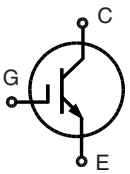
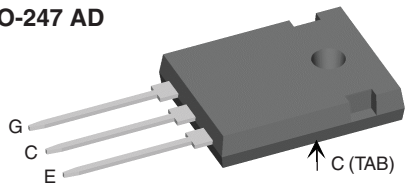
High Voltage IGBT with optional Diode

V_{CES} = 1200 V
I_{C25} = 60 A
$V_{CE(sat)\ typ}$ = 2.4 V

Short Circuit SOA Capability
Square RBSOA



TO-247 AD



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

Type	Replacements
IXDH30N120	IXDH30N120D1 IXA33IF1200HB

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	60	A
I_{C90}	T_C = 90°C	38	A
I_{CM}	T_C = 90°C; t_p = 1 ms	76	A
RBSOA	V_{GE} = ±15 V; T_J = 125°C; R_G = 47 Ω Clamped inductive load; L = 30 µH	I_{CM} = 50 $V_{CEK} < V_{CES}$	A
t_{SC} (SCSOA)	V_{GE} = ±15 V; V_{CE} = V_{CES}; T_J = 125°C R_G = 47 Ω, non repetitive	10	µs
P_C	T_C = 25°C; IGBT	300	W
	Diode	135	W
T_J		-55 ... +150	°C
T_{stg}		-40 ... +150	°C
M_d	Mounting torque	1.1/10	Nm/lb.in.
Weight		6	g

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 = 1 mA; V_{CE} = V_{GE}	4.5		6.5	V
I_{CES}	V_{CE} = V_{CES}; T_J = 25°C			1.5	mA
	T_J = 125°C		2.5		mA
I_{GES}	V_{CE} = 0 V; V_{GE} = ±20 V			± 500	nA
$V_{CE(sat)}$	I_C = 30 A; V_{GE} = 15 V		2.4	2.9	V

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 packages

Advantages

- Space savings
- High power density
- IXDT: surface mountable high power package

Typical Applications

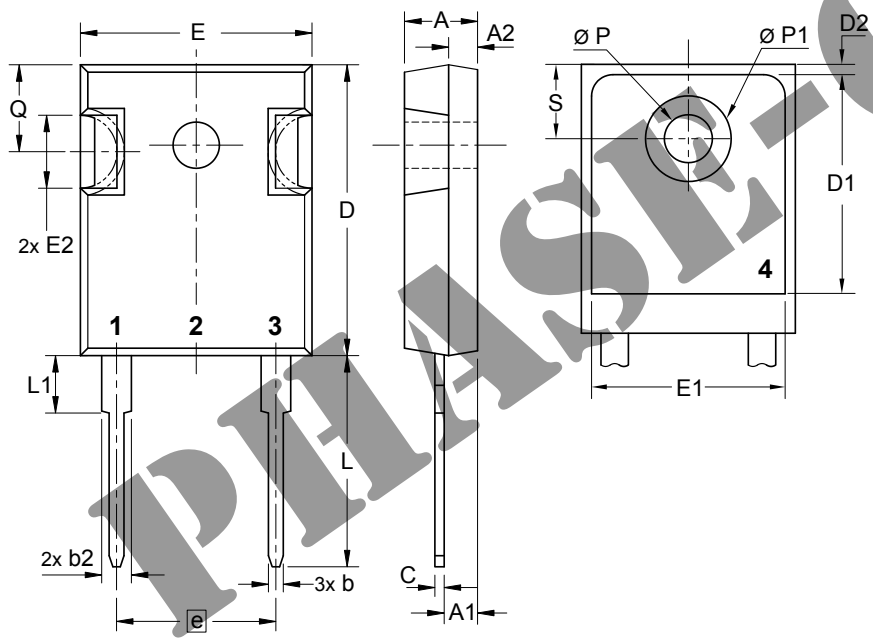
- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninteruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies

