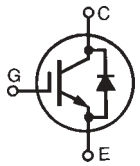
IXYS

HiPerFAST™ IGBT with Diode
ISOPLUS247™
(Electrically Isolated Back Surface)

IXGR 24N60CD1

V_{CES} = 600 V
I_{C25} = 42 A
$V_{CE(sat)}$ = 2.5 V

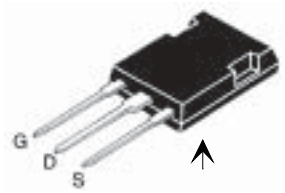


Preliminary data sheet

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	42	A
I_{C90}	T_C = 90°C	22	A
I_{CM}	T_C = 25°C, 1 ms	80	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 22 Ω Clamped inductive load, L = 100 µH	I_{CM} = 48 @ 0.8 V_{CES}	A
P_C	T_C = 25°C	80	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C
V_{ISOL}		2500	V
Weight	TO-247	6	g

ISOPLUS 247

E153432



Isolated back surface*

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 = 750 µA, V_{GE} = 0 V		600			V
$V_{GE(th)}$	I_C = 250 µA, V_{GE} = V_{GE}		2.5		5.5	V
I_{CES}	V_{CE} = 0.8 • V_{CES} V_{GE} = 0 V	T_J = 25°C T_J = 125°C			200 3	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			2.1	2.5	V

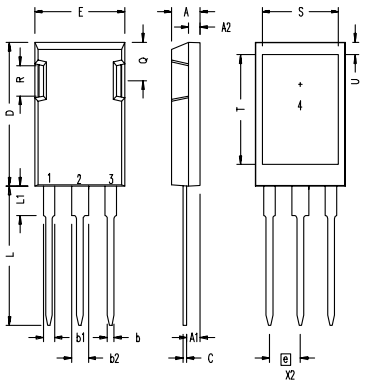
Features
- Silicon chip on Direct-Copper-Bond substrate
  - High power dissipation
  - Isolated mounting surface
  - 2500V electrical isolation
- Low drain to tab capacitance(<35pF)
- Low $R_{DS\ (on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Fast intrinsic rectifier
- Low gate charge process

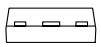
Applications
- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control

Advantages
- Easy assembly
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values (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 %	9	17		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		1500		pF
C_{oes}			170		pF
C_{res}			40		pF
Q_g	$I_C = I_T$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		55		nC
Q_{ge}			13		nC
Q_{gc}			17		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		15		ns
t_{ri}	$I_C = I_T$, V_{GE} = 15 V, L = 300 µH		25		ns
$t_{d(off)}$	V_{CE} = 0.8 • V_{CES}, $R_G = R_{off}$ = 18 Ω		75	140	ns
t_{fi}	Remarks: Switching times may increase		60	110	ns
E_{off}	for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G		0.24	0.36	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		15		ns
t_{ri}	$I_C = I_T$, V_{GE} = 15 V, L = 300 µH		25		ns
E_{on}	V_{CE} = 0.8 • V_{CES}, $R_G = R_{off}$ = 18 Ω		1		mJ
$t_{d(off)}$	Remarks: Switching times may increase		130		ns
t_{fi}	for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or		110		ns
E_{off}	increased R_G		0.6		mJ
R_{thJC}				0.157	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	Characteristic Values (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 %	T_J = 150°C		1.6	V
		T_J = 25°C		2.5	V
I_{RM}	$I_F = I_T$, V_{GE} = 0 V, $-di_F/dt$ = 100 A/µs		6		A
t_{rr}	V_R = 100 V	T_J = 100°C	100		ns
	I_F = 1 A; -di/dt = 100 A/µs; V_R = 30 V	T_J = 25°C	25		ns
R_{thJC}				1.65	K/W

Notes: 1. I_T = 24A
2. See IXGH24N60CD1 data sheet for characteristic curves.

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