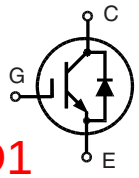
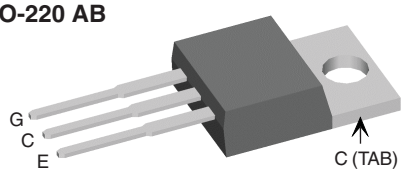
High Voltage IGBT with optional Diode

V_{CES} = 600 V
I_{C25} = 32 A
$V_{CE(sat)\ typ}$ = 2.2 V

High Speed,
Low Saturation Voltage



TO-220 AB



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

Replacements:
IXYP15N65C3D1 / IXXP12N65B4D1

Symbol	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} = 20 kΩ	600	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	32	A
I_{C90}	T_C = 90°C	20	A
I_{CM}	T_C = 90°C, t_p =1 ms	40	A
RBSOA	V_{GE} = ±15 V, T_J = 125°C, R_G = 22 Ω Clamped inductive load, L = 30 µH	I_{CM} = 60 V_{CEK} < V_{CES}	A
t_{SC} (SCSOA)	V_{GE} = ±15 V, V_{CE} = 600 V, T_J = 125°C R_G = 22 Ω, non repetitive	10	µs
P_C	T_C = 25°C IGBT Diode	140 50	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	0.4 - 0.6	Nm
Weight		2	g

Features

- NPT IGBT technology
- low switching losses
- low tail current
- no latch up
- 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

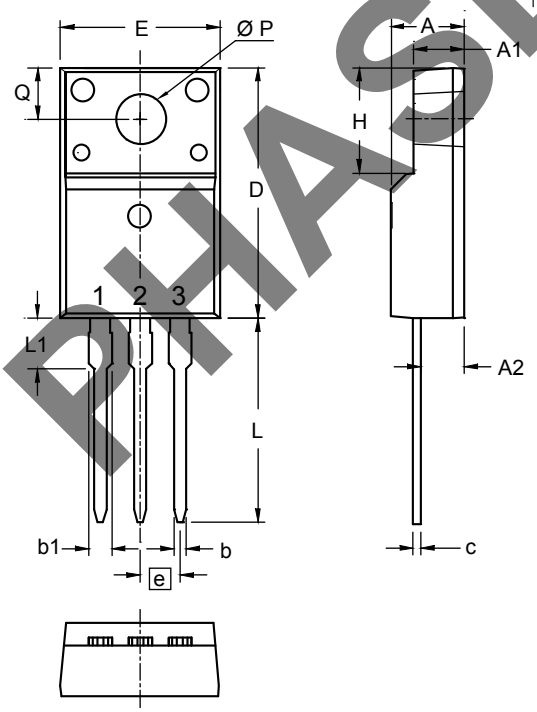
Symbol	Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{(BR)CES}$	V_{GE} = 0 V	600			V
$V_{GE(th)}$	I_C = 0.4 mA, V_{CE} = V_{GE}	3		5	V
I_{CES}	V_{CE} = V_{CES} T_J = 25°C T_J = 125°C		 0.7	0.1	mA mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V			± 500	nA
$V_{CE(sat)}$	I_C = 20 A, V_{GE} = 15 V		2.2	2.8	V

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		800		pF
C_{oes}			85		pF
C_{res}			50		pF
Q_g	I_C = 20 A, V_{GE} = 15 V, V_{CE} = 480 V		70		nC
$t_{d(on)}$	Inductive load, T_J = 125°C		25		ns
t_r	I_C = 20 A, V_{GE} = ±15 V,		30		ns
$t_{d(off)}$	V_{CE} = 300 V, R_G = 22 Ω		260		ns
t_f			55		ns
E_{on}			0.9		mJ
E_{off}			0.4		mJ
R_{thJC}				0.9	K/W
R_{thCH}	Package with heatsink compound	0.5			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 = 20 A, V_{GE} = 0 V		2.1	2.4	V
	I_F = 20 A, V_{GE} = 0 V, T_J = 125°C		1.6		V
I_F	T_C = 25°C			25	A
	T_C = 90°C			15	A
I_{RM}	I_F = 10 A, -di_F/dt = 400 A/µs, V_R = 300 V		11		A
t_{rr}	V_{GE} = 0 V, T_J = 125°C		80		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}				2.5	K/W

