri}	$I_C = I_T$, V_{GE} = 15 V, L = 100 µH		50		ns
E_{on}	V_{CE} = 0.8 V_{CES}, R_G = 2.7 Ω		2.2		mJ
$t_{d(off)}$	Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G		190		ns
t_{fi}			180		ns
E_{off}			2.6		mJ
R_{thJC}				0.73	K/W
R_{thCK}			0.15		K/W

ISOPLUS 247 OUTLINE





1 Gate, 2 Drain (Collector)
3 Source (Emitter)
4 no connection

Dim.	Millimeter Min.	Max.	Inches 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

Reverse Diode (FRED)

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	min.	typ.	max.	
V_F	$I_F = I_T$, V_{GE} = 0 V, Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %			1.8	V
I_{RM}	$I_F = I_T$, V_{GE} = 0 V, -di_F/dt = 100 A/µs		2	2.5	A
t_{rr}	V_R = 100 V				
	I_F = 1 A; -di/dt = 200 A/µs; V_R = 30 V		35		ns
R_{thJC}				1.15	K/W

Note: 1. I_T = 40A

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

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715 6,306,728B1 4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025