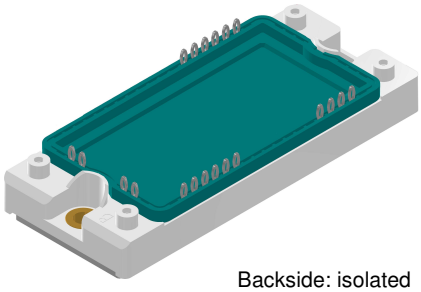
IGBT Trench Module

V_{CES} = 1700 V
I_{C25} = 400 A
$V_{CE(sat)}$ = 2 V

Boost/Brake Chopper + free wheeling Diode + NTC

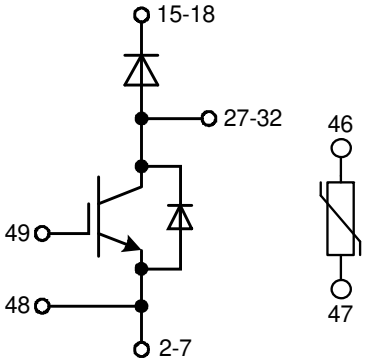
Part number

MITA300RF1700PTED



Backside: isolated

E72873



Features / Advantages:

- Brake with Infineon IGBT³

Applications:

- AC motor drives
- Solar inverter
- Medical equipment
- Uninterruptible power supply
- Air-conditioning systems
- Welding equipment
- Switched-mode and resonant-mode power supplies
- Inductive heating, cookers
- Pumps, Fans

Package: E2-Pack

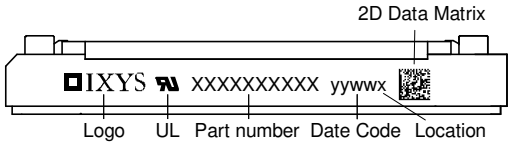
- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- PressFit-Pins for PCB mounting
- Height: 17 mm
- Base plate: Copper internally DCB isolated
- Advanced power cycling
- Phase Change Material available

Free Wheeling Diode FWD				Ratings			
Symbol	**Definition**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
V_{RSM}	*max. non-repetitive reverse blocking voltage*		T_{VJ} = 25°C			1700	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			1700	V
I_R	*reverse current, drain current*	V_R = 1700 V	T_{VJ} = 25°C			100	µA
	* not applicable, see Ices at IGBT	V_R = 1700 V	T_{VJ} = 125°C			0.8	mA
V_F	*forward voltage drop*	I_F = 40 A	T_{VJ} = 25°C			2.20	V
		I_F = 80 A				2.75	V
		I_F = 40 A	T_{VJ} = 125°C			2.30	V
		I_F = 80 A				3.15	V
I_{FAV}	*average forward current*	T_C = 80°C	T_{VJ} = 150°C			40	A
		rectangular d = 0.5					
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 150°C			1.35	V
r_F	*slope resistance* }					23	mΩ
R_{thJC}	*thermal resistance junction to case*					1	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.30		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			125	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine; V_R = 0 V	T_{VJ} = 45°C			300	A
C_J	*junction capacitance*	V_R = 900 V f = 1 MHz	T_{VJ} = 25°C		14		pF

Boost IGBT				Ratings			
Symbol	**Definition**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°C			1700	V
V_{GES}	*max. DC gate voltage*					±20	V
V_{GEM}	*max. transient gate emitter voltage*					±30	V
I_{C25}	*collector current*		T_C = 25°C			400	A
I_{C80}			T_C = 80°C			280	A
P_{tot}	*total power dissipation*		T_C = 25°C			1390	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 300 A; V_{GE} = 15 V	T_{VJ} = 25°C		2	2.45	V
			T_{VJ} = 125°C		2.4		V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 12 mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	5.2	5.8	6.4	V
I_{CES}	*collector emitter leakage current*	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C			1.2	mA
			T_{VJ} = 125°C		1.4		mA
I_{GES}	*gate emitter leakage current*	V_{GE} = ±20 V				800	nA
$Q_{G(on)}$	*total gate charge*	V_{CE} = 900 V; V_{GE} = 15 V; I_C = 300 A			3400		nC
$t_{d(on)}$	*turn-on delay time*	inductive load V_{CE} = 900 V; I_C = 300 A V_{GE} = ±15 V; R_G = 4.7 Ω	T_{VJ} = 125°C		340		ns
t_r	*current rise time*				90		ns
$t_{d(off)}$	*turn-off delay time*				800		ns
t_f	*current fall time*				400		ns
E_{on}	*turn-on energy per pulse*				100		mJ
E_{off}	*turn-off energy per pulse*				75		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 4.7 Ω	T_{VJ} = 125°C				
I_{CM}		V_{CEmax} = 1700 V				600	A
SCSOA	*short circuit safe operating area*	V_{CEmax} = 1700 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 = 4.7 Ω; non-repetitive			1600		A
R_{thJC}	*thermal resistance junction to case*					0.09	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.03		K/W

