

IGBT with optional Diode

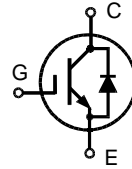
IXDR 35N60 BD1

$$V_{CES} = 600 \text{ V}$$

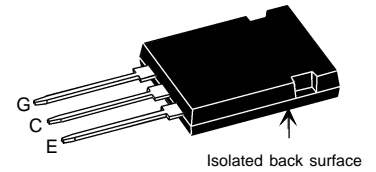
$$I_{C25} = 38 \text{ A}$$

$$V_{CE(sat)typ} = 2.2 \text{ V}$$

High Speed,
Low Saturation Voltage



ISOPLUS 247™



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

* Patent pending

Symbol	Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C}$ to 150°C	600	V
V_{CGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GE} = 20 \text{ k}\Omega$	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	38	A
I_{C90}	$T_C = 90^\circ\text{C}$	24	A
I_{CM}	$T_C = 90^\circ\text{C}$, $t_p = 1 \text{ ms}$	48	A
RBSOA	$V_{GE} = \pm 15 \text{ V}$, $T_J = 125^\circ\text{C}$, $R_G = 10 \Omega$ Clamped inductive load, $L = 30 \mu\text{H}$	$I_{CM} = 110$ $V_{CEK} < V_{CES}$	A
t_{SC} (SCSOA)	$V_{GE} = \pm 15 \text{ V}$, $V_{CE} = 600 \text{ V}$, $T_J = 125^\circ\text{C}$ $R_G = 10 \Omega$, non repetitive	10	μs
P_C	$T_C = 25^\circ\text{C}$	IGBT	125 W
		Diode	50 W
T_J		-55 ... +150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
V_{ISOL}	50/60 Hz RMS; $I_{ISOL} \leq 1 \text{ mA}$	2500	V~
F_C	mounting force with clip	20...120	N
Weight	typical	6	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
- Epoxy meets UL 94V-0
- Isolated and UL registered E153432

Advantages

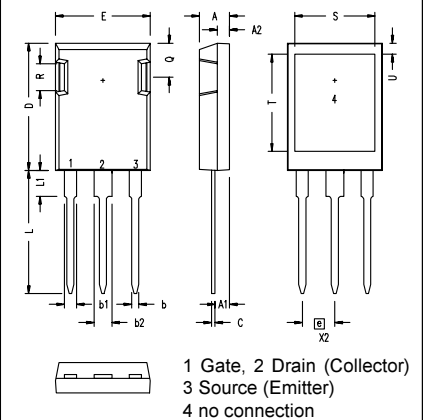
- DCB Isolated mounting tab
- Meets TO-247AD package Outline
- Package for clip or spring mounting
- Space savings
- High power density

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.
$V_{(BR)CES}$	$V_{GE} = 0 \text{ V}$	600		V
$V_{GE(th)}$	$I_C = 0.7 \text{ mA}$, $V_{CE} = V_{GE}$	3		5 V
I_{CES}	$V_{CE} = V_{CES}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$		1	0.1 mA mA
I_{GES}	$V_{CE} = 0 \text{ V}$, $V_{GE} = \pm 20 \text{ V}$			$\pm 500 \text{ nA}$
$V_{CE(sat)}$	$I_C = 35 \text{ A}$, $V_{GE} = 15 \text{ V}$	2.2	2.7	V

Symbol	Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
C_{ies}	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$		1600	pF
C_{oes}			150	pF
C_{res}			90	pF
Q_g	$I_C = 35\text{ A}, V_{GE} = 15\text{ V}, V_{CE} = 480\text{ V}$		140	nC
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = 35\text{ A}, V_{GE} = \pm 15\text{ V},$ $V_{CE} = 300\text{ V}, R_G = 10\ \Omega$		30	ns
t_r			45	ns
$t_{d(off)}$			320	ns
t_f			70	ns
E_{on}			1.6	mJ
E_{off}		0.8	mJ	
R_{thJC}	Package with heatsink compound			1 K/W
R_{thCH}			0.25	K/W