Symbol	Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz		1650		pF
C_{oes}			250		pF
C_{res}			110		pF
Q_g	I_C = 30 A; V_{GE} = 15 V; V_{CE} = 0.5 V_{CES}		120		nC
$t_{d(on)}$	**Inductive load, T_J = 125°C**		100		ns
t_r			70		ns
$t_{d(off)}$			500		ns
t_f	I_C = 30 A; V_{GE} = ±15 V;		70		ns
E_{on}	V_{CE} = 600 V; R_G = 47 Ω		4.6		mJ
E_{off}			3.4		mJ
R_{thJC}				0.42	K/W
R_{thCK}	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 = 30 A; V_{GE} = 0 V		2.5	2.7	V
	I_F = 30 A; V_{GE} = 0 V; T_J = 125°C		2.0		V
I_F	T_C = 25°C			60	A
	T_C = 90°C			35	A
I_{RM}	I_F = 30 A; -di_F/dt = 400 A/µs; V_R = 600 V		20		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	K/W

TO-247 AD Outline



Sym.	Inches min.	Inches max.	Millimeter min.	Millimeter max.
A	0.185	0.209	4.70	5.30
A1	0.087	0.102	2.21	2.59
A2	0.059	0.098	1.50	2.49
D	0.819	0.845	20.79	21.45
E	0.610	0.640	15.48	16.24
E2	0.170	0.216	4.31	5.48
e	0.430 BSC		10.92 BSC	
L	0.780	0.800	19.80	20.30
L1	-	0.177	-	4.49
Ø P	0.140	0.144	3.55	3.65
Q	0.212	0.244	5.38	6.19
S	0.242 BSC		6.14 BSC	
b	0.039	0.055	0.99	1.40
b2	0.065	0.094	1.65	2.39
b4	0.102	0.135	2.59	3.43
c	0.015	0.035	0.38	0.89
D1	0.515	-	13.07	-
D2	0.020	0.053	0.51	1.35
E1	0.530	-	13.45	-
Ø P1	-	0.29	-	7.39

