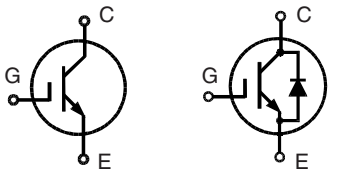
IXYS

High Voltage IGBT with optional Diode

IXDH 20N120
IXDH 20N120 D1

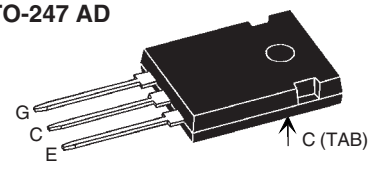
V_{CES} = 1200 V
I_{C25} = 38 A
$V_{CE(sat)\ typ}$ = 2.4 V

Short Circuit SOA Capability
Square RBSOA



IXDH 20N120 IXDH 20N120 D1

TO-247 AD



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

Symbol	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} = 20 kΩ		1200	V
V_{GES}	Continuous		±20	V
V_{GEM}	Transient		±30	V
I_{C25}	T_C = 25°C		38	A
I_{C90}	T_C = 90°C		25	A
I_{CM}	T_C = 90°C, t_p = 1 ms		50	A
RBSOA	V_{GE} = ±15 V, T_J = 125°C, R_G = 82 Ω Clamped inductive load, L = 30 µH		I_{CM} = 35 V_{CEK} < V_{CES}	A
t_{SC} (SCSOA)	V_{GE} = ±15 V, V_{CE} = V_{CES}, T_J = 125°C R_G = 82 Ω, non repetitive		10	µs
P_C	T_C = 25°C	IGBT Diode	200 75	W W
T_J			-55 ... +150	°C
T_{stg}			-40< ... +150	°C
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s			300	°C
M_d	Mounting torque		0.8 - 1.2	Nm
Weight			6	g

Features

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

Advantages

- Space savings
- High power density

Typical Applications

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

Symbol	Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{(BR)CES}$	V_{GE} = 0 V		1200			V
$V_{GE(th)}$	I_C = 0.6 mA, V_{CE} = V_{GE}		4.5		6.5	V
I_{CES}	V_{CE} = V_{CES}	T_J = 25°C T_J = 125°C			1	mA mA
				2		
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				± 500	nA
$V_{CE(sat)}$	I_C = 20 A, V_{GE} = 15 V			2.4	3	V

418

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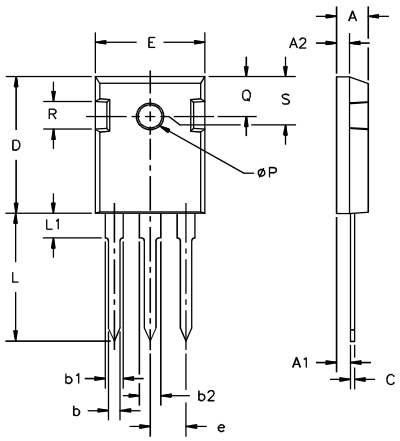
Symbol	Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		1000		pF
C_{oes}			150		pF
C_{res}			70		pF
Q_g	I_C = 20 A, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		70		nC
$t_{d(on)}$	**Inductive load, T_J = 125°C** I_C = 20 A, V_{GE} = ±15 V, V_{CE} = 600 V, R_G = 82 Ω		100		ns
t_r			75		ns
$t_{d(off)}$			500		ns
t_f			70		ns
E_{on}			3.1		mJ
E_{off}			2.4		mJ
R_{thJC}				0.63	K/W
R_{thCH}	Package with heatsink compound		0.25		K/W

Reverse Diode (FRED) [D1 version only]

Symbol	Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_F	I_F = 20 A, V_{GE} = 0 V		2.6	2.9	V
	I_F = 20 A, V_{GE} = 0 V, T_J = 125°C		2.1		V
I_F	T_C = 25°C			31	A
	T_C = 90°C			19	A
I_{RM}	I_F = 20 A, -di_F/dt = 400 A/µs, V_R = 600 V		15		A
t_{rr}	V_{GE} = 0 V, T_J = 125°C		200		ns
t_{rr}	I_F = 1 A, -di_F/dt = 100 A/µs, V_R = 30 V, V_{GE} = 0 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
∅P	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	

418

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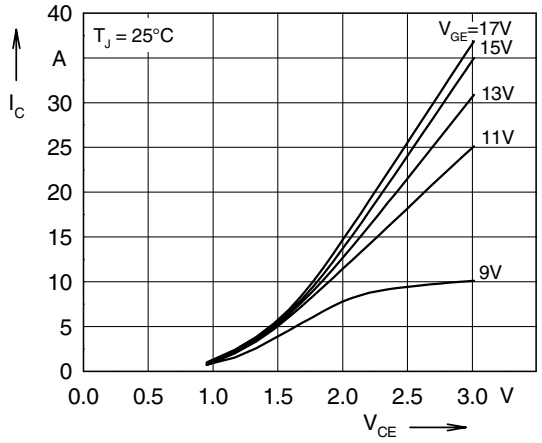

