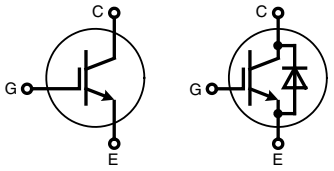
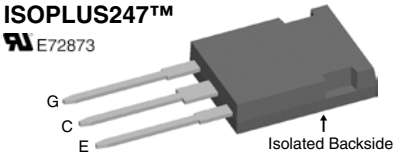
NPT³ IGBT
in ISOPLUS247™

I_{C25} = 36 A
V_{CES} = 1200 V
$V_{CE(sat)typ}$ = 2.4 V



IXER 20N120 IXER 20N120D1



G = Gate C = Collector E = Emitter

IGBT			
Symbol	**Conditions**	Maximum Ratings	
V_{CES}	T_{VJ} = 25°C to 150°C	1200	V
V_{GES}		± 20	V
I_{C25}	T_C = 25°C	29	A
I_{C90}	T_C = 90°C	19	A
I_{CM}	V_{GE} = ±15 V; R_G = 68 Ω; T_{VJ} = 125°C	40	A
V_{CEK}	RBSOA Clamped inductive load; L = 100 µH	V_{CES}	
t_{SC} (SCSOA)	V_{CE} = 900 V; V_{GE} = ±15 V; R_G = 68 Ω; T_{VJ} = 125°C; non-repetitive	10	µs
P_{tot}	T_C = 25°C	130	W

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified)			
		min.	typ.	max.	
$V_{CE(sat)}$	I_C = 20 A; V_{GE} = 15 V; T_{VJ} = 25°C		2.4	2.8	V
	T_{VJ} = 125°C		2.8		V
$V_{GE(th)}$	I_C = 0.6 mA; V_{GE} = V_{CE}	4.5		6.5	V
I_{CES}	V_{CE} = V_{CES}; V_{GE} = 0 V; T_{VJ} = 25°C			0.2	mA
	T_{VJ} = 125°C		0.2		mA
I_{GES}	V_{CE} = 0 V; V_{GE} = ± 20 V			200	nA
$t_{d(on)}$			205		ns
t_r	Inductive load		105		ns
$t_{d(off)}$	L = 100 µH; T_{VJ} = 125°C		320		ns
t_f	V_{CE} = 600 V; I_C = 25 A		175		ns
E_{on}	V_{GE} = ±15 V; R_G = 68 Ω		4.1		mJ
E_{off}			1.5		mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz		1.2		nF
Q_{Gon}	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 20 A		100		nC
R_{thJC}				0.96	K/W
R_{thCH}	with heatsink compound		0.5		K/W

Features

- NPT³ IGBT
  - low saturation voltage
  - positive temperature coefficient for easy paralleling
  - fast switching
  - short tail current for optimized performance in resonant circuits
- HiPerFRED™ diode
  - fast reverse recovery
  - low operating forward voltage
  - low leakage current
- ISOPLUS247™ package
  - isolated back surface
  - low coupling capacity between pins and heatsink
  - high reliability
  - industry standard outline

Applications

- single switches
- choppers with complementary free wheeling diodes
- phaselegs, H bridges, three phase bridges e.g. for
  - power supplies, UPS
  - AC, DC and SR drives
  - induction heating