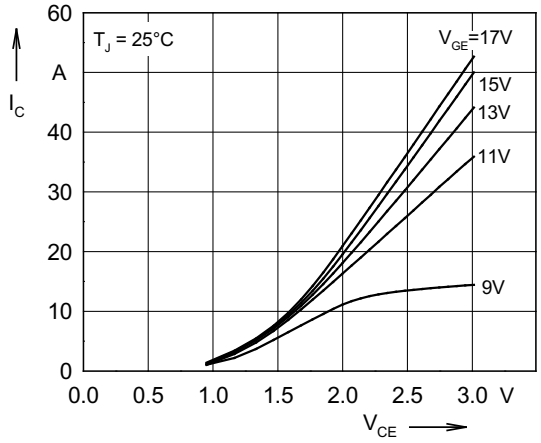


Fig. 1 Typ. output characteristics

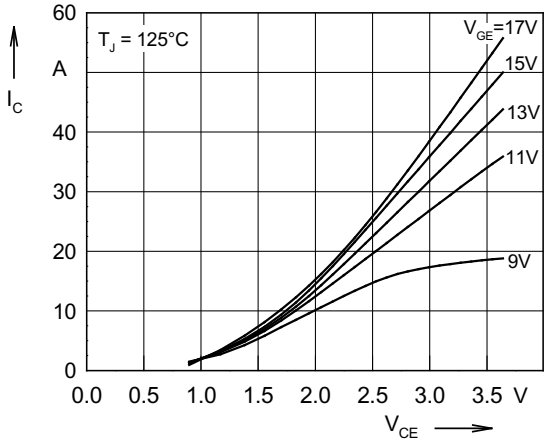


Fig. 2 Typ. output characteristics

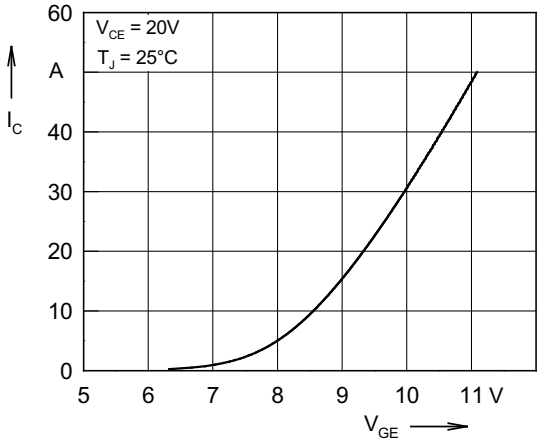


Fig. 3 Typ. transfer characteristics

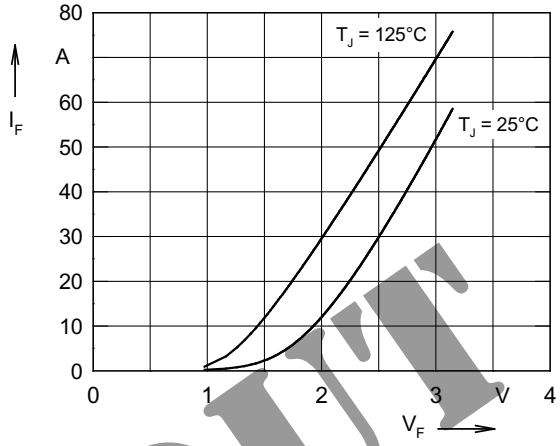


Fig. 4 Typ. forward characteristics of free wheeling diode

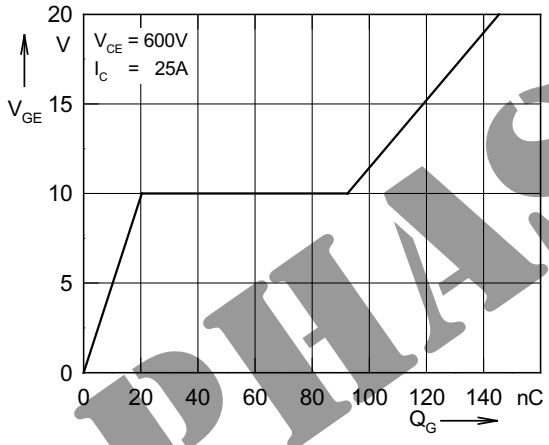


Fig. 5 Typ. turn on gate charge

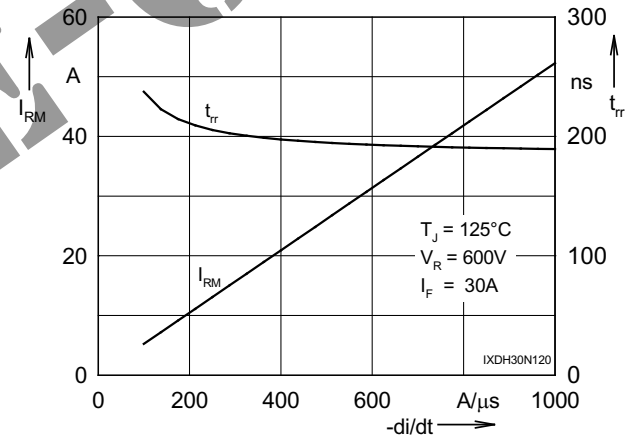


Fig. 6 Typ. turn off characteristics of free wheeling diode

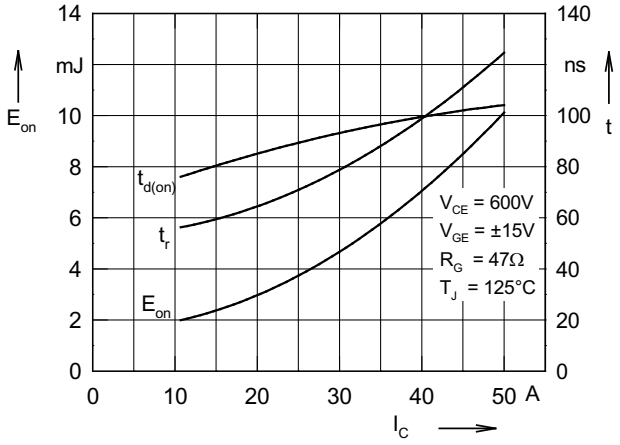


