

IGBT Module

Sixpack

Short Circuit SOA Capability
Square RBSOA

$$I_{C25} = 43 \text{ A}$$

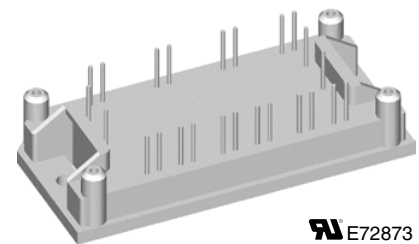
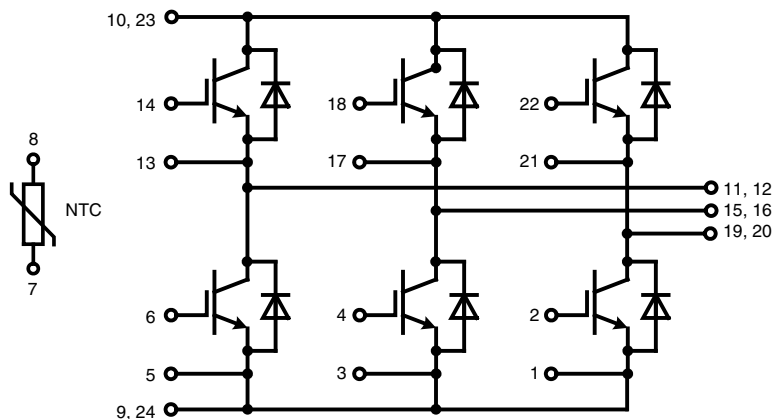
$$V_{CES} = 1200 \text{ V}$$

$$V_{CE(sat) \text{ typ.}} = 1.9 \text{ V}$$

Preliminary data

Part name (Marking on product)

MWI 45-12T6K



E72873

Pin configuration see outlines.

Features:

- Trench IGBTs
 - low saturation voltage
 - positive temperature coefficient for easy paralleling
 - fast switching
 - short tail current for optimized performance also in resonant circuits
- HiPerFRED™ diode:
 - fast reverse recovery
 - low operating forward voltage
 - low leakage current
- Industry Standard Package
 - solderable pins for PCB mounting
 - isolated copper base plate

Application:

- AC drives
- UPS
- Welding

Package:

- UL registered
- Industry standard E1-pack

IGBTs

Symbol	Definitions	Conditions	Ratings			Unit	
			min.	typ.	max.		
V_{CES}	collector emitter voltage		$T_{VJ} = 25^{\circ}\text{C}$ to 150°C			V	
V_{GES}	max. DC gate voltage	continuous			± 20	V	
V_{GEM}	max. transient collector gate voltage	transient			± 30	V	
I_{C25}	collector current		$T_C = 25^{\circ}\text{C}$			A	
I_{C80}			$T_C = 80^{\circ}\text{C}$			A	
P_{tot}	total power dissipation		$T_C = 25^{\circ}\text{C}$			W	
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 25\text{ A}; V_{GE} = 15\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			V	
			$T_{VJ} = 125^{\circ}\text{C}$			V	
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 1\text{ mA}; V_{GE} = V_{CE}$	$T_{VJ} = 25^{\circ}\text{C}$	4.5	6.5	V	
I_{CES}	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			mA	
			$T_{VJ} = 125^{\circ}\text{C}$			mA	
I_{GES}	gate emitter leakage current	$V_{CE} = 0\text{ V}; V_{GE} = \pm 20\text{ V}$			400	nA	
C_{ies}	input capacitance	$V_{CE} = 25\text{ V}; V_{GE} = 0\text{ V}; f = 1\text{ MHz}$		1810		pF	
$Q_{G(on)}$	total gate charge	$V_{CE} = 600\text{ V}; V_{GE} = 15\text{ V}; I_C = 25\text{ A}$		240		nC	
$t_{d(on)}$	turn-on delay time	inductive load $V_{CE} = 600\text{ V}; I_C = 25\text{ A}$ $V_{GE} = \pm 15\text{ V}; R_G = 36\ \Omega$	$T_{VJ} = 125^{\circ}\text{C}$			90	ns
t_r	current rise time					50	ns
$t_{d(off)}$	turn-off delay time					520	ns
t_f	current fall time					90	ns
E_{on}	turn-on energy per pulse					2.5	mJ
E_{off}	turn-off energy per pulse					3.4	mJ
I_{CM}	reverse bias safe operating area	RBSOA; $V_{GE} = \pm 15\text{ V}; R_G = 36\ \Omega$ $L = 100\ \mu\text{H}$; clamped induct. load $V_{CEmax} = V_{CES} - L_S \cdot di/dt$	$T_{VJ} = 125^{\circ}\text{C}$			50	A
t_{SC} (SCSOA)	short circuit safe operating area	$V_{CE} = 900\text{ V}; V_{GE} = \pm 15\text{ V}; R_G = 36\ \Omega$; non-repetitive	$T_{VJ} = 125^{\circ}\text{C}$			10	μs
R_{thJC}	thermal resistance junction to case	(per IGBT)			0.8	K/W	
R_{thCH}	thermal resistance case to heatsink	(per diode)			0.3	K/W	

