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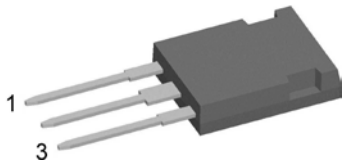
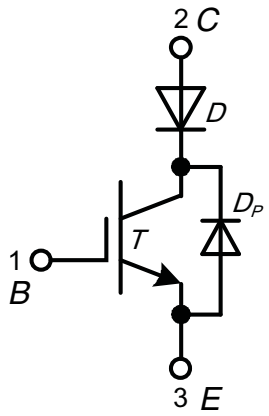
Reverse blocking IGBT

V_{CES} = 1200 V
I_{C25} = 53 A
$V_{CE(sat)\ typ.}$ = 3.0 V

Part number
IRA37IH1200HJ



E72873



Features / Advantages:

- Rugged XPT design (Xtreme light Punch Through) results in:
  - short circuit rated for 10 µsec.
  - very low gate charge
  - low EMI
  - square RBSOA @ 3x Ic
- Thin wafer technology combined with the XPT design results in a competitive low $V_{CE(sat)}$
- Low V_F diode *D*
- Protection diode D_P

Applications:

- AC switch
- Heating systems
- Lamp control (diming)
- Solid state relay

Package: ISOPLUS247

- Isolation Voltage: 3600V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

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IGBT *T*				Ratings			
Symbol	**Definitions**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°C			1200	V
V_{GES}	*max. DC gate voltage*					±20	V
V_{GEM}	*max. transient gate emitter voltage*					±30	V
I_{C25}	*collector current (die level)*		T_C = 25°C			58	A
I_{C90}			T_C = 90°C			37	A
P_{tot}	*total power dissipation (chip)*		T_C = 25°C			195	W
$V_{CE(sat)}$	*collector emitter saturation voltage, (chip)*	I_C = 35 A; V_{GE} = 15 V	T_{VJ} = 25°C		1.8	2.1	V
			T_{VJ} = 125°C		2.1		V
	*component level between pin 2 and 3 **	I_C = 35 A; V_{GE} = 15 V	T_{VJ} = 25°C		3.0		V
			T_{VJ} = 125°C		3.1		V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 1.5 mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	5.4	5.9	6.5	V
I_{CES}	*collector emitter leakage current*	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C			0.1	mA
			T_{VJ} = 125°C		0.1		mA
I_{GES}	*gate emitter leakage current*	V_{GE} = ±20 V; V_{CE} = 0 V				500	µA
$Q_{G(on)}$	*total gate charge*	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 35 A			106		nC
	External diode DSEP 30-12 - diagramm see Fig. 1						
$t_{d(on)}$	*turn-on delay time*	V_{CE} = 600 V; I_C = 35 A V_{GE} = ±15 V; R_G = 27 Ω	T_{VJ} = 125°C		tbd		ns
t_r	*current rise time*				tbd		ns
$t_{d(off)}$	*turn-off delay time*				tbd		ns
t_f	*current fall time*				tbd		ns
E_{on}	*turn-on energy per pulse*				tbd		mJ
E_{off}	*turn-off energy per pulse*				tbd		mJ
	Internal diode - diagramm see Fig. 2						
$t_{d(on)}$	*turn-on delay time*	V_{CE} = 600 V; I_C = 35 A V_{GE} = ±15 V; R_G = 27 Ω	T_{VJ} = 125°C		tbd		ns
t_r	*current rise time*				tbd		ns
$t_{d(off)}$	*turn-off delay time*				tbd		ns
t_f	*current fall time*				tbd		ns
E_{on}	*turn-on energy per pulse*				tbd		mJ
E_{off}	*turn-off energy per pulse*				tbd		mJ
$E_{rec\ int}$	*reverse recovery losses internal*				tbd		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 27 Ω	T_{VJ} = 125°C				
I_{CM}		V_{CEmax} = 1200 V				105	A
SCSOA	*short circuit safe operating area*	V_{CEmax} = 1200 V					
t_{SC}	*short circuit duration*	V_{CE} = 900 V; V_{GE} = ±15 V;	T_{VJ} = 125°C			10	µs
I_{SC}	*short circuit current*	R_G = 27 Ω; non-repetitive				140	A
R_{thJC}	*thermal resistance junction to case*					0.64	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.22		K/W

* $V_{CE(sat)}$ component = $V_{CE(sat)}$ chip + V_F chip + 2·$R_{pin\text{-}chip}$ · I_C

Fig. 1 turn-on/turn-off with external diode (DSEP 30-12)

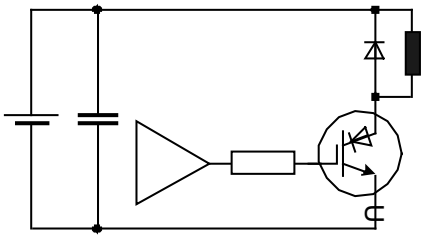
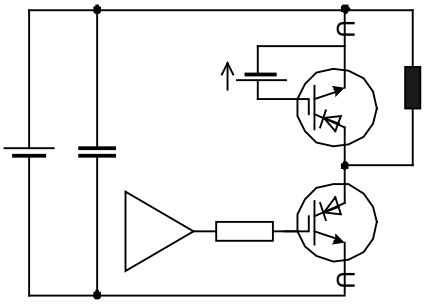


