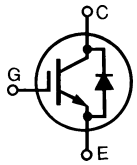
High Voltage IGBT with Diode

Combi Pack
Short Circuit SOA Capability

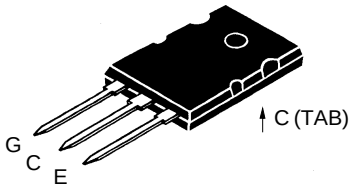
IXSK35N120AU1

V_{CES} = 1200 V
I_{C25} = 70 A
$V_{CE(sat)}$ = 4 V



Symbol	Test Conditions		Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C		1200	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ		1200	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		35	A
I_{CM}	T_C = 25°C, 1 ms		140	A
SSOA (RBSOA)	V_{GE} = 15 V, T_J = 125°C, R_G = 22 Ω Clamped inductive load, L = 30 μH		I_{CM} = 70 @ 0.8 V_{CES}	A
t_{SC} **(SCSOA)**	V_{GE} = 15 V, V_{CE} = 720 V, T_J = 125°C R_G = 22 Ω, non repetitive		10	μs
P_C	T_C = 25°C	IGBT Diode	300 190	W W
T_J			-55 ... +150	°C
T_{JM}			150	°C
T_{stg}			-55 ... +150	°C
T_L	1.6 mm (0.063 in) from case for 10 s		300	°C
M_d	Mounting torque		1.15/13	Nm/lb.in.
Weight			10	g

TO-264 AA



G = Gate, C = Collector,
E = Emitter, TAB = Collector

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
BV_{CES}	I_C = 5 mA, V_{GE} = 0 V		1200			V
$V_{GE(th)}$	I_C = 4 mA, V_{CE} = V_{GE}		4		8	V
I_{CES}	V_{CE} = 0.8 • V_{CES}	T_J = 25°C			750	μA
	V_{GE} = 0 V	T_J = 125°C			15	mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	nA
$V_{CE(sat)}$	I_C = I_{C90}, V_{GE} = 15 V				4	V

Features

- International standard package JEDEC TO-264 AA
- High frequency IGBT and anti-parallel FRED in one package
- 2nd generation HDMOS™ process
- Low $V_{CE(sat)}$
  - for minimum on-state conduction losses
- MOS Gate turn-on
  - drive simplicity
- Fast Recovery Epitaxial Diode (FRED)
  - soft recovery with 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 in one package)
- Easy to mount with one screw (isolated mounting screw hole)
- High power density

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

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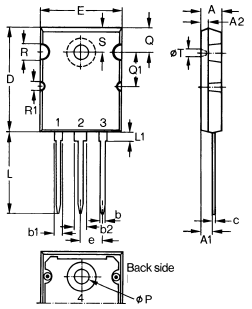
Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	$I_C = I_{C90}$; V_{CE} = 10 V, Pulse test, t ≤ 300 µs, duty cycle ≤ 2 %	20	26		S
$I_{C(on)}$	V_{GE} = 15 V, V_{CE} = 10 V		170		A
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		3900		pF
C_{oes}			295		pF
C_{res}			60		pF
Q_g	$I_C = I_{C90}$, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		150	190	nC
Q_{ge}			40	60	nC
Q_{gc}			70	100	nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		80		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V,		150		ns
$t_{d(off)}$	L = 100 µH, V_{CE} = 0.8 V_{CES}, R_G = 2.7 Ω		400	900	ns
t_{fi}			500	700	ns
E_{off}	Note 1		10		mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		80		ns
t_{ri}	$I_C = I_{C90}$, V_{GE} = 15 V,		150		ns
E_{on}	L = 100 µH		8		mJ
$t_{d(off)}$	V_{CE} = 0.8 V_{CES}, R_G = 2.7 Ω		400		ns
t_{fi}			700		ns
E_{off}	Note 1		15		mJ
R_{thJC}				0.42	K/W
R_{thCK}			0.15		K/W

TO-264 AA Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46 BSC		.215 BSC	
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072

Reverse Diode (FRED)

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_F	$I_F = I_{C90}$, V_{GE} = 0 V, Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %, T_J = 125°C			2.35	V
I_{RM}	$I_F = I_{C90}$, V_{GE} = 0 V, $-di_F/dt$ = 480 A/µs		32	36	A
t_{rr}	V_R = 540 V T_J = 100°C		225		ns
	I_F = 1 A; -di/dt = 200 A/µs; V_R = 30 V T_J = 25°C		40	60	ns
R_{thJC}				0.65	K/W

IXSK 35N120AU1 characteristic curves are located in the IXSH 35N120A data sheet, Publication No. D96001DE, pages 66 - 67.