Fig. 7 Typ. turn on energy and switching times versus collector current

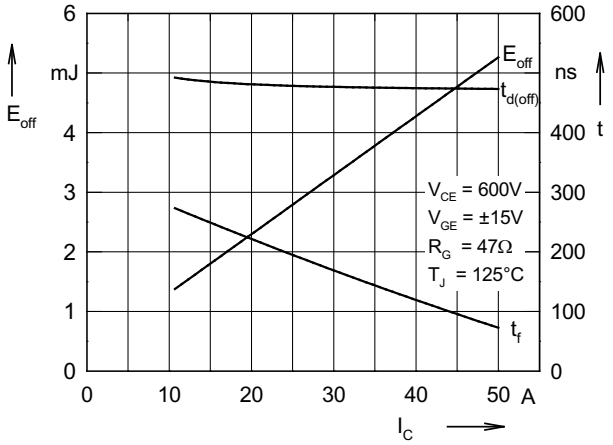


Fig. 8 Typ. turn off energy and switching times versus collector current

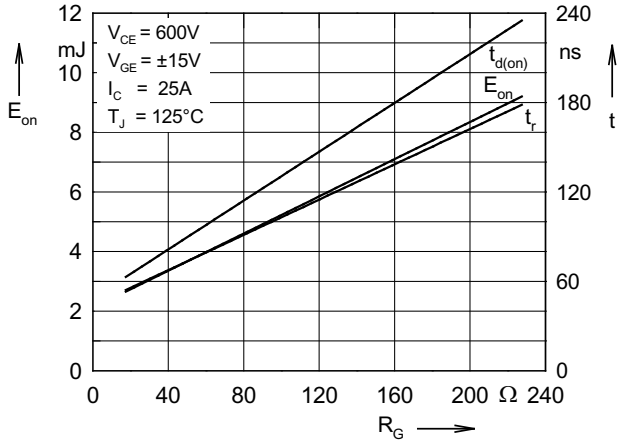


Fig. 9 Typ. turn on energy and switching times versus gate resistor

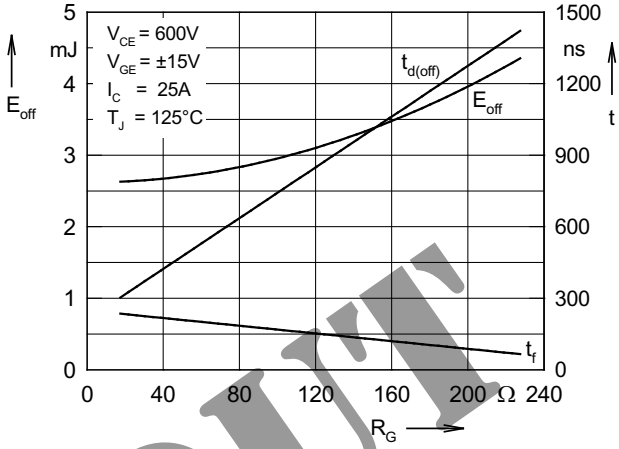


Fig.10 Typ. turn off energy and switching times versus gate resistor

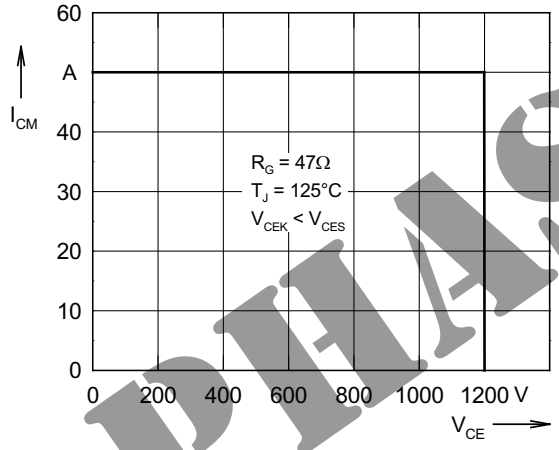


Fig. 11 Reverse biased safe operating area RBSOA

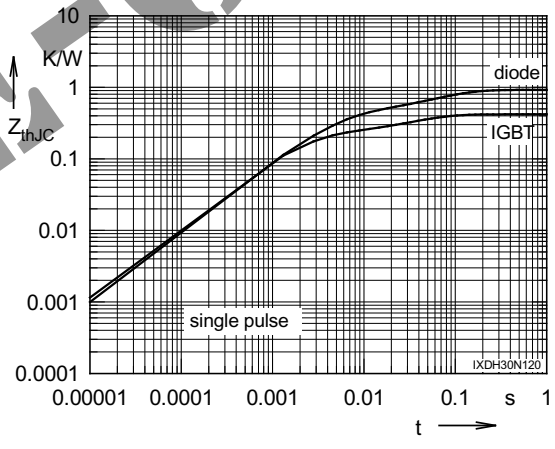


Fig. 12 Typ. transient thermal impedance