Fig. 2 turn-on/-off with internal diode



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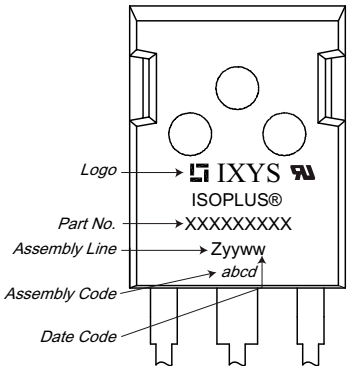
Diode *D*							
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			1200	V
I_{F25}	*forward current (chip)*		T_C = 25°C			53	A
I_{F80}			T_C = 80°C			34	A
V_F	*forward voltage (chip)*	I_F = 35 A	T_{VJ} = 25°C			1.2	V
			T_{VJ} = 125°C			1.1	V
I_R	*reverse current*	$V_R = V_{RRM}$	T_{VJ} = 25°C			10	µA
			T_{VJ} = 125°C		50	100	µA
Q_{rr}	*reverse recovery charge*	V_R = 600 V	T_{VJ} = 125°C		tbd		µC
I_{RM}	*max. reverse recovery current*	-di_F/dt = 400 A/µs			tbd		A
t_{rr}	*reverse recovery time*	I_F = 20 A; V_{GE} = 0 V			tbd		ns
E_{rec}	*reverse recovery energy*				tbd		mJ
R_{thJC}	*thermal resistance junction to case*					1.7	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.57		K/W

Package ISOPLUS247				Ratings			
Symbol	**Definitions**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	*RMS current*	per terminal				70	A
T_{stg}	*storage temperature*			-55		150	°C
T_{VJ}	*virtual junction temperature*			-40		150	°C
Weight					6		g
F_C	*mounting force with clip*			20		120	N
$d_{Spp/App}$	*creepage distance on surface / striking distance through air*		*terminal to terminal*	2.7			mm
$d_{Spb/Apb}$			*terminal to backside*	4.1			mm
V_{ISOL}	*isolation voltage*	t = 1 second	50/60 Hz, RMS, $I_{ISOL} \leq$ 1 mA	3600			V
		t = 1 minute		3000			V
$R_{pin-chip}$	*resistance pin to chip at 125°C*	$V_{CE(sat)}$ comp. = $V_{CE(sat)}$ chip + V_F chip + 2·$R_{pin-chip}$ · I_C				1.2	mΩ

Product Marking

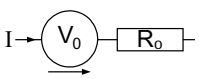


Part number

I = IGBT
R = Reverse blocking IGBT
A = Generation 1
37 = Current Rating [A]
IH = Copack with series connected diode
1200 = Reverse Voltage [V]
HJ = ISOPLUS247 (3)

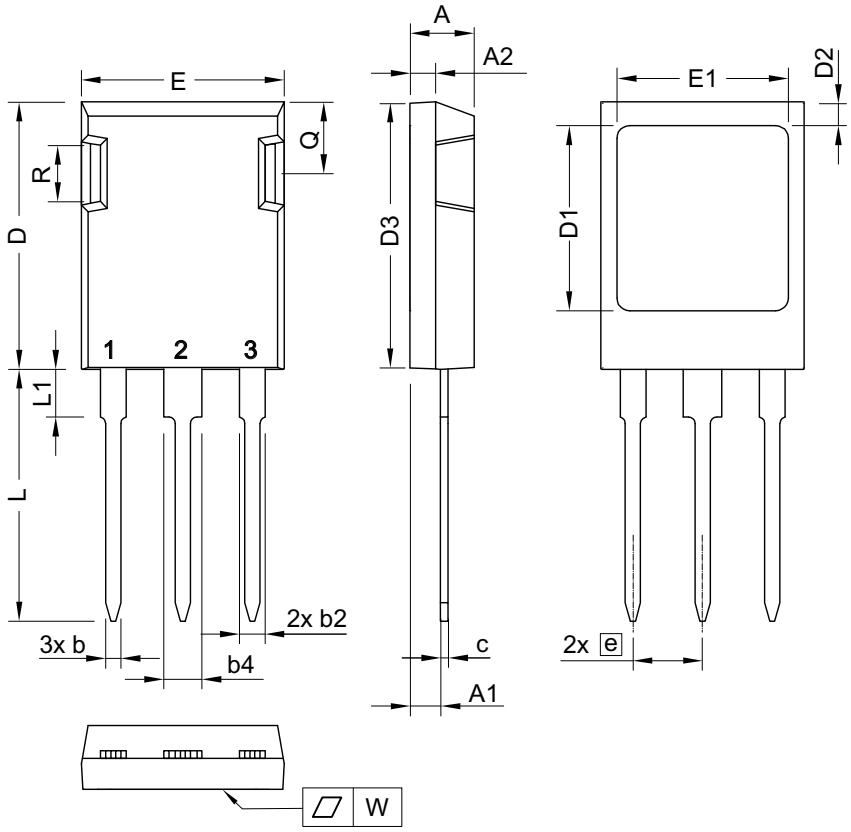
Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	IRA37IH1200HJ	IRA37IH1200HJ	Tube	30	515175

Equivalent Circuits for Simulation **on die level*



		IGBT T_{VJ} = 150°C	Diode T_{VJ} = 150°C	
$V_{0\,max}$	*threshold voltage*	1.1	0.86	V
$R_{0\,max}$	*slope resistance **	39	6.7	mΩ

Outlines SimBus F



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
b2	1.91	2.20	0.075	0.087
b4	2.92	3.24	0.115	0.128
c	0.61	0.83	0.024	0.033
D	20.80	21.34	0.819	0.840
D1	15.75	16.26	0.620	0.640
D2	1.65	2.15	0.065	0.085
D3	20.30	20.70	0.799	0.815
E	15.75	16.13	0.620	0.635
E1	13.21	13.72	0.520	0.540
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	4.25	5.50	0.167	0.217
W	-	0.10	-	0.004

Die konvexe Form des Substrates ist typ. < 0.04 mm über der Kunststoffoberfläche 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 $L_{max.}$