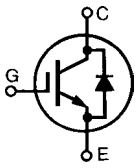
IXYS

HiPerFAST™ IGBT with Diode

IXGX 40N60BD1

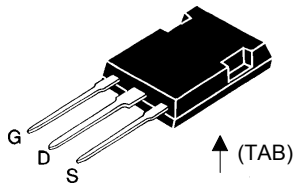
V_{CES} = 600 V
I_{C25} = 75 A
$V_{CE(sat)}$ = 2.1 V
$t_{fi(typ)}$ = 180 ns

Preliminary Data



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	40	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	250	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
M_d	Mounting torque, TO-264	1.13/10	Nm/lb.in.
Weight		5	g
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C

PLUS247 (IXGX)



G = Gate C = Collector
E = Emitter Tab = Collector

Features

- International standard package PLUS247 (hole-less TO-247)
- High frequency IGBT and antparallel FRED in one package
- New generation HDMOS™ process
- High current handling capability
- MOS Gate turn-on fordrive simplicity
- Fast Recovery Epitaxial Diode (FRED) with soft recovery and low I_{RM}

Applications

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

Advantages

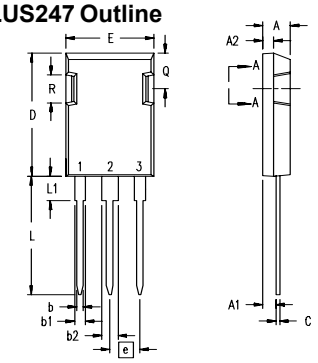
- Space savings (two devices on one package
- Easy to mount with 1 screw
- Easy spring clip assembly

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 = 500 µA, V_{CE} = V_{GE}		2.5		5.0	V
I_{CES}	V_{CE} = 0.8 • V_{CES} V_{GE} = 0 V	T_J = 25°C T_J = 125°C			650 3	µA mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15 V Pulse test, t < 300µs,duty cycle < 2%			1.6	2.1	V

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Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	$I_C = I_{C90}$; V_{CE} = 10 V, Pulse test, t ≤ 300 µs, duty cycle ≤ 2 %	30	42		S
C_{ies}			3300		pF
C_{oes}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		370		pF
C_{res}			65		pF
Q_g			116		nC
Q_{ge}	$I_C = I_{C90}$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		23		nC
Q_{gc}			65		nC
$t_{d(on)}$			25		ns
t_{ri}	**Inductive load, T_J = 25°C**		30		ns
$t_{d(off)}$	$I_C = I_{C90}$, V_{GE} = 15 V		180	300	ns
t_{fi}	V_{CE} = 0.8 V_{CES}, $R_G = R_{off}$ = 4.7 Ω		180	270	ns
E_{off}	Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G		2.7	6.0	mJ
$t_{d(on)}$			25		ns
t_{ri}	**Inductive load, T_J = 125°C**		30		ns
E_{on}	$I_C = I_{C90}$, V_{GE} = 15 V		1.2		mJ
$t_{d(off)}$	V_{CE} = 0.8 V_{CES}, $R_G = R_{off}$ = 4.7 Ω		300		ns
t_{fi}	Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • V_{CES},		270		ns
E_{off}	higher T_J or increased R_G		4.0		mJ
R_{thJC}				0.50	K/W
R_{thCK}			0.15		K/W

PLUS247 Outline



Terminals: 1 - Gate
2 - Drain (Collector)
3 - Source (Emitter)
4 - Drain (Collector)

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	0.244
R	4.32	4.83	.170	.190

Reverse Diode (FRED)

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values min.	typ.	max.	
V_F	$I_F = I_{C90}$, V_{GE} = 0 V, T_J = 150°C			1.3	V
	Pulse test, t ≤ 300 ms, duty cycle d 22 %			1.8	V
I_{RM}	$I_F = I_{C90}$, V_{GE} = 0 V, $-di_F/dt$ = 100 A/µs, V_R = 100 V			7.5	A
t_{rr}	I_F = 1 A; -di/dt = 100 A/µs; V_R = 30 V		35		ns
R_{thJC}				0.65	K/W

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