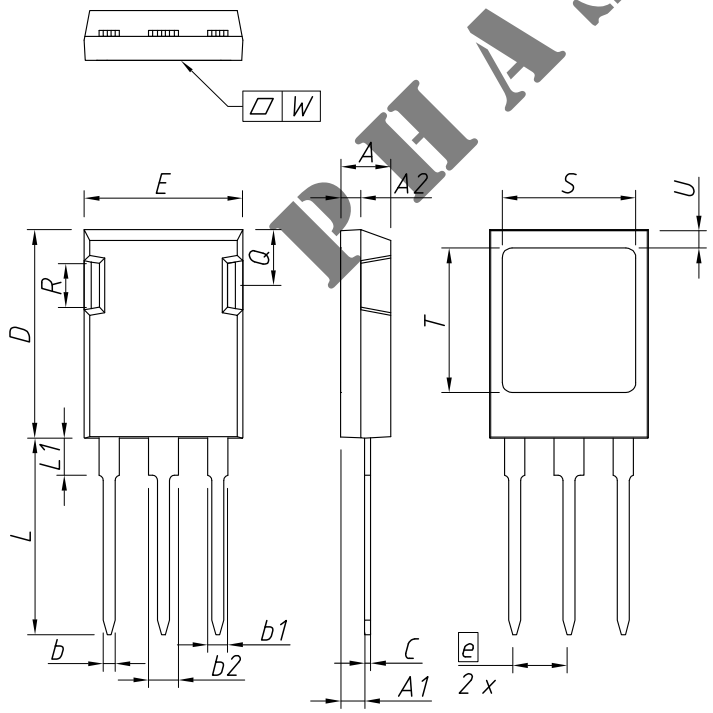
Diode [D1 version only]					
Symbol	**Conditions**			**Maximum Ratings**	
I_{F25}	T_C = 25°C			25	A
I_{F90}	T_C = 90°C			15	A

Symbol	**Conditions**		**Characteristic Values**			
			min.	**typ.**	**max.**	
V_F	I_F = 20 A; V_{GE} = 0 V;	T_{VJ} = 25°C		2.6	3.0	V
		T_{VJ} = 125°C		2.0		V
I_{RM}	V_R = 600 V; L = 100 µH; T_{VJ} = 125°C			16		A
t_{rr}	di_F/dt = -400A/µs; I_F = 15 A; V_{GE} = 0 V			130		ns
R_{thJC}				2.3		K/W
R_{thCH}	with heatsink compound			1.3		

Module			
Symbol	**Conditions**	**Maximum Ratings**	
T_{VJ}		-55...+150	°C
T_{stg}		-55...+150	°C
V_{ISOL}	$I_{ISOL} \leq$ 1 mA; 50/60 Hz	2500	V~
F_C	mounting force with clip	20...120	N

Symbol	**Conditions**	**Characteristic Values**			
		min.	**typ.**	**max.**	
C_P	coupling capacity between shorted pins and mounting tab in the case		30		pF
Weight			6		g

ISOPLUS247™ Outline



DIM.	MILLIMETER		INCHES	
	MIN	MAX	MIN	MAX
A	4,83	5,21	0,190	0,205
A1	2,29	2,54	0,090	0,100
A2	1,91	2,16	0,075	0,085
b	1,14	1,40	0,045	0,055
b1	1,91	2,15	0,075	0,085
b2	2,92	3,20	0,115	0,126
C	0,61	0,83	0,024	0,033
D	20,80	21,34	0,819	0,840
E	15,75	16,13	0,620	0,635
e	5,45 BSC		0,215 BSC	
L	19,81	20,60	0,780	0,811
L1	3,81	4,38	0,150	0,172
Q	5,59	6,20	0,220	0,244
R	4,32	4,85	0,170	0,191
S	13,21	13,72	0,520	0,540
T	15,75	16,26	0,620	0,640
U	1,65	2,03	0,065	0,080
W	-	0,10	-	0,004

Die konvexe Form des Substrates ist typ. < 0.04 mm über der Kunststofffoberfläche der Bauteilunterseite
The convex bow of substrate is typ. < 0.04 mm over plastic surface level of device bottom side

Die Gehäuseabmessungen entsprechen dem Typ TO-247 AD gemäß JEDEC außer Schraubloch und L_{max}.
This drawing will meet all dimensions requiarement of JEDEC outline TO-247 AD except screw hole and except L_{max}.