Diodes

Symbol	Definitions	Conditions	Maximum Ratings			Unit	
			min.	typ.	max.		
V_{RRM}	max. repetitive reverse voltage				1600	V	
I_{F25}	forward current		$T_C = 25^{\circ}\text{C}$			A	
I_{F80}			$T_C = 80^{\circ}\text{C}$			A	
Symbol	Conditions	Characteristic Values				Unit	
		min.	typ.	max.			
V_F	forward voltage	$I_F = 25\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			V	
			$T_{VJ} = 125^{\circ}\text{C}$			V	
I_{RM}	max. reverse recovery current	$V_R = 600\text{ V}; I_F = 25\text{ A}$ $di_F/dt = -600\text{ A}/\mu\text{s}$	$T_{VJ} = 100^{\circ}\text{C}$			25	A
t_{rr}	reverse recovery time					150	ns
R_{thJC}	thermal resistance junction to case	(per diode)			0.9	K/W	
R_{thCH}	thermal resistance case to heatsink	(per diode)			0.3	K/W	

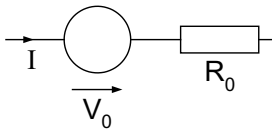
Temperature Sensor NTC

Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
R_{25}	resistance	$T_C = 25^\circ\text{C}$	4.45	4.7	5.0	k Ω
$B_{25/85}$				3510		K

Module

Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
T_{VJ}	operating temperature		-40		125	$^\circ\text{C}$
T_{VJM}	max. virtual junction temperature				150	$^\circ\text{C}$
T_{stg}	storage temperature		-40		125	$^\circ\text{C}$
V_{ISOL}	isolation voltage	$I_{ISOL} \leq 1 \text{ mA}; 50/60 \text{ Hz}$			2500	V~
M_d	mounting torque	(M4)	2.0		2.2	Nm
d_S	creep distance on surface		12.7			mm
d_A	strike distance through air		12.7			mm
Weight				40		g