ISOPLUS 247 OUTLINE


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	.190	.205
A ₁	2.29	2.54	.090	.100
A ₂	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b ₁	1.91	2.13	.075	.084
b ₂	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	.244
R	4.32	4.83	.170	.190
S	13.21	13.72	.520	.540
T	15.75	16.26	.620	.640
U	1.65	3.03	.065	.080

Symbol	Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_F	$I_F = 35\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 35\text{ A}, V_{GE} = 0\text{ V}, T_J = 125^\circ\text{C}$		2.1 1.6	V V
I_F	$T_C = 25^\circ\text{C}$ $T_C = 90^\circ\text{C}$			35 A 18 A
I_{RM}	$I_F = 15\text{ A}, -di_F/dt = 400\text{ A}/\mu\text{s}, V_R = 300\text{ V}$		13	A
t_{rr}	$V_{GE} = 0\text{ V}, T_J = 125^\circ\text{C}$		90	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}				2.3 K/W

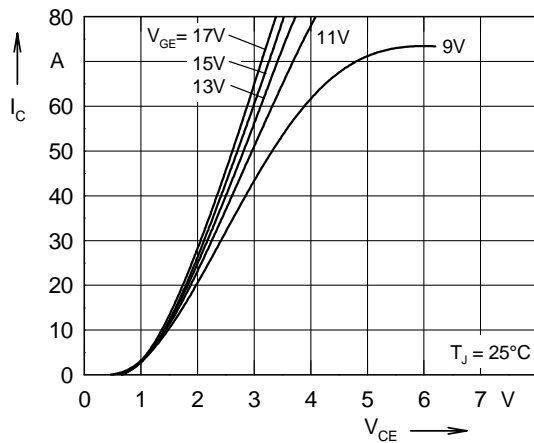


Fig. 1 Typ. output characteristics

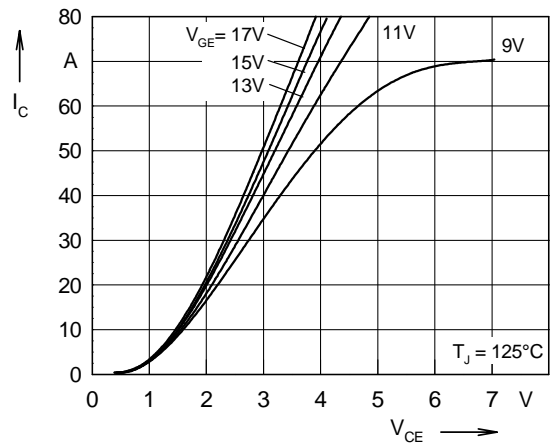


Fig. 2 Typ. output characteristics

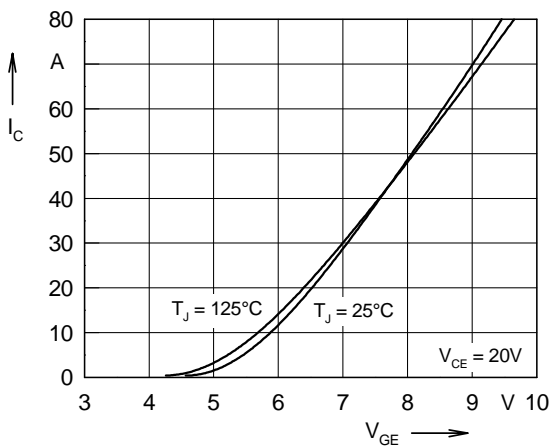


Fig. 3 Typ. transfer characteristics

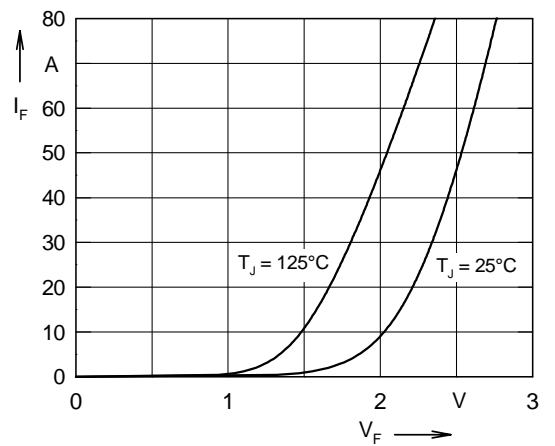


Fig. 4 Typ. forward characteristics of free wheeling diode

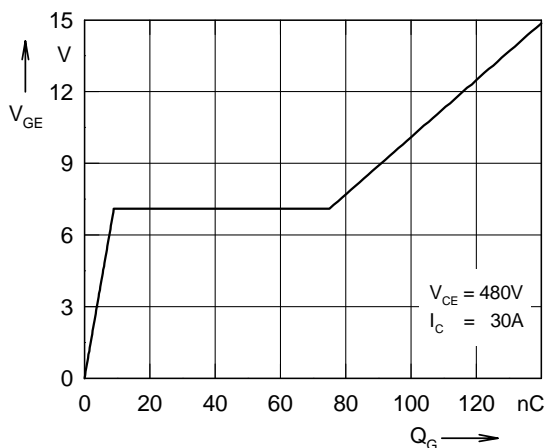


Fig. 5 Typ. turn on gate charge

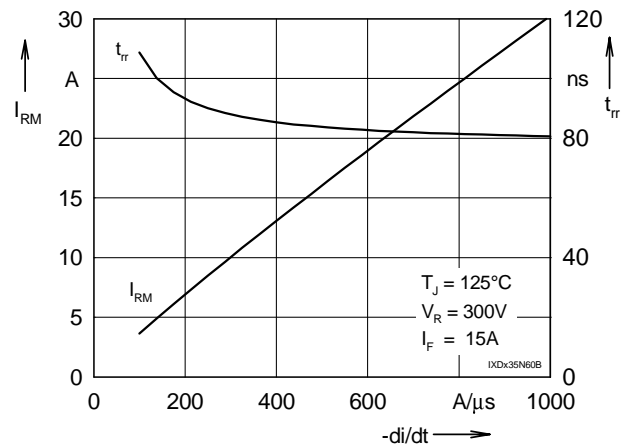


Fig. 6 Typ. turn off characteristics of free wheeling diode

