

IGBT Module

Sixpack

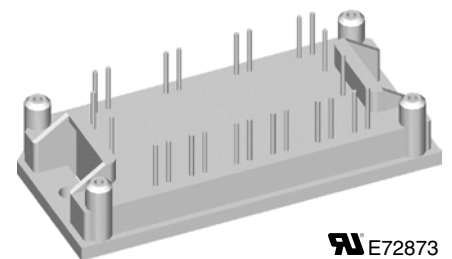
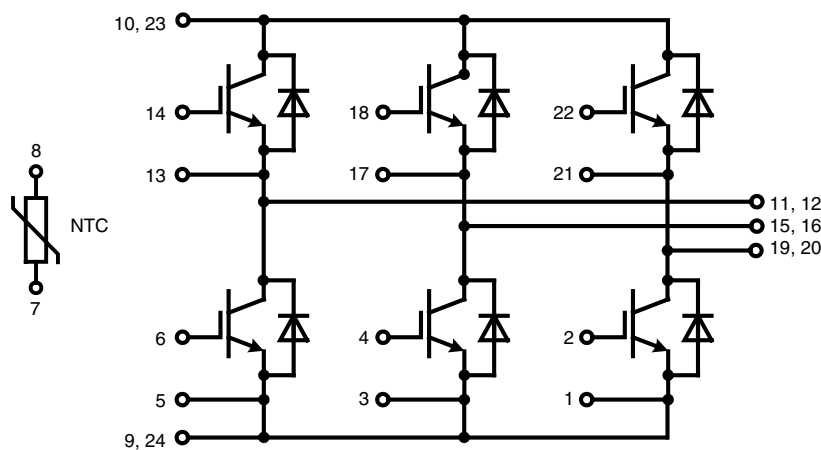
Short Circuit SOA Capability
Square RBSOA

$$\begin{aligned} I_{C25} &= 43 \text{ A} \\ V_{CES} &= 1200 \text{ V} \\ V_{CE(sat) \text{ typ.}} &= 1.9 \text{ V} \end{aligned}$$

Preliminary data

Part name (Marking on product)

MWI 45-12T6K



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	min.	Ratings			Unit
				typ.	max.		
V_{CES}	collector emitter voltage	$T_{VJ} = 25^{\circ}\text{C}$ to 150°C			1200		V
V_{GES}	max. DC gate voltage	continuous			± 20		V
V_{GEM}	max. transient collector gate voltage	transient			± 30		V
I_{C25}	collector current	$T_C = 25^{\circ}\text{C}$			43		A
I_{C80}		$T_C = 80^{\circ}\text{C}$			31		A
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$			160		W
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 25\text{ A}; V_{GE} = 15\text{ V}$		1.9 2.2	2.3		V V
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 1\text{ mA}; V_{GE} = V_{CE}$	4.5		6.5		V
I_{CES}	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0\text{ V}$		0.6	0.4		mA 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			
V_{RRM}	max. repetitive reverse voltage			1600		V
I_{F25}	forward current	$T_C = 25^{\circ}\text{C}$		49		A
I_{F80}		$T_C = 80^{\circ}\text{C}$		32		A

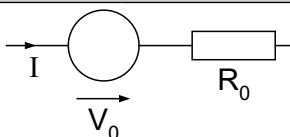
Symbol	Conditions		Characteristic Values			
			min.	typ.	max.	
V_F	forward voltage	$I_F = 25\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	2.4 1.6	2.7	V V
I_{RM}	max. reverse recovery current	$V_R = 600\text{ V}; I_F = 25\text{ A}$ $di_F/dt = -600\text{ A}/\mu\text{s}$	$T_{VJ} = 100^{\circ}\text{C}$	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			
			min.	typ.	max.	Unit
R_{25} $B_{25/85}$	resistance	$T_C = 25^{\circ}\text{C}$	4.45	4.7 3510	5.0	$\text{k}\Omega$ K

