

ITF48IF1200HR

Trench IGBT

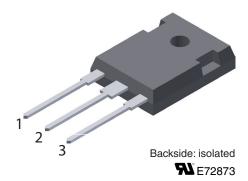
Copack

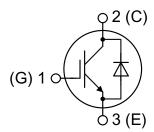
= 1200 V

72 A

 $V_{CE(sat)} = 2.05 V$

Part number ITF48IF1200HR





Features / Advantages:

- Easy paralleling due to the positive temperature coefficient of the on-state voltage
- Fast Trench IGBT
 - very low V_{CE(sat)}
- short circuit rated for 10 µsec.
- very low gate charge
- low EMI
- square RBSOA @ 3x I_c
- Sonic[™] diode
 - fast and soft reverse recovery
 - low operating forward voltage

Applications:

- Solar inverter
- Medical equipment
- Uninerruptible power supply
- · Air-conditioning system
- Welding equipment
- Switched-mode and resonant-mode power supplies
- · Inductive heating, cookers
- Pumps, Fans

Package: ISO247

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

Terms & Conditions of usage

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact the sales office, which is responsible for you. Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you. Should you intend to use the product in aviation, in health or live endangering or life support applications, please notify. For any such application we urgently recommend

to perform joint risk and quality assessments:

the conclusion of quality agreements;
 to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

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

Data according of IEC 60747 and per semiconductor unless otherwise specified

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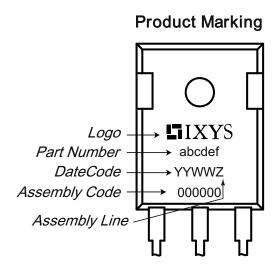


IGBT				ļ	Rating	S	
Symbol	Definitions	Conditions		min.	typ.	max.	
V _{CE}	collector emitter voltage		$T_{VJ} = 25^{\circ}C$			1200	٧
V _{GES}	max. DC gate voltage		$T_{VJ} = 25^{\circ}C$			±20	V
I _{C25}	collector current		$T_C = 25^{\circ}C$			72	Α
I _{C80}			$T_C = 80^{\circ}C$			56	Α
I _{C100}			$T_C = 100^{\circ}C$			48	Α
$\mathbf{P}_{\mathrm{tot}}$	total power dissipation		$T_C = 25^{\circ}C$			390	W
$\mathbf{V}_{CE(sat)}$	collector emitter saturation voltage	$I_{C} = 40 \text{ A}; V_{GE} = 15 \text{ V}$	$T_{VJ} = 25^{\circ}C$ $T_{VJ} = 175^{\circ}C$		2.05 2.70	2.40	V V
V _{GE(th)}	gate emitter threshold voltage	$I_C = 1.5 \text{ mA}; V_{GE} = V_{CE}$	$T_{VJ} = 25^{\circ}C$	5.3	5.8	6.3	V
I _{CES}	collector emitter leakage current	$V_{CE} = V_{CES}$; $V_{GE} = 0 \text{ V}$	$T_{VJ} = 25^{\circ}C$			0.25	mA
			$T_{VJ} = 175^{\circ}C$		1.5		mA
I _{GES}	gate emitter leakage current	$V_{GE} = \pm 20 \text{ V}$				600	nA
\mathbf{Q}_{Gon}	total gate charge	$V_{CE} = 600 \text{ V}; V_{GE} = 0/15 \text{ V}; I_{C} = 40 \text{ A}$			175		nC
t _{d(on)}	turn-on delay time				26		ns
t _r	current rise time				26		ns
$\mathbf{t}_{d(off)}$	turn-off delay time	inductive load			350		ns
t_f	current fall time	$V_{CE} = 600 \text{ V}; I_{C} = 40 \text{ A}$	$T_{VJ} = 150^{\circ}C$		110		ns
E _{on}	turn-on energy per pulse	$V_{GE} = 0/15 \text{ V}; R_{G} = 12 \Omega$			3.0		mJ
E _{off}	turn-off energy per pulse				2.4		mJ
$E_{rec(off)}$	reverse recovery losses at turn- off	J			1.1		mJ
RBSOA	reverse bias safe operating area	$V_{GE} = 15 \text{ V};$ $V_{CEmax} = 1200 \text{ V}$	$T_{VJ} \leq 175^{\circ}C$			160	А
I _{CM}	all and almost and a second an area	CEmax = 1200 V				100	
SCSOA	short circuit safe operation area	$V_{CE} = 600 \text{ V}; V_{GE} = \pm 15 \text{ V}$	$T_{V,J} \leq 175^{\circ}C$			40	
t _{sc}	short circuit duration	$R_{G} = 12 \Omega$; none repetitive	V3 <u> </u>			10	μs
I _{SC}	short circuit current	<u> </u>			140		A
R _{thJC}	thermal resistance junction to case					0.38	K/W
R _{thJH}	thermal resistance junction to heatsing	with heat transfer paste (IXYS test	setup)		0.6		K/W
Diode							
V _{RRM}	max. repetitive reverse voltage		$T_C = 25^{\circ}C$			1200	V
I _{F25}			$T_C = 25^{\circ}C$			67	A
I _{F80}	forward current		$T_{\rm C} = 80^{\circ}{\rm C}$			50	Α
I _{F100}			$T_C = 100^{\circ}C$			43	Α
V _F	forward voltage	I _F = 30 A	$T_{VJ} = 25^{\circ}C$			2.20	V
V F	iorward vonage	I _F = 30 A	$T_{VJ} = 25^{\circ}C$		1.95	2.20	V
Q _{rr}	reverse recovery charge) v - 222 v			3.8		μC
I _{RM}	max. reverse recovery current	$V_{R} = 600 \text{ V}$			55		A
t _{rr}	reverse recovery time	$-di_F/dt = -1800 \text{ A/}\mu\text{s}$ $I_F = 40 \text{ A}; V_{GE} = 0 \text{ V}$	$T_{VJ} = 150^{\circ}C$		250		ns
E _{rec}	reverse recovery losses	$I_F = 40 \text{ A}; V_{GE} = 0 \text{ V}$			1.1		mJ
R _{thJC}	thermal resistance junction to case					0.7	K/W
	thermal resistance junction to heatsin	nk with heat transfer paste (IXYS test s	setun)		1.1		K/W
R _{thJH}	anormai resistance junction to neatsir	with fleat transier paste (IV 19 fest	setup)		1.1		11/1/