TO-220 AB Outline



Dim.	Millimeters min	Millimeters max	Inches min	Inches max
A	4.50	4.90	0.177	0.193
A1	2.34	2.74	0.092	0.108
A2	2.56	2.96	0.101	0.117
b	0.70	0.90	0.028	0.035
c	0.45	0.60	0.018	0.024
D	15.67	16.07	0.617	0.633
E	9.96	10.36	0.392	0.408
e	2.54 BSC		0.100 BSC	
H	6.48	6.88	0.255	0.271
L	12.68	13.28	0.499	0.523
L1	3.03	3.43	0.119	0.135
Ø P	3.08	3.28	0.121	0.129
Q	3.20	3.40	0.126	0.134

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

20190131a

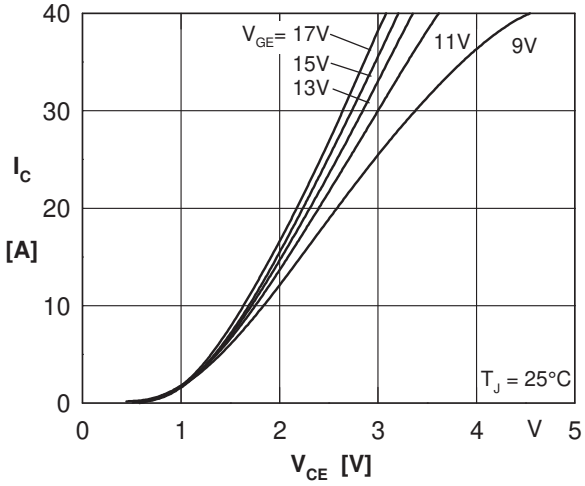


Fig. 1 Typ. output characteristics