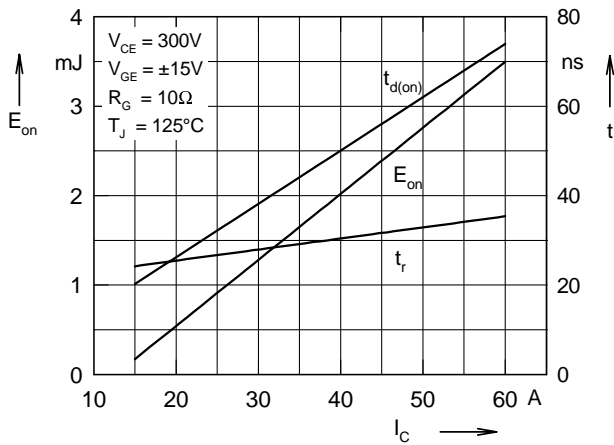


Fig. 7 Typ. turn on energy and switching times versus collector current

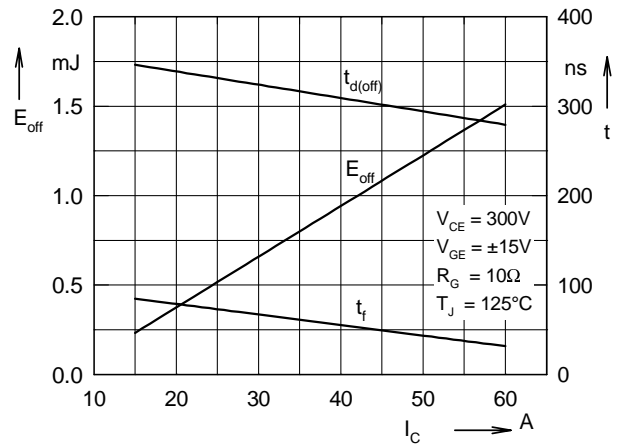


Fig. 8 Typ. turn off energy and switching times versus collector current

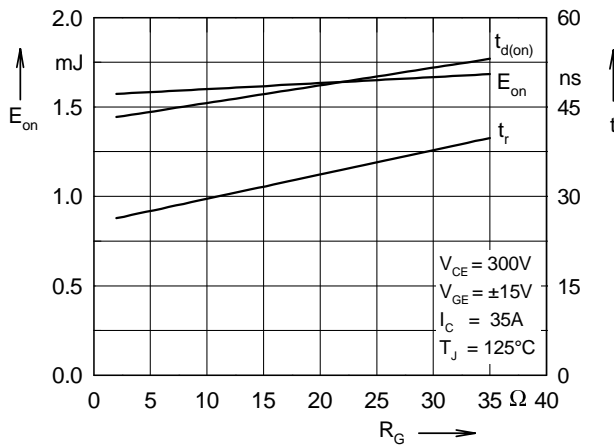


Fig. 9 Typ. turn on energy and switching times versus gate resistor

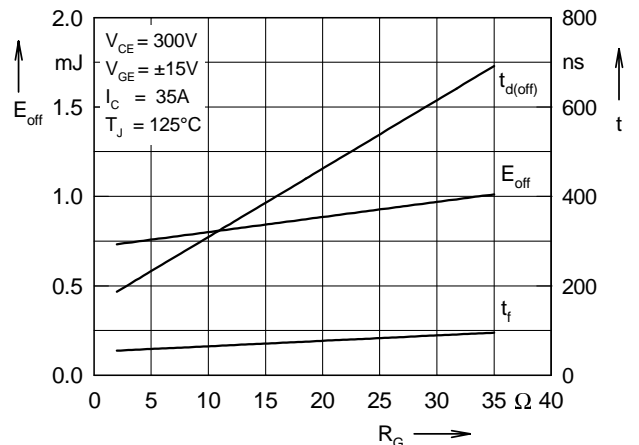


Fig.10 Typ. turn off energy and switching times versus gate resistor

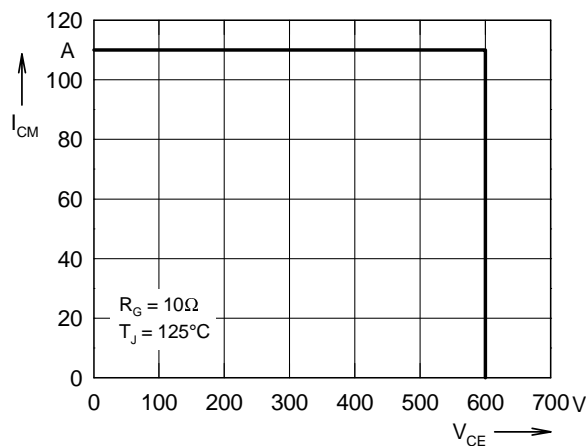


Fig. 11 Reverse biased safe operating area RBSOA

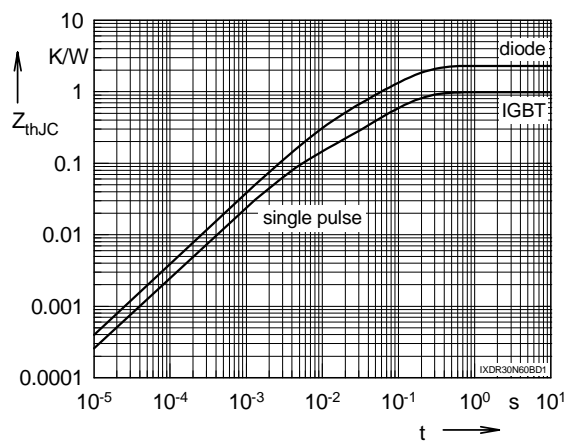


Fig. 12 Typ. transient thermal impedance