Package ISO247			Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.	
I _{RMS}	RMS current	per terminal			50	А
T _{stg}	storage temperature		-40		150	°C
T _{op}	operation temperature		-40		150	°C
T _{VJ}	virtual junction temperature		-40		175	°C
Weight				6		g
M _D F _C	mounting torque mounting force with clip		0.8 40		1.2 120	Nm N
d _{Spp/App}	creepage distance on surface / striking distance through air	terminal to terminal terminal to backside	2.7 4.1			mm mm
V _{ISOL}	isolation voltage	$t = 1$ second $t = 1$ minute 50/60 Hz; RMS; $I_{ISOL} < 1$ mA		3600 3000		V



Part number

I = IGBT

T = IGBT Trench

F = Fast

48 = Current Rating [A]

IF = Copack 1200 = Reverse Voltage [V]

HR = ISO247 (3)

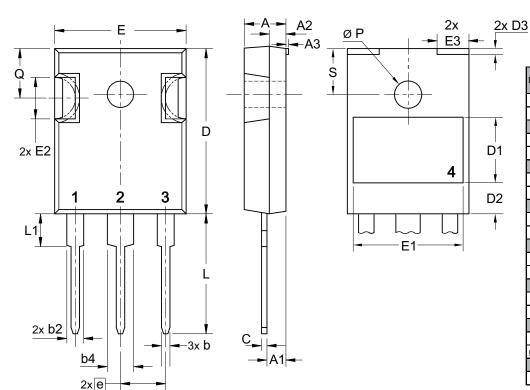
Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	ITF48IF1200HR	ITF48IF1200HR	Tube	30	517181

Equivale	ent Circuits for Simulation	*on die level		$T_{VJ} = \frac{1}{2}$	175°C
$I \rightarrow V_0$	-R₀-		IGBT	Diode	
$V_{0 max}$	threshold voltage		0.88	1.2	V
$R_{0 \text{ max}}$	slope resistance *		58	30	$\text{m}\Omega$

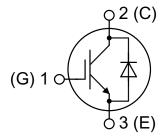




Outlines ISO247



Dim.	Millimeter		Inches		
DIIII.	min	max	min	max	
Α	4.70	5.30	0.185	0.209	
A1	2.21	2.59	0.087	0.102	
A2	1.50	2.49	0.059	0.098	
А3	typ.	0.05	typ.	0.002	
b	0.99	1.40	0.039	0.055	
b2	1.65	2.39	0.065	0.094	
b4	2.59	3.43	0.102	0.135	
С	0.38	0.89	0.015	0.035	
D	20.79	21.45	0.819	0.844	
D1	typ.	8.90	typ. 0.350		
D2	typ. 2.90		typ. 0.114		
D3	typ. 1.00		typ. 0.039		
Е	15.49	16.24	0.610	0.639	
E1	typ.	13.45	typ. 0.530		
E2	4.31	5.48	0.170	0.216	
E3	typ.	4.00	typ. 0.157		
е	5.46 BSC		0.215 BSC		
L	19.80	20.30	0.780	0.799	
L1	-	4.49	- 0.17		
ØΡ	3.55	3.65	0.140 0.144		
Q	5.38	6.19	0.212 0.244		
S	6.14	BSC	0.242 BSC		