Fig. 1 Typ. output characteristics

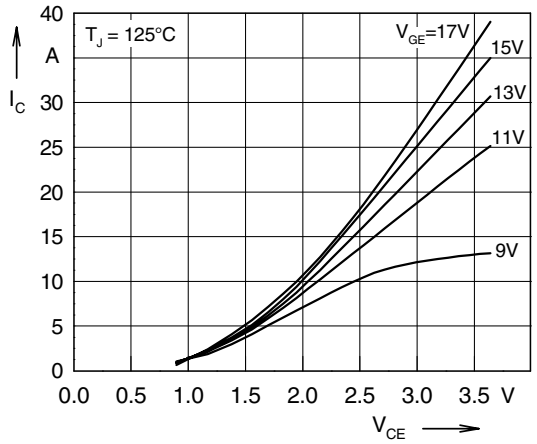

Fig. 2 Typ. output characteristics

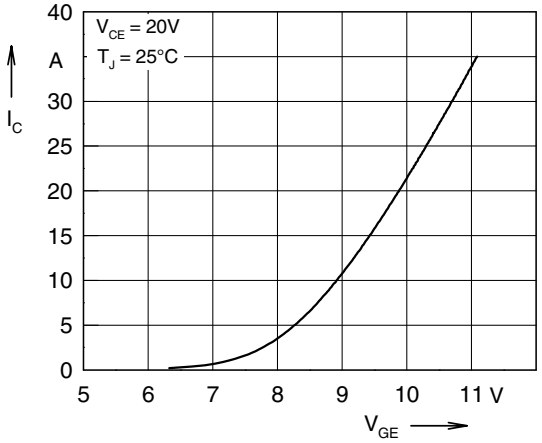

Fig. 3 Typ. transfer characteristics

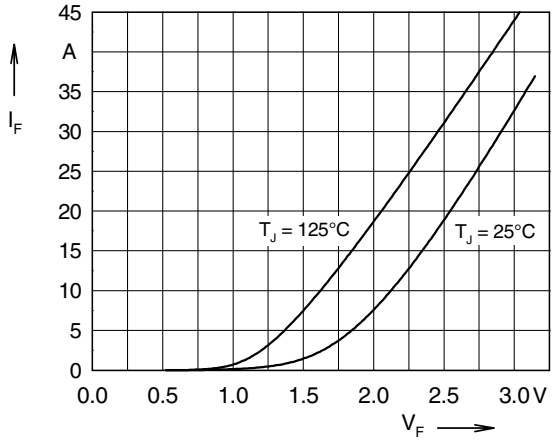

Fig. 4 Typ. forward characteristics of free wheeling diode (D1 version only)

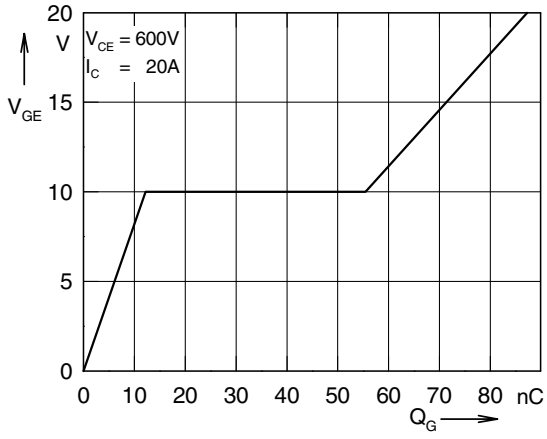

Fig. 5 Typ. turn on gate charge

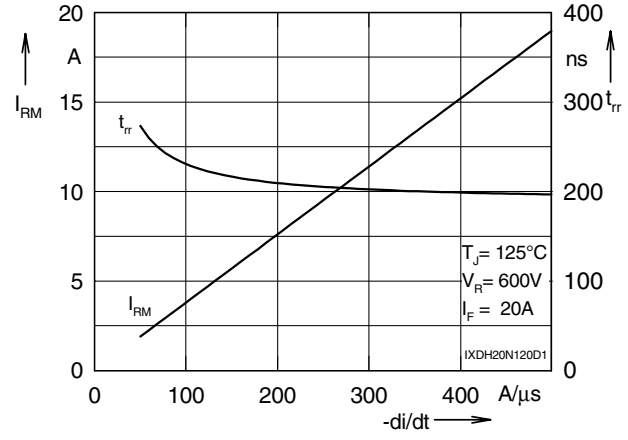

Fig. 6 Typ. turn off characteristics of free wheeling diode (D1 version only)

418

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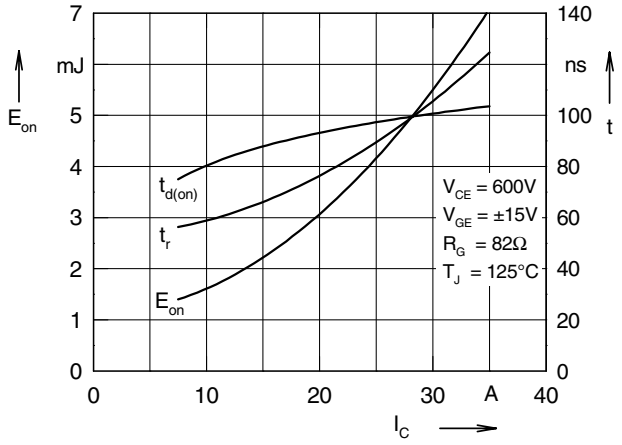

