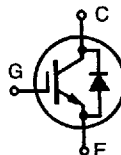


High Voltage IGBT with Diode

IXDH 20N120 AU1

$$\begin{aligned} V_{CES} &= 1200 \text{ V} \\ I_{C25} &= 34 \text{ A} \\ V_{CE(sat) \text{ typ}} &= 2.8 \text{ V} \end{aligned}$$

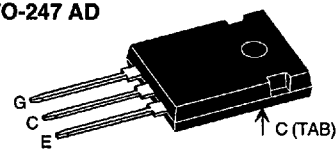
Short Circuit SOA Capability
Square RBSOA



Preliminary Data

Symbol	Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C}$ to 150°C	1200	V
V_{CGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GE} = 20 \text{ k}\Omega$	1200	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	34	A
I_{C90}	$T_C = 90^\circ\text{C}$	21	A
I_{CM}	$T_C = 90^\circ\text{C}$, $t_p = 1 \text{ ms}$	42	A
RBSOA	$V_{GE} = \pm 15 \text{ V}$, $T_J = 125^\circ\text{C}$, $R_G = 68 \Omega$ Clamped inductive load, $L = 30 \mu\text{H}$	$I_{CM} = 35$ $V_{CEK} < V_{CES}$	A
t_{SC} (SCSOA)	$V_{GE} = \pm 15 \text{ V}$, $V_{CE} = V_{CES}$, $T_J = 125^\circ\text{C}$ $R_G = 68 \Omega$, non repetitive	10	μs
P_C	$T_C = 25^\circ\text{C}$	IGBT Diode	200 75 W W
T_J		-55 ... +150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$
M_d	Mounting torque	1.1/10	Nm/lb.in.
Weight		6	g

TO-247 AD



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

Features

- NPT IGBT technology
- high switching speed
- low switching losses
- square RBSOA, no latch up
- high short circuit capability
- positive temperature coefficient for easy paralleling
- MOS input, voltage controlled
- fast recovery epitaxial diode
- International standard package

Advantages

- Space savings
- High power density

Typical Applications

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

Symbol	Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
$V_{(BR)CES}$	$V_{GE} = 0 \text{ V}$	1200		V
$V_{GE(th)}$	$I_C = 0.6 \text{ mA}$, $V_{CE} = V_{GE}$	4.5		6.5 V
I_{CES}	$V_{CE} = V_{CES}$ $V_{CE} = 0.8 \cdot V_{CES}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$		2	1.1 mA mA
I_{GES}	$V_{CE} = 0 \text{ V}$, $V_{GE} = \pm 20 \text{ V}$			$\pm 500 \text{ nA}$
$V_{CE(sat)}$	$I_C = 20 \text{ A}$, $V_{GE} = 15 \text{ V}$	2.8	3.4	V

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

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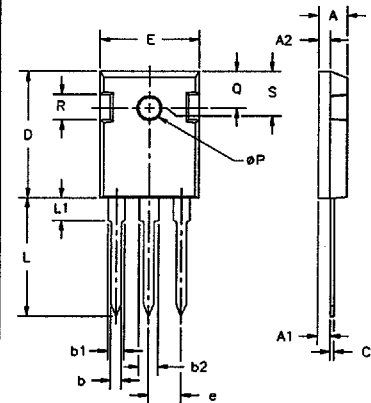
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Symbol	Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
C_{ies}	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$		1000	pF
C_{oes}			150	pF
C_{res}			70	pF
Q_g	$I_C = 20\text{ A}, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$		70	nC
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = 20\text{ A}, V_{GE} = \pm 15\text{ V},$ $V_{CE} = 600\text{ V}, R_G = 68\ \Omega$		60	ns
t_r			60	ns
$t_{d(off)}$			400	ns
t_f			50	ns
E_{on}			3.5	mJ
E_{off}			2.1	mJ
R_{thJC}	Package with heatsink compound			0.63 K/W
R_{thCK}			0.25	K/W

Reverse Diode (FRED)

Symbol	Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_F	$I_F = 20\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 20\text{ A}, V_{GE} = 0\text{ V}, T_J = 125^\circ\text{C}$	2.7	2.8	V
I_F	$T_C = 25^\circ\text{C}$ $T_C = 90^\circ\text{C}$		27	A
I_{RM}	$I_F = 20\text{ A}, -di_F/dt = 100\text{ A}/\mu\text{s}, V_R = 600\text{ V}$	7		A
t_{rr}	$V_{GE} = 0\text{ V}, T_J = 125^\circ\text{C}$	300		ns
t_{rr}	$I_F = 1\text{ A}, -di_F/dt = 100\text{ A}/\mu\text{s}, V_R = 30\text{ V}, V_{GE} = 0\text{ V}$	40		ns
R_{thJC}				1.6 K/W