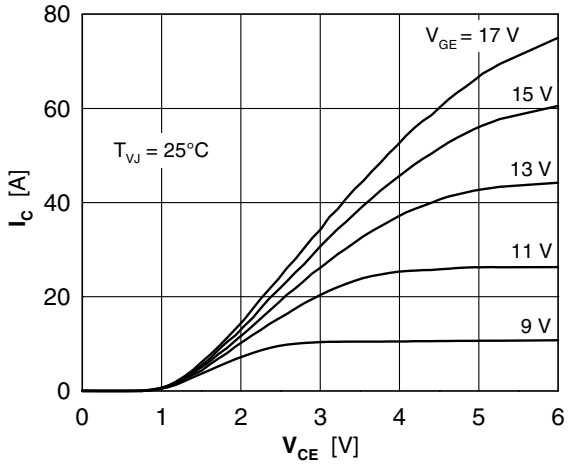


Fig. 1 Typ. output characteristics

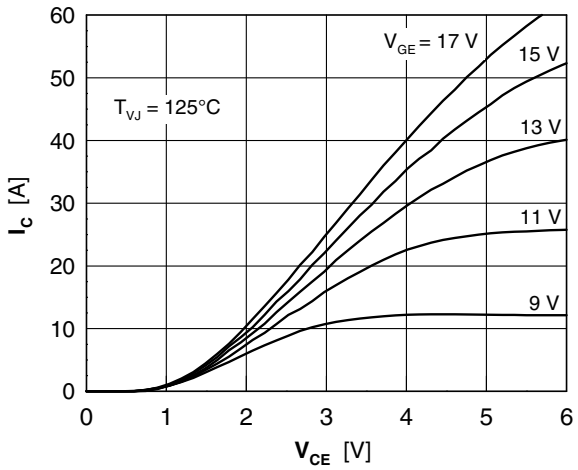


Fig. 2 Typ. output characteristics

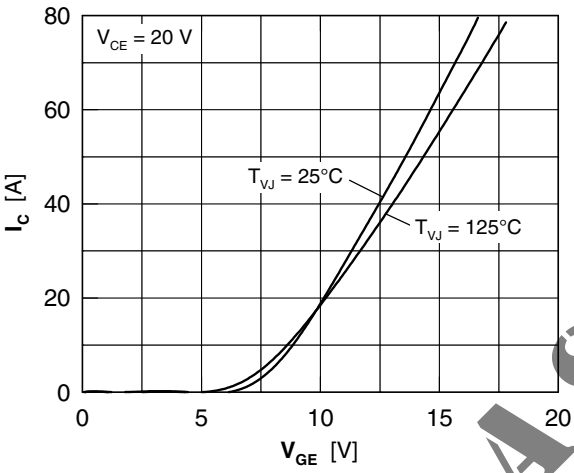


Fig. 3 Typ. transfer characteristics

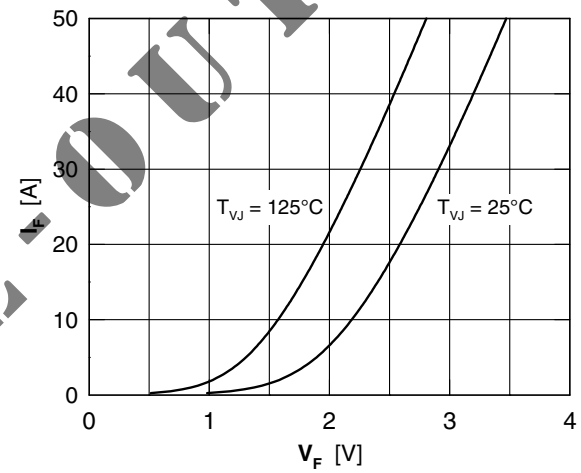


Fig. 4 Typ. forward characteristics of free wheeling diode

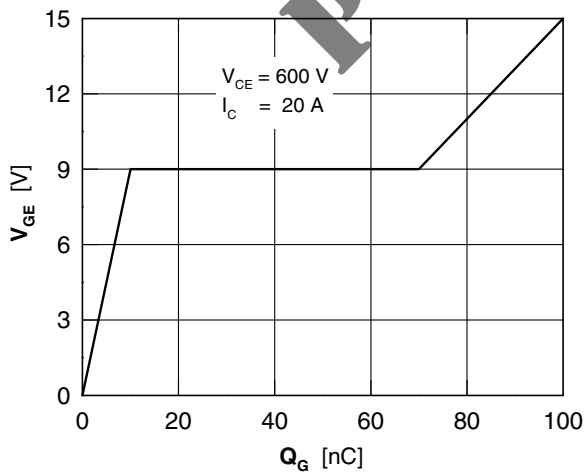


Fig. 5 Typ. turn on gate charge

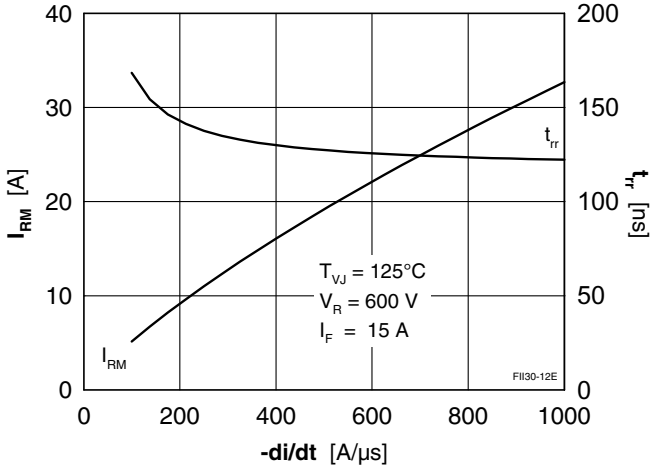