Boost Diode BD							
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			1700	V
I_{F25}	*forward current*		T_C = 25°C			400	A
I_{F80}			T_C = 80°C			300	A
V_F	*forward voltage*	I_F = 300 A	T_{VJ} = 25°C			2.20	V
			T_{VJ} = 125°C		2.00		V
I_R	*reverse current*	V_R = V_{RRM}	T_{VJ} = 25°C			1.2	mA
			T_{VJ} = 125°C		1.2		mA
Q_{rr}	*reverse recovery charge*	V_R = 900 V $-di_F/dt$ = 3000 A/µs I_F = 300 A; V_{GE} = 0 V	T_{VJ} = 125°C		80		µC
I_{RM}	*max. reverse recovery current*				300		A
t_{rr}	*reverse recovery time*				950		ns
E_{rec}	*reverse recovery energy*				40		mJ
R_{thJC}	*thermal resistance junction to case*					0.14	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.05		K/W

Package E2-Pack				Ratings			
Symbol	**Definition**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	*RMS current*	per terminal				30	A
T_{VJ}	*virtual junction temperature*			-40		150	°C
T_{op}	*operation temperature*			-40		125	°C
T_{stg}	*storage temperature*			-40		125	°C
Weight					176		g
M_D	*mounting torque*			3		6	Nm
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*		*terminal to terminal*	6.0			mm
$d_{Spb/Apb}$			*terminal to backside*	12.0			mm
V_{ISOL}	*isolation voltage*	t = 1 second	50/60 Hz, RMS; I_{ISOL} ≤ 1 mA	3600			V
		t = 1 minute		3000			V
$R_{pin-chip}$	*resistance pin to chip*	$V = V_{CEsat} + 2 \cdot R \cdot I_C$ resp. $V = V_F + 2 \cdot R \cdot I_F$			2.5		mΩ

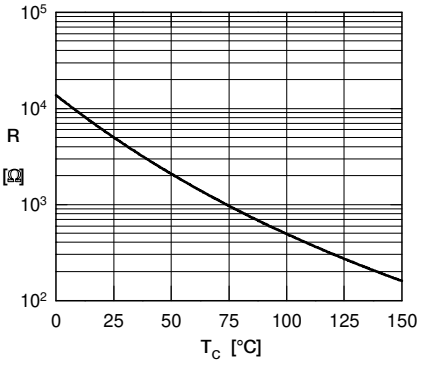


Part description

M = Module
I = IGBT
T = IGBT Trench
A = Gen 3 / std
300 = Current Rating [A]
RF = Boost/Brake Chopper + free wheeling Diode
1700 = Reverse Voltage [V]
PT = PressFit-Pin, Thermistor
ED = E2-Pack
- = Hyphen
PC = Phase Change Material