TO-247 AD Outline



Dim.	Millimeter Min. Max.	Inches Min. Max.
A	4.7 5.3	.185 .209
A ₁	2.2 2.54	.087 .102
A ₂	2.2 2.6	.059 .098
b	1.0 1.4	.040 .055
b ₁	1.65 2.13	.065 .084
b ₂	2.87 3.12	.113 .123
C	.4 .8	.016 .031
D	20.80 21.46	.819 .845
E	15.75 16.26	.610 .640
e	5.20 5.72	0.205 0.225
L	19.81 20.32	.780 .800
L1	4.50	.177
ØP	3.55 3.65	.140 .144
Q	5.89 6.40	0.232 0.252
R	4.32 5.49	.170 .216
S	6.15 BSC	.242 BSC

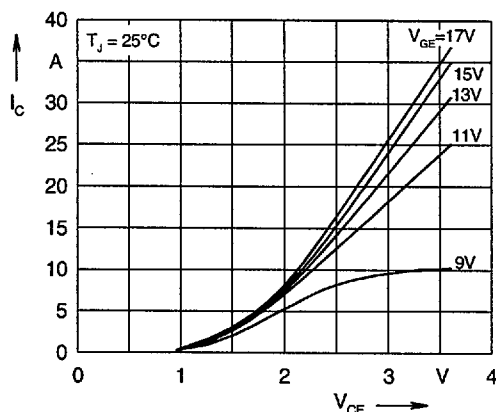


Fig. 1 Typ. output characteristics

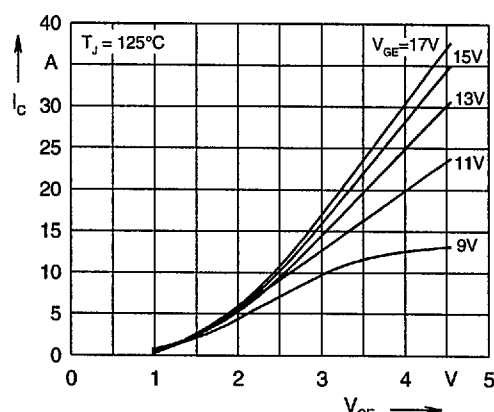


Fig. 2 Typ. output characteristics

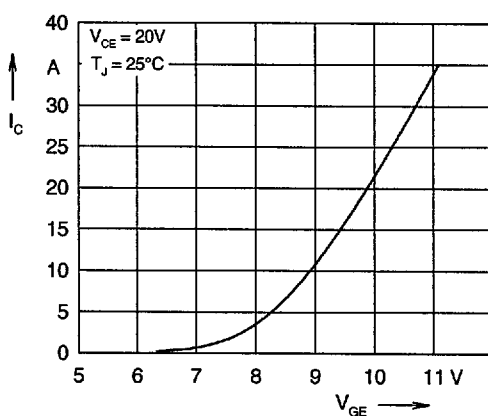


Fig. 3 Typ. transfer characteristics

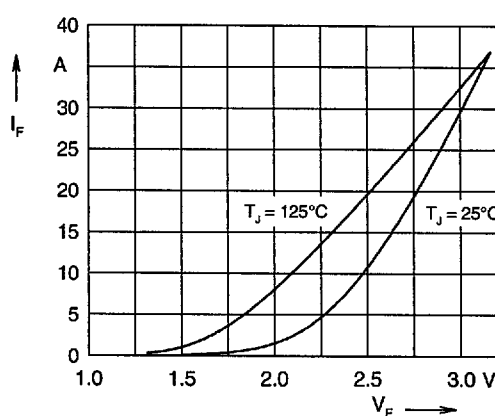


Fig. 4 Typ. forward characteristics of free wheeling diode

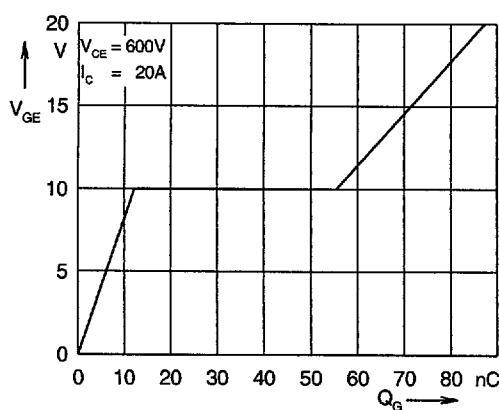