Module

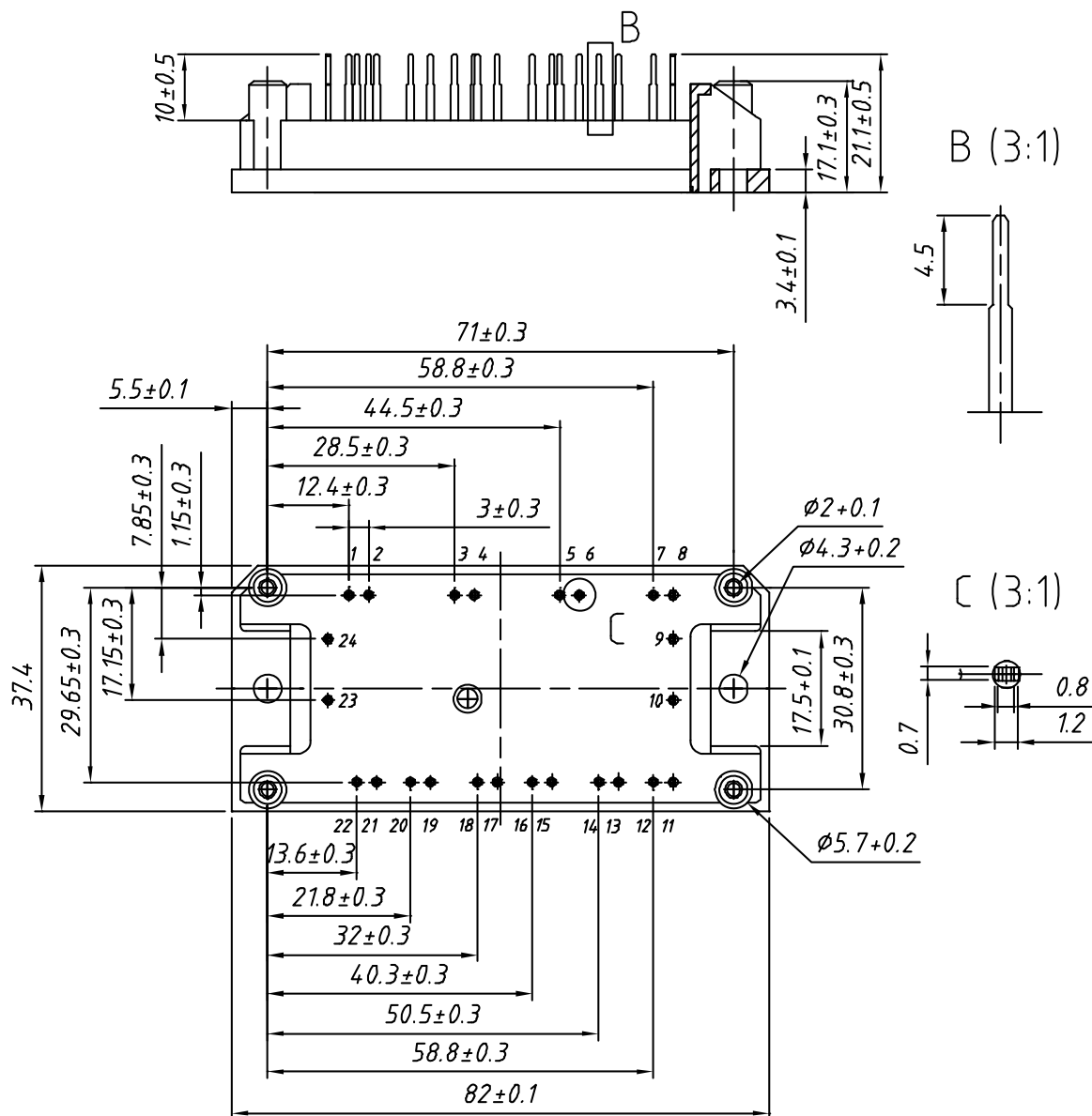
Symbol	Definitions	Conditions	Ratings			
			min.	typ.	max.	Unit
T_{VJ}	operating temperature		-40		125	$^{\circ}\text{C}$
T_{VJM}	max. virtual junction temperature				150	$^{\circ}\text{C}$
T_{stg}	storage temperature		-40		125	$^{\circ}\text{C}$
V_{ISOL}	isolation voltage	$I_{ISOL} \leq 1 \text{ mA}; 50/60 \text{ Hz}$			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 R_0	IGBT	$T_{VJ} = 125^{\circ}\text{C}$		tbd tbd		V $\text{m}\Omega$
V_0 R_0	free wheeling diode	$T_{VJ} = 125^{\circ}\text{C}$		1.6 13		V $\text{m}\Omega$

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