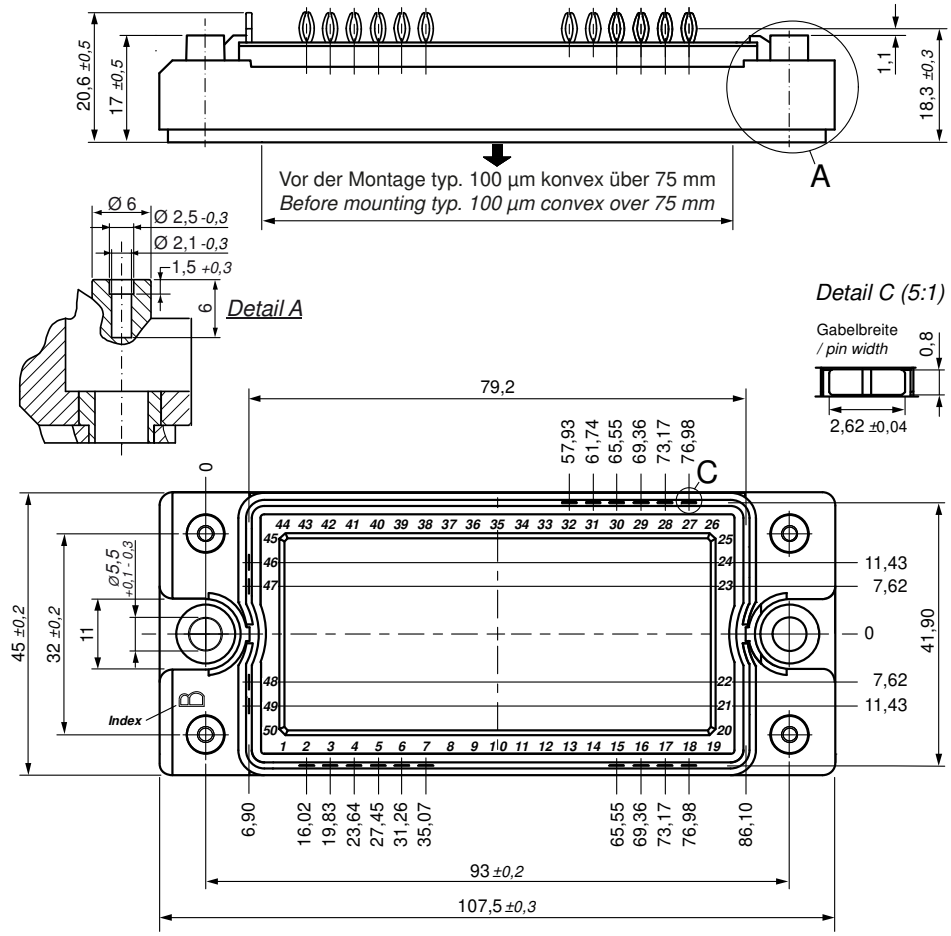
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MITA300RF1700PTED	MITA300RF1700PTED	Blister	28	516670
Alternative	MITA300RF1700PTED-PC	MITA300RF1700PTED	Blister	28	515402

Temperature Sensor NTC						
Symbol	**Definition**	**Conditions**	**min.**	**typ.**	**max.**	**Unit**
R_{25}	*resistance*	T_{VJ} = 25°	4.85	5	5.15	kΩ
$B_{25/50}$	*temperature coefficient*			3375		K



Typ. NTC resistance vs. temperature

Outlines E2-Pack

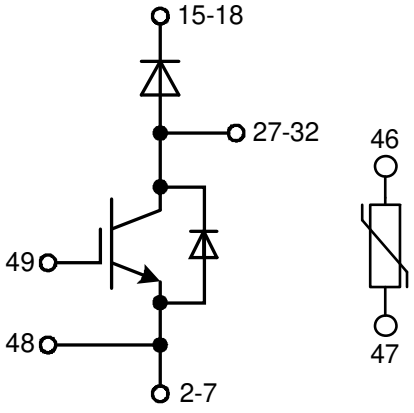


Bemerkung / ***Note:***

- Nicht tolerierte Maße nach / *Measure without tolerances according DIN ISO 2768-T1-m*
- PCB-Lochmuster / *PCB hole pattern:* **see pin position**
- Toleranz Pin-Position und PCB-Lochmuster / *Tolerance of pin position and PCB hole pattern:* ⌖ **0.1**
- Bohrlochdurchmesser / *Diameter of drill:* **Ø 2.35 mm**
- Endlochdurchmesser / *Diameter of plated holes:* **Ø 2.14 - 2.29 mm** (Cu thickness in via typ. 50 µm)
- Beschichtung / *Plating:* **chem. Sn max. 15 µm**
- Einpresskraft / *Insert Force:* per terminal with a typ. insert speed of 7 mm/s: **typ. 90 N**
- Weitere Angaben / *Further information:* www.ixys.com **Application note IXAN0077**
- Montageanleitung / *Mounting instruction:* www.ixys.com **Application note IXAN0024**