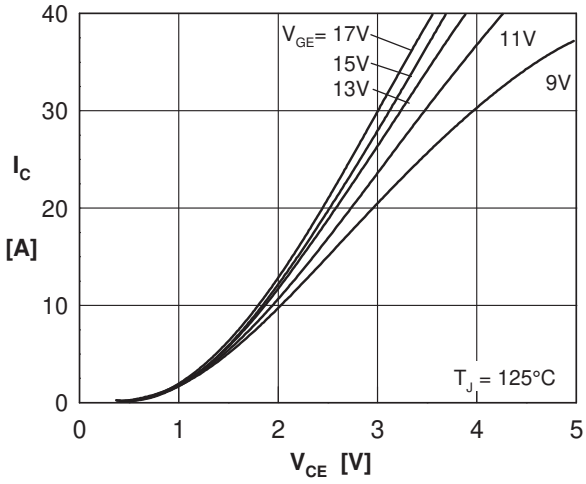


Fig. 2 Typ. output characteristics

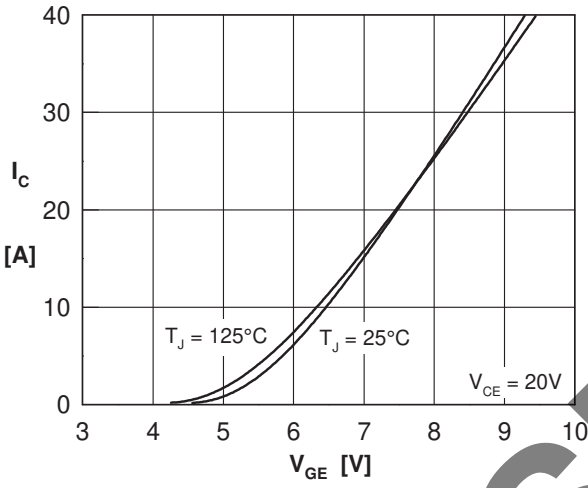


Fig. 3 Typ. transfer characteristics

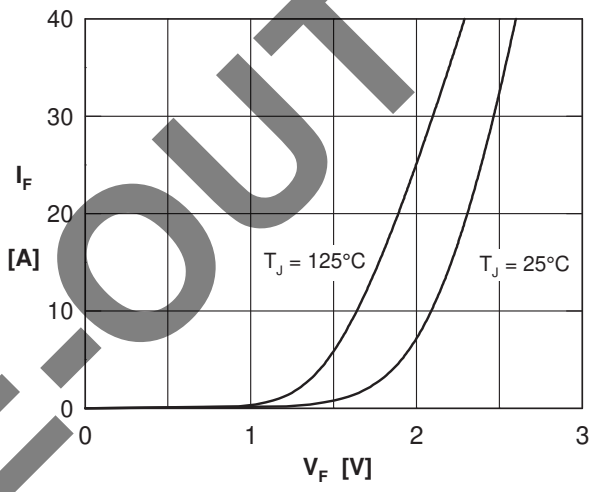


Fig. 4 Typ. forward characteristics of free wheeling diode

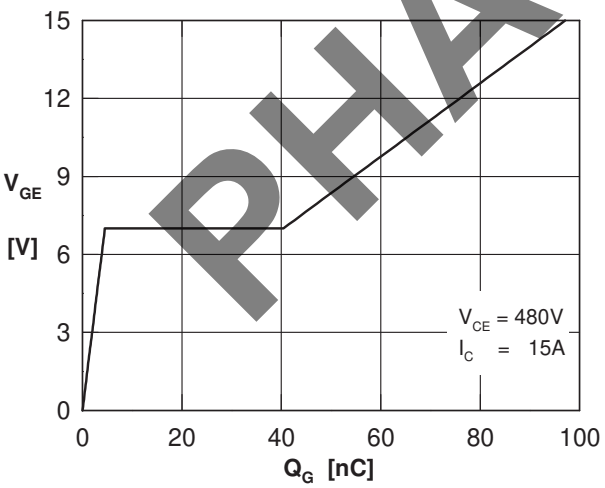


Fig. 5 Typ. turn on gate charge

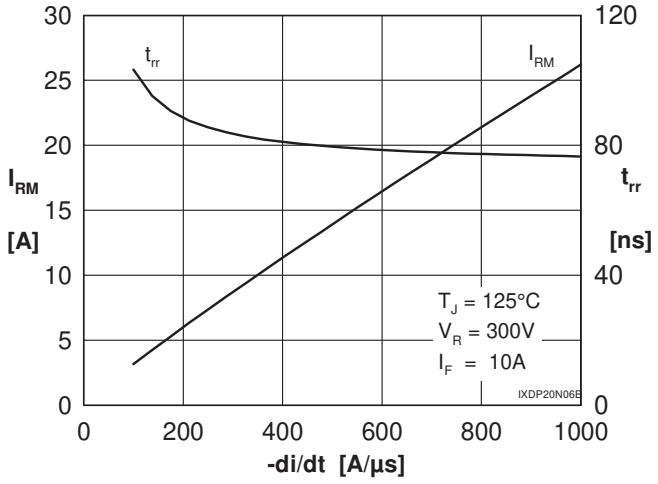


Fig. 6 Typ. turn off characteristics of free wheeling diode

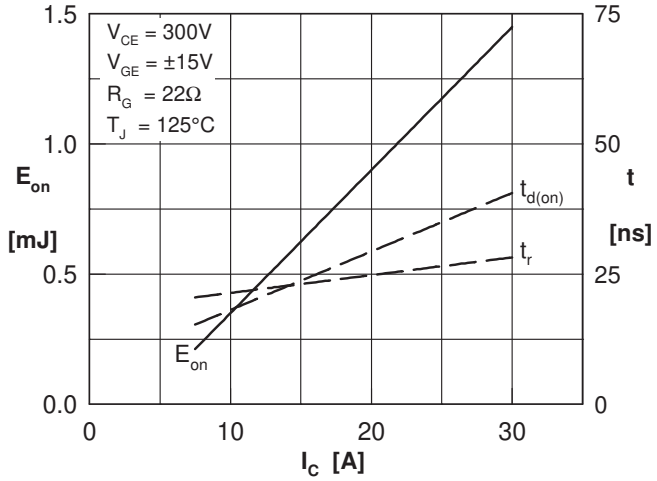


Fig. 7 Typ. turn on energy and switching times versus collector current