IGBT

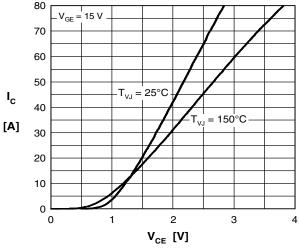
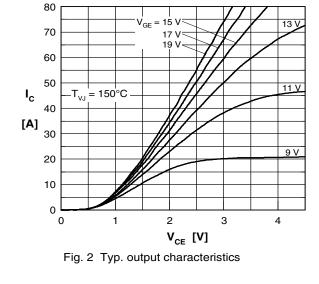


Fig. 1 Typ. output characteristics



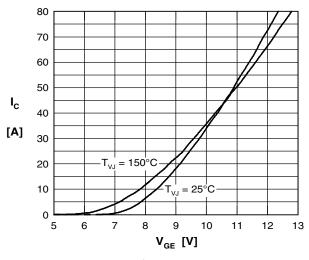


Fig. 3 Typ. transfer characteristics

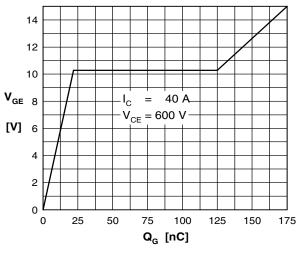


Fig. 4 Typ. turn-on gate charge

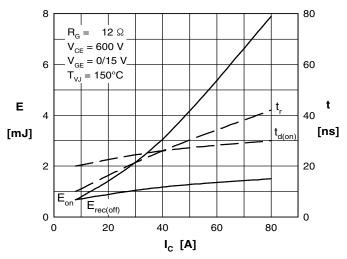


Fig. 5 Typ. turn-on energy & switching times versus collector current

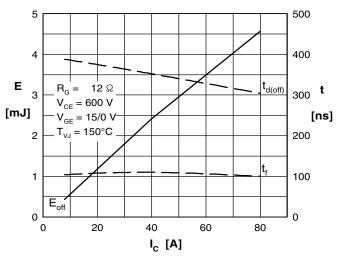


Fig. 6 Typ. turn-off energy & switching times versus collector current

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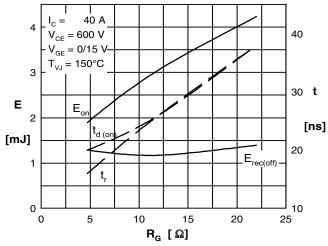


Fig. 7 Typ. turn-on energy and switching times versus gate resistor

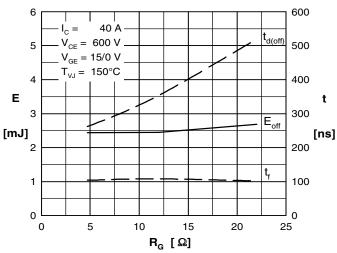


Fig. 8 Typ. turn-off energy and switching times versus gate resistor

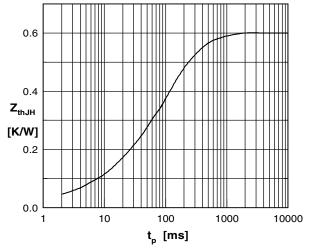


Fig. 9 Typ. transient thermal impedance

DIODE

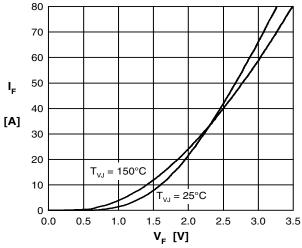


Fig. 10 Typ. forward characteristics

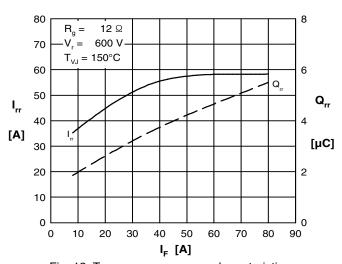


Fig. 12 Typ. reverse recovery characteristics

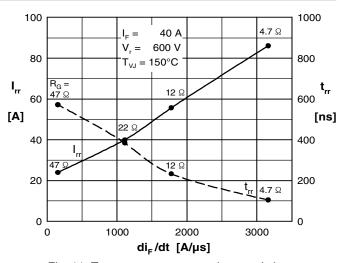


Fig. 11 Typ. reverse recovery characteristics

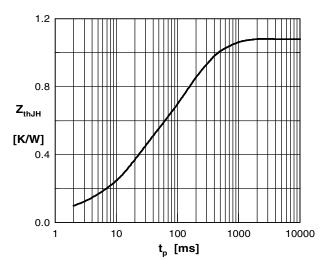


Fig. 13 Typ. transient thermal impedance

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 APT40GP60B2DQ2G
 APT40GP90B2DQ2G
 APT50GN120B2G
 APT50GT60BRG

 APT64GA90B2D30
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 NGTB30N60L2WG
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 IGP30N60H3XKSA1
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 STGFW30V60DF
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 APT25GR120S

 APT30GN60BDQ2G
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 APT30GS60BRDQ2G
 APT30N60BC6
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