Fig. 6 Typ. turn off characteristics of free wheeling diode

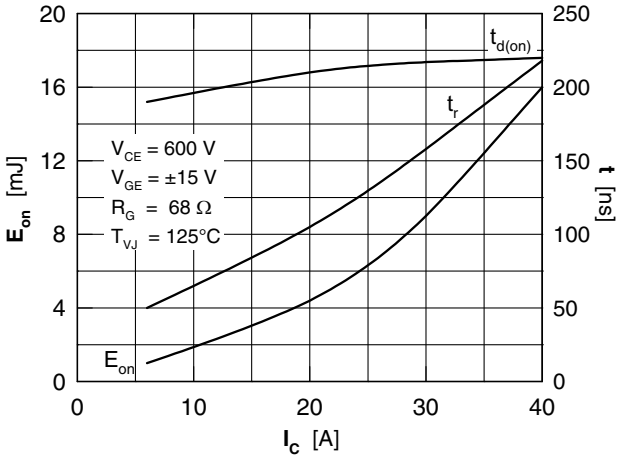


Fig. 7 Typ. turn on energy and switching times versus collector current

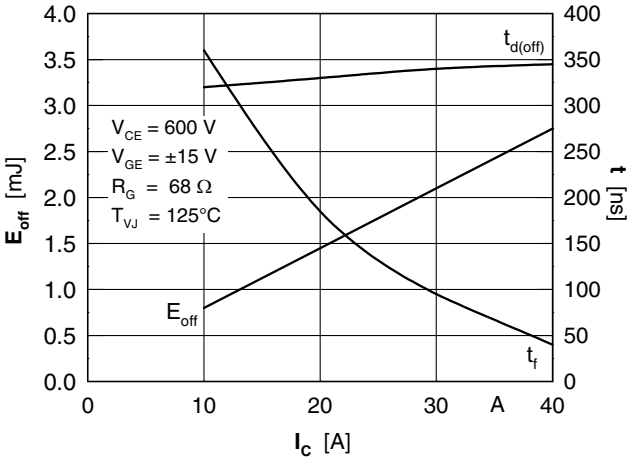


Fig. 8 Typ. turn off energy and switching times versus collector current

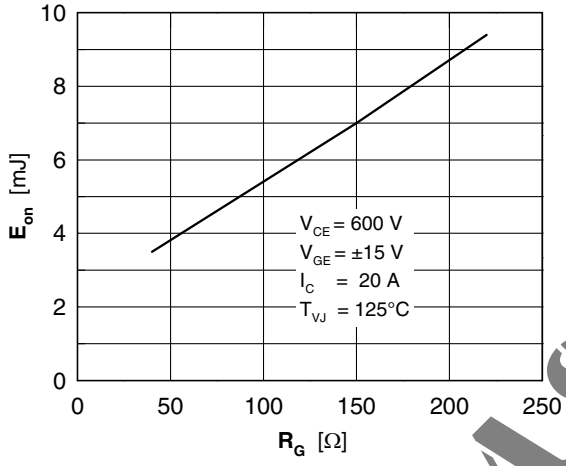


Fig. 9 Typ. turn on energy vs gate resistor

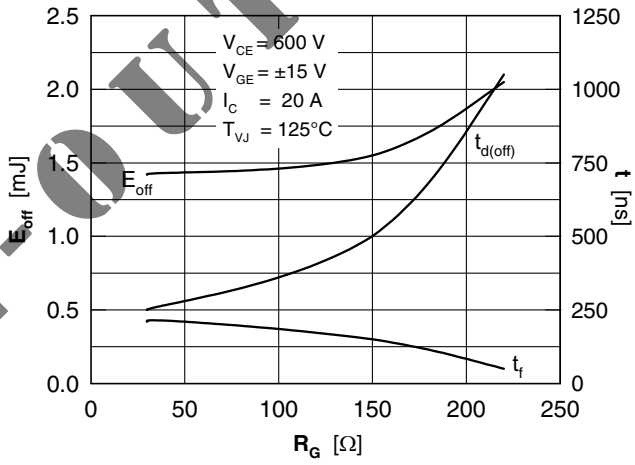


Fig.10 Typ. turn off energy and switching times versus gate resistor