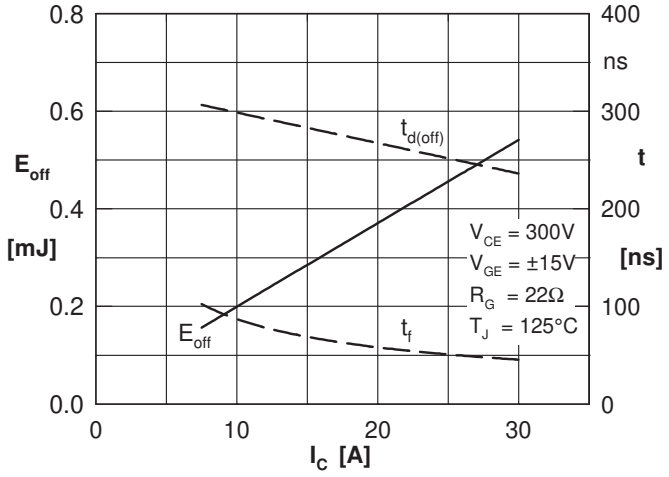


Fig. 8 Typ. turn off energy and switching times versus collector current

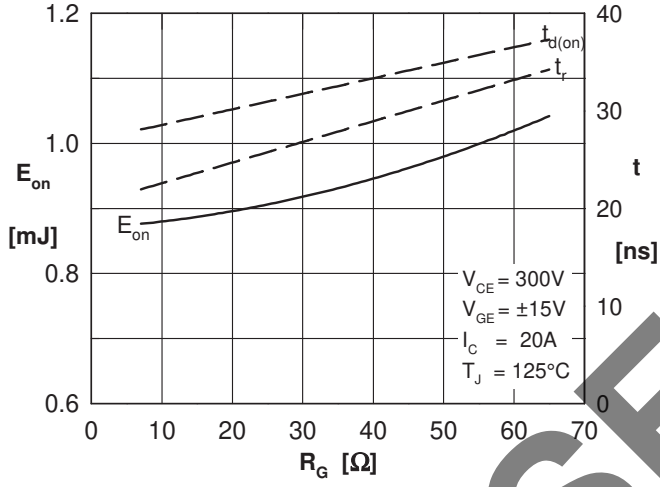


Fig. 9 Typ. turn on energy and switching times versus gate resistor

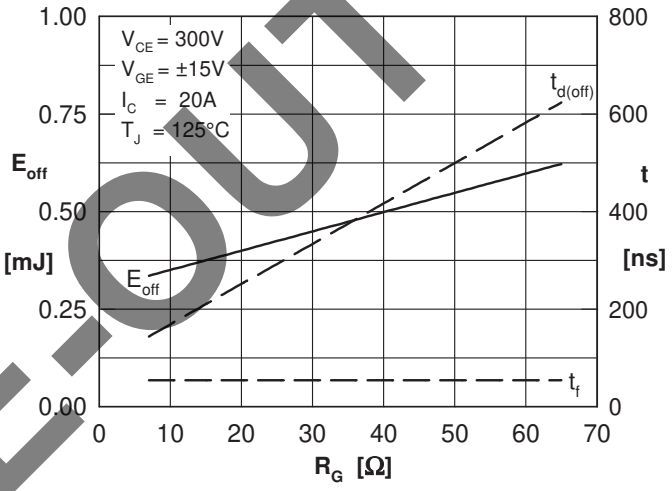


Fig.10 Typ. turn off energy and switching times versus gate resistor

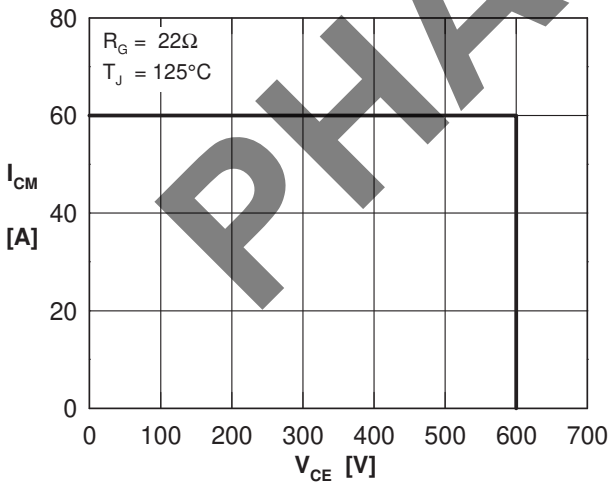


Fig. 5 Typ. turn on gate charge

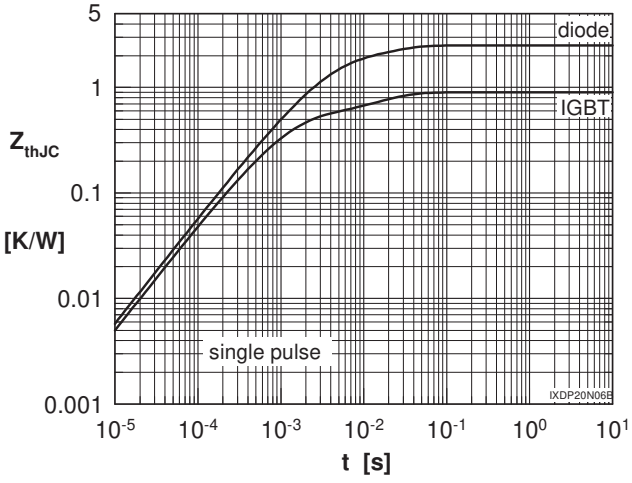


Fig. 6 Typ. turn off characteristics of free wheeling diode