***Detail A*:** PCB-Montage / *Mounting on PCB*

- Empfohlene, selbstschneidende Schraube / *Recommended, self-tapping screw:* **EJOT PT®** (Größe / *size:* **K25**)
- Max. Schraubenlänge / *Max. screw length:* **PCB-Dicke** / **thickness + 6 mm** (max. Lochtiefe / *hole depth)*
- Empfohlenes Drehmoment / *Recommended mounting torque:* **1.5 Nm**



Boost IGBT

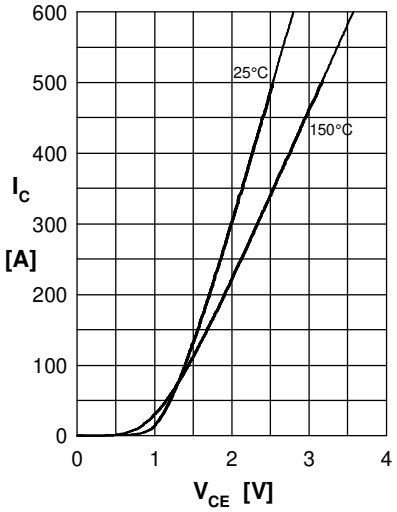


Fig.1 Typ. output characteristics IGBT

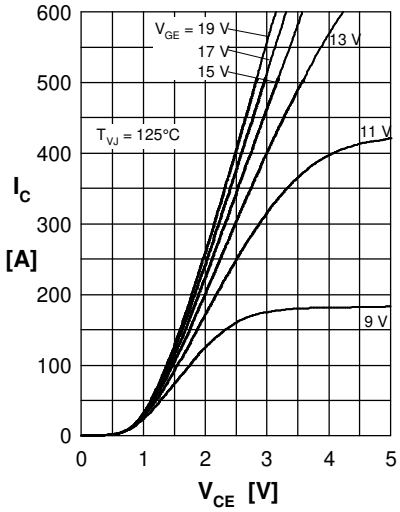


Fig.2 Typ. output characteristics IGBT

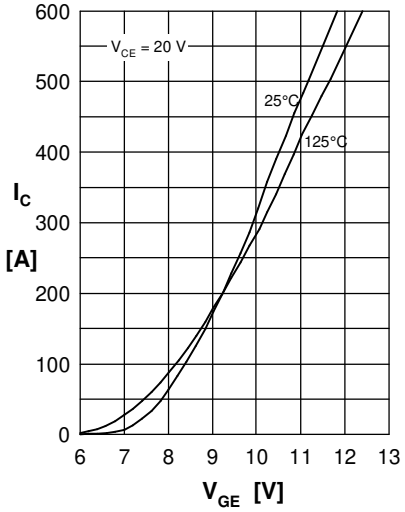


Fig. 3 Typ. transfer charact. IGBT