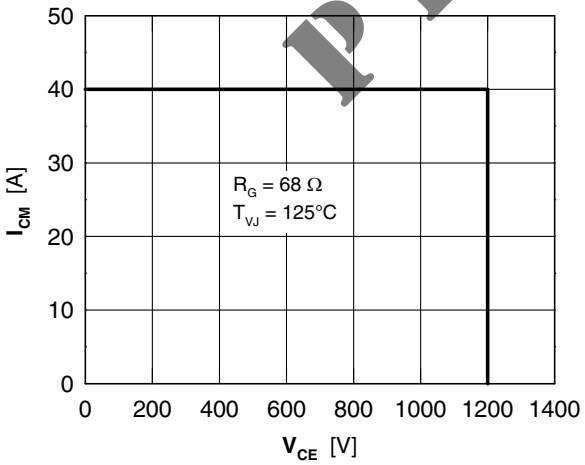
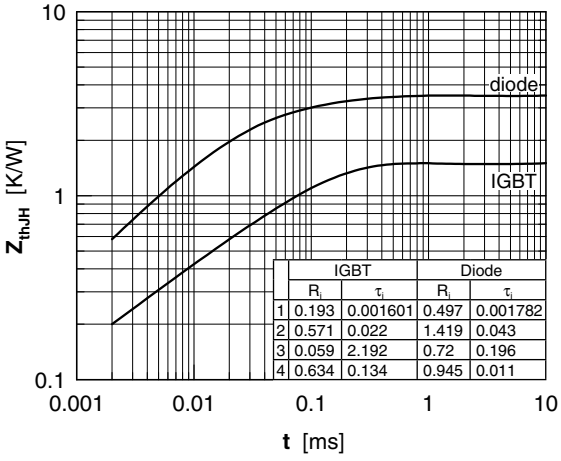


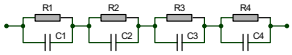
Fig. 11 Reverse biased safe operating area RBSOA



	IGBT		Diode	
	R_i	τ_i	R_i	τ_i
1	0.193	0.001601	0.497	0.001782
2	0.571	0.022	1.419	0.043
3	0.059	2.192	0.72	0.196
4	0.634	0.134	0.945	0.011

Fig. 12 Typ. transient thermal impedance

Thermal Analysis Model



$$Z_{th}(t) = \sum_{i=1}^{n} \left[R_i \cdot \left(1 - \exp\left(-\frac{t}{\tau_i} \right) \right) \right]$$