Fig. 7 Typ. turn on energy and switching times versus collector current

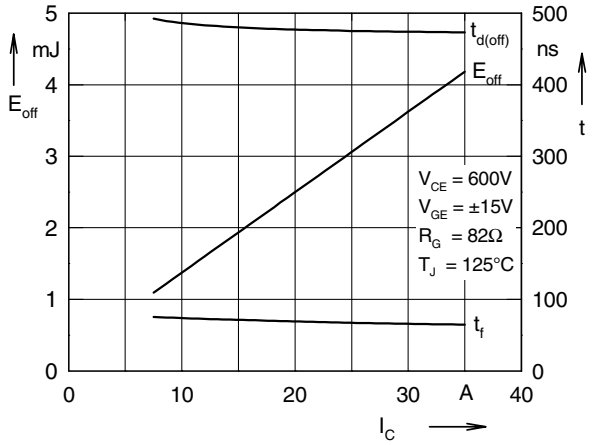

Fig. 8 Typ. turn off energy and switching times versus collector current

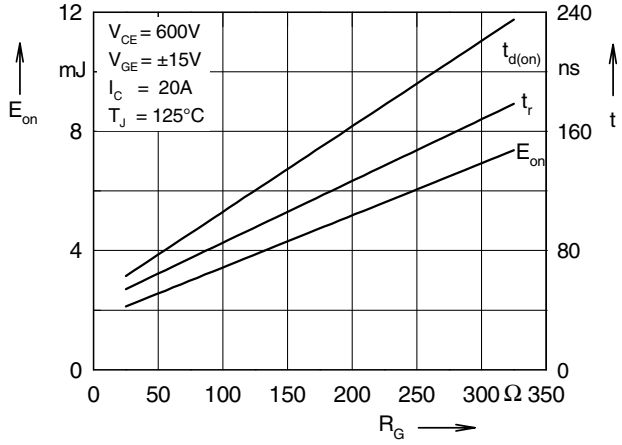

Fig. 9 Typ. turn on energy and switching times versus gate resistor

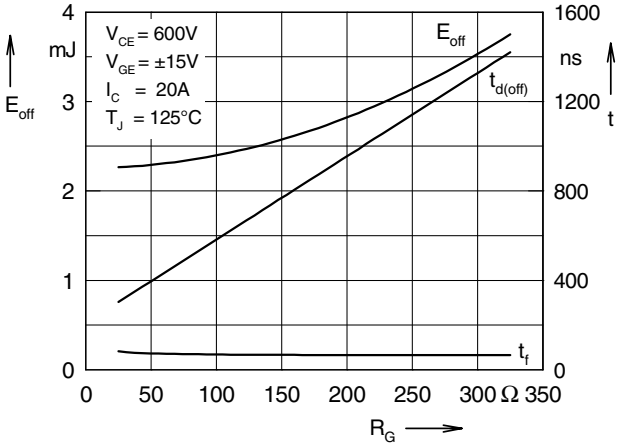

Fig.10 Typ. turn off energy and switching times versus gate resistor

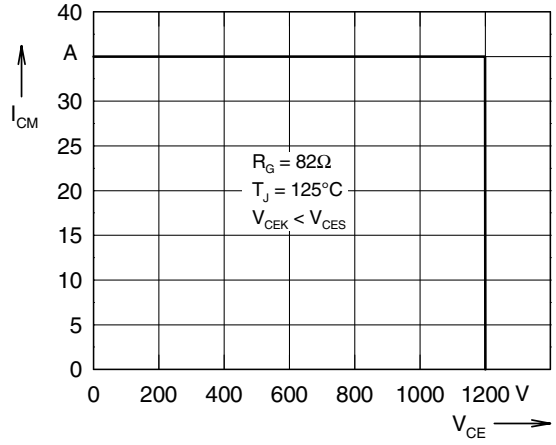

Fig. 11 Reverse biased safe operating area RBSOA

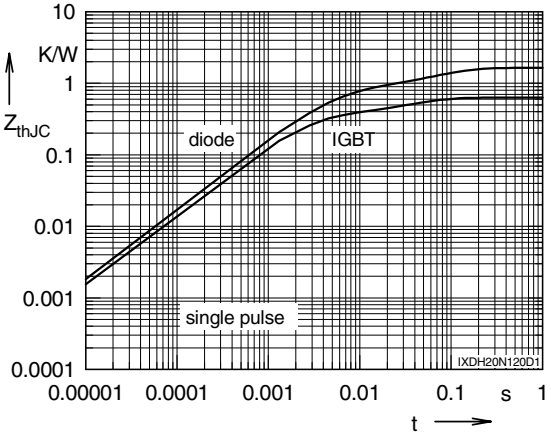

Fig. 12 Typ. transient thermal impedance

418

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