Fig. 5 Typ. turn on gate charge

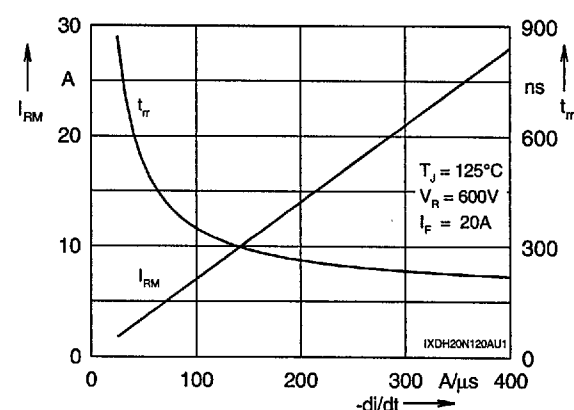


Fig. 6 Typ. turn off characteristics of free wheeling diode

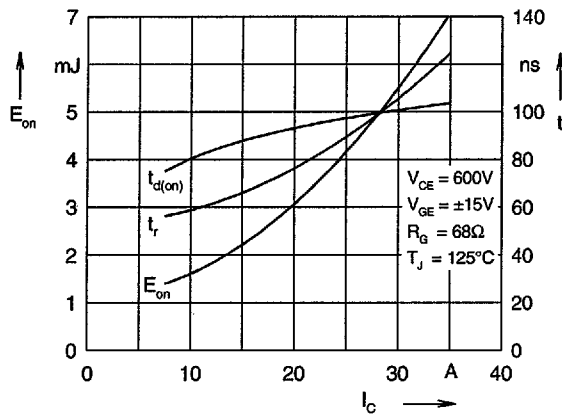


Fig. 7 Typ. turn on energy and switching times versus collector current

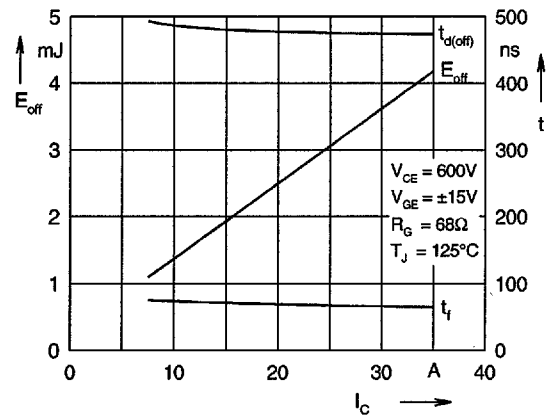


Fig. 8 Typ. turn off energy and switching times versus collector current

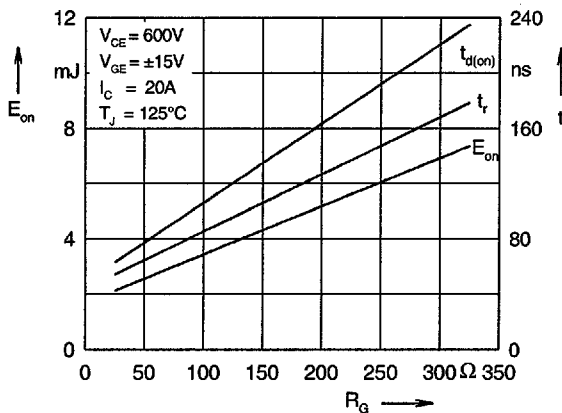


Fig. 9 Typ. turn on energy and switching times versus gate resistor

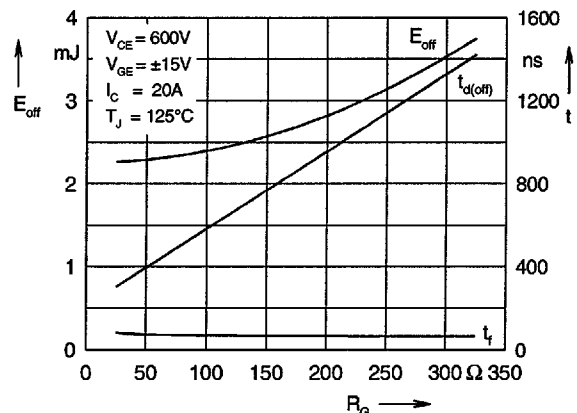


Fig. 10 Typ. turn off energy and switching times versus gate resistor

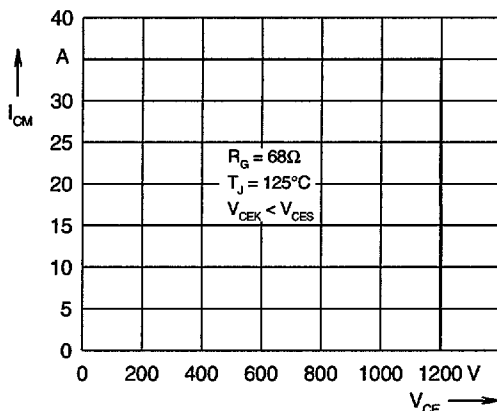


Fig. 11 Reverse biased safe operating area RBSOA

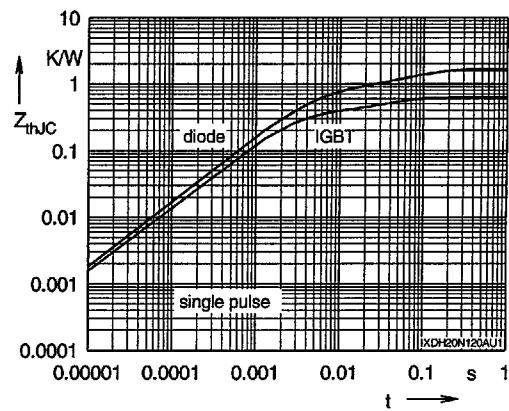


Fig. 12 Typ. transient thermal impedance