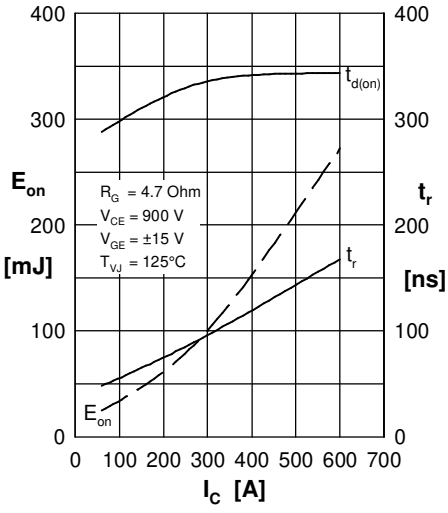


Fig. 4 Typ. turn-on energy & switch. times vs. collector current

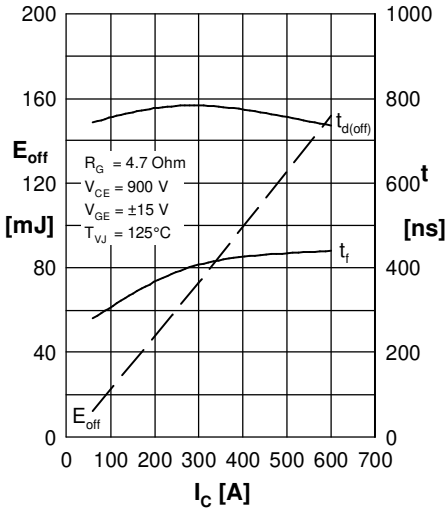


Fig. 5 Typ. turn-off energy & switch. times vs. collector current

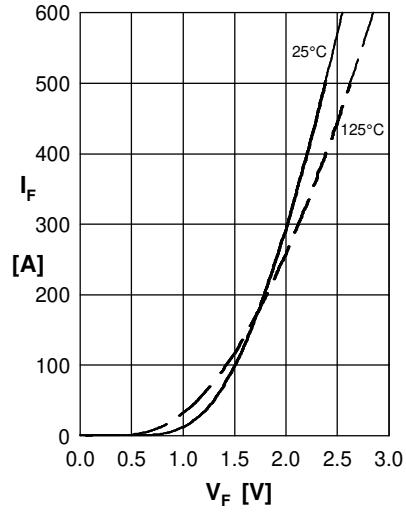


Fig. 6 Typ. forward characteristics Diode

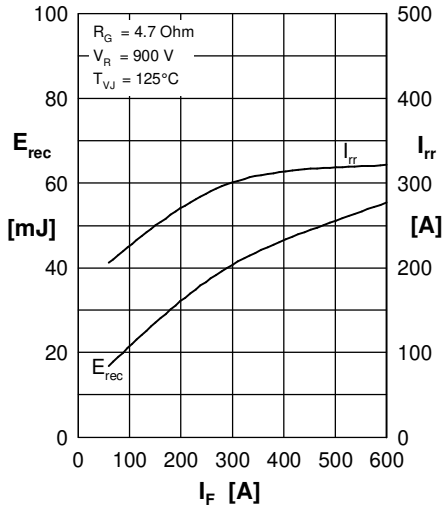


Fig. 7 Typ. reverse recovery characteristics Diode

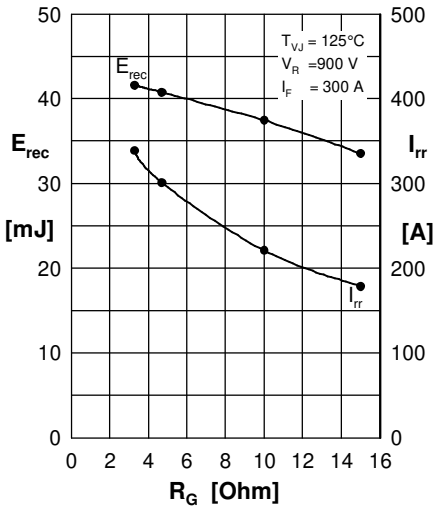


Fig. 8 Typ. reverse recovery characteristics Diode

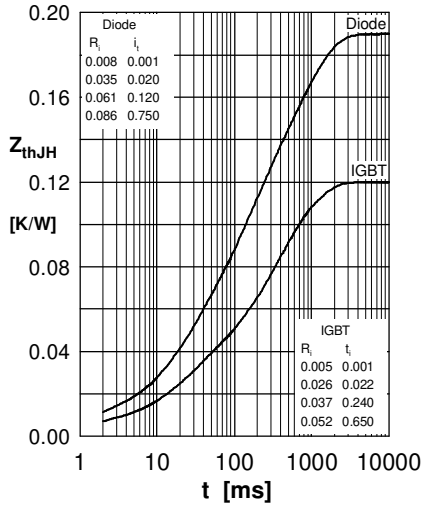


Fig. 9 Typ. transient thermal resistance juntion to heatsink