Equivalent Circuits for Simulation

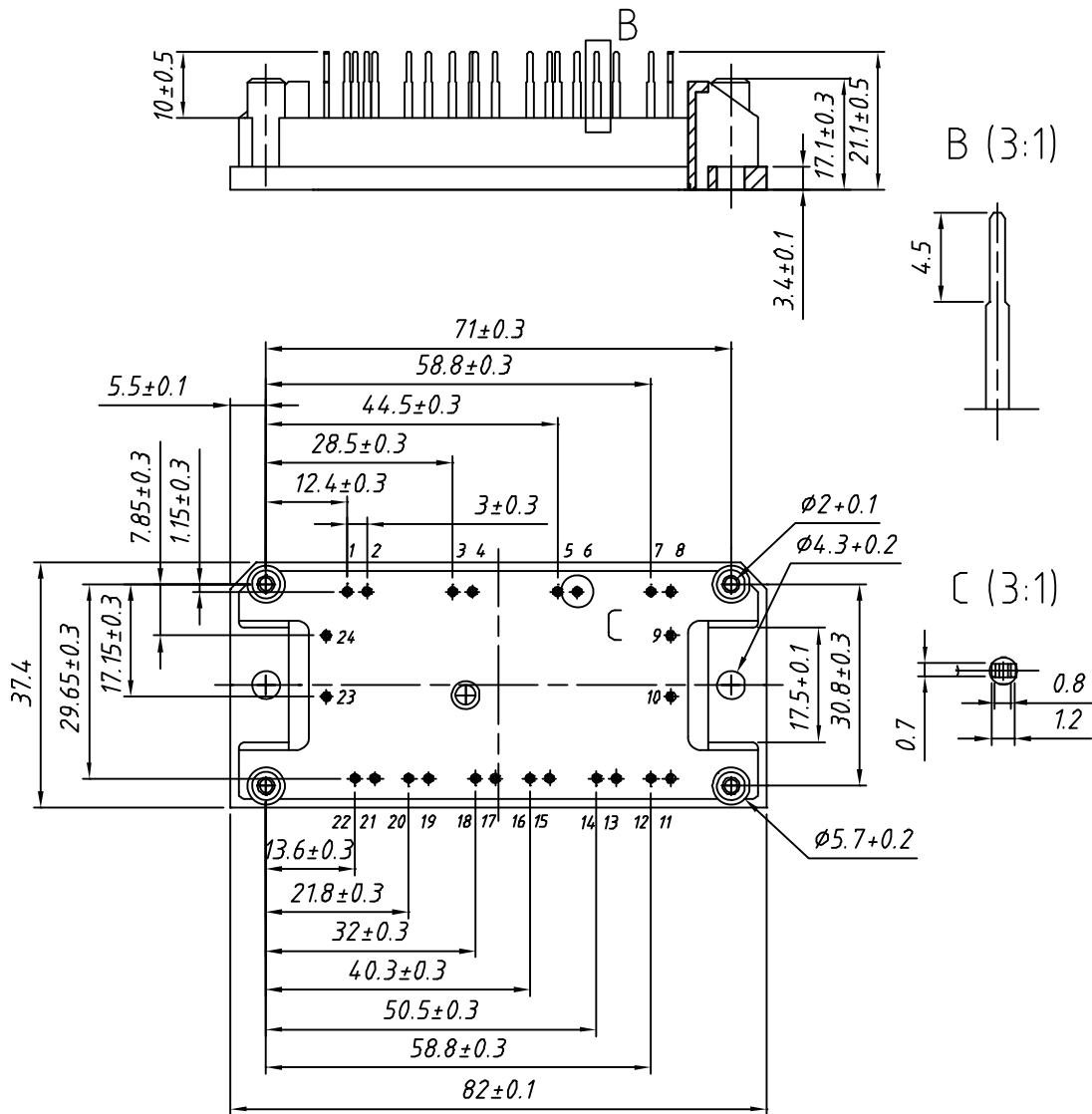


Ratings

Symbol	Definitions	Conditions	min.	typ.	max.	Unit
V_0	IGBT	$T_{VJ} = 125^\circ\text{C}$		tbd		V
R_0				tbd		m Ω
V_0	free wheeling diode	$T_{VJ} = 125^\circ\text{C}$		1.6		V
R_0				13		m Ω

Outline Drawing

Dimensions in mm (1 mm = 0.0394")



Product Marking

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MWI 45-12T6K	MWI45-12T6K	Box	10	500 145