IXYS

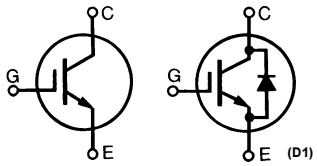
Advanced Technical Information

HiPerFAST™ IGBT ISOPLUS247™

(Electrically Isolated Backside)

IXGR 40N60C
IXGR 40N60CD1

V_{CES} = 600 V
I_{C25} = 75 A
$V_{CE(sat)}$ = 2.5 V
$t_{fi(typ)}$ = 75 ns



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	75	A
I_{C110}	T_C = 110°C	35	A
I_{CM}	T_C = 25°C, 1 ms	150	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 10 Ω Clamped inductive load	I_{CM} = 80 @ 0.8 V_{CES}	A
P_C	T_C = 25°C	200	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
M_d	Mounting torque (M3)	1.13/10	Nm/lb.in.
Weight		5	g

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) Min.	Typ.	Max.	
BV_{CES}	I_C = 250 μA, V_{GE} = 0 V I_C = 750 μA	40N60C 40N60CD1	600 600			V
$V_{GE(th)}$	I_C = 250 μA, V_{CE} = V_{GE} I_C = 500 μA	40N60C 40N60CD1	2.5 2.5		5.0 5.0	V V
I_{CES}	V_{CE} = 0.8 • V_{CES} T_J = 25°C V_{GE} = 0 V; note 1 T_J = 25°C T_J = 125°C T_J = 125°C	40N60C 40N60CD1 40N60C 40N60CD1			200 650 1 3	μA μA mA mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	nA
$V_{CE(sat)}$	I_C = I_T, V_{GE} = 15 V				2.5	V

ISOPLUS 247

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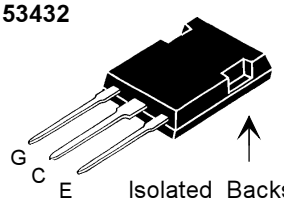


G = Gate, C = Collector
E = Emitter

* 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

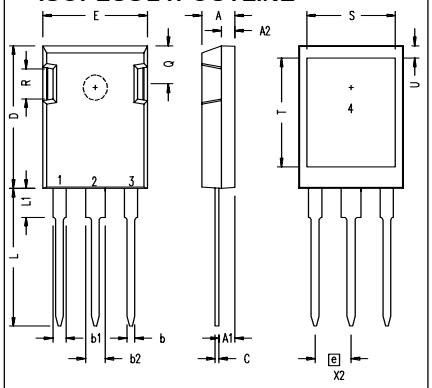
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- AC motor speed control
- DC servo and robot drives
- DC choppers

Advantages

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

Symbol	Test Conditions		Characteristic Values (T_J = 25°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 %		30	40		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz			3300		pF
C_{oes}		40N60C		310		pF
		40N60CD1		370		pF
C_{res}				65		pF
Q_g	$I_C = I_T$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}			116		nC
Q_{ge}				23		nC
Q_{gc}				55		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**			25		ns
t_{ri}	$I_C = I_T$, V_{GE} = 15 V			30		ns
$t_{d(off)}$	V_{CE} = 0.8 • V_{CES}, $R_G = R_{off}$ = 4.7 Ω			100	150	ns
t_{fi}	Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G			75	150	ns
E_{off}				0.85	1.70	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**			25		ns
t_{ri}	$I_C = I_T$, V_{GE} = 15 V			35		ns
E_{on}		40N60C		0.4		mJ
$t_{d(off)}$	V_{CE} = 0.8 • V_{CES}, $R_G = R_{off}$ = 4.7 Ω	40N60CD1		1.2		mJ
t_{fi}	Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G			150		ns
				105		ns
E_{off}				1.2		mJ
R_{thJC}					0.6	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) (IXGH40N60CD1 only) **Characteristic Values** (T_J = 25°C, unless otherwise specified)

Symbol	Test Conditions		min.	typ.	max.	
V_F	$I_F = I_T$, V_{GE} = 0 V, Note 1	T_J = 150°C			1.3	V
		T_J = 25°C			1.8	V
I_{RM}	$I_F = I_T$, V_{GE} = 0 V, V_R = 100 V, $-di_F/dt$ = 100 A/μs	T_J = 100°C			7.5	A
t_{rr}	I_F = 1 A; -di/dt = 100 A/μs; V_R = 30 V			3.5		ns
R_{thJC}					0.90	K/W

Note: 1. Pulse test, t_p ≤ 300 ms, duty cycle d ≤ 2 %
2. I_T = 40A