

**IGBT Module****Sixpack**

Short Circuit SOA Capability

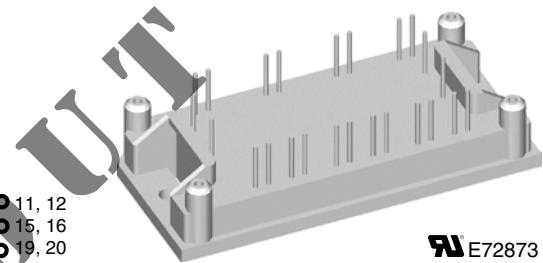
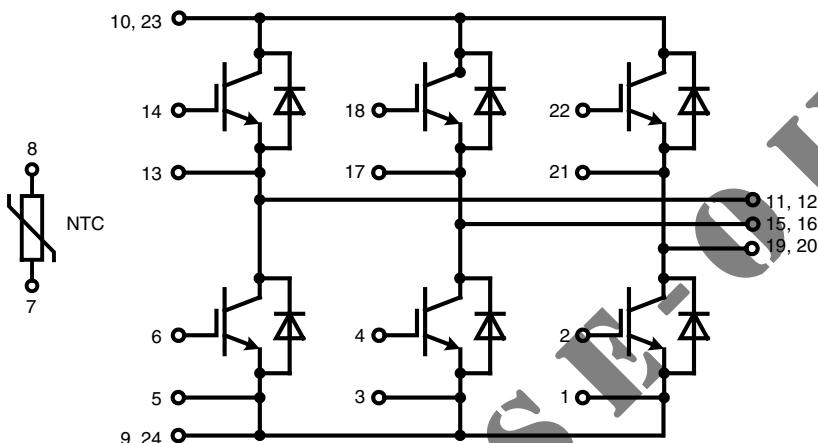
Square RBSOA

 $I_{C25}$  = 29 A  
 $V_{CES}$  = 1200 V  
 $V_{CE(sat)\ typ.}$  = 2.5 V

Preliminary data

**Part name** (Marking on product)

MWI 30-12E6K



E72873

Pin configuration see outlines.

**Features:**

- SPT 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

## Ratings

Symbol	Definitions	Conditions	min.	typ.	max.	Unit
$V_{CES}$	collector emitter voltage	$T_{VJ} = 25^\circ\text{C}$ to $150^\circ\text{C}$		1200		V
$V_{GES}$	max. DC gate voltage	continuous		$\pm 20$		V
$V_{GEM}$	max. transient collector gate voltage	transient		$\pm 30$		V
$I_{C25}$	collector current	$T_C = 25^\circ\text{C}$	29		A	
$I_{C80}$		$T_C = 80^\circ\text{C}$	21		A	
$P_{tot}$	total power dissipation	$T_C = 25^\circ\text{C}$	130		W	
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 20 \text{ A}; V_{GE} = 15 \text{ V}$	$T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	2.5 2.9	2.9	V
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 0.6 \text{ mA}; V_{GE} = V_{CE}$	$T_{VJ} = 25^\circ\text{C}$	4.5	6.5	V
$I_{CES}$	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}$	$T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	0.6	1	mA mA
$I_{GES}$	gate emitter leakage current	$V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$		200		nA
$C_{ies}$	input capacitance	$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}; f = 1 \text{ MHz}$		1180		pF
$Q_{G(on)}$	total gate charge	$V_{CE} = 600 \text{ V}; V_{GE} = 15 \text{ V}; I_C = 20 \text{ A}$		100		nC
$t_{d(on)}$	turn-on delay time	$T_{VJ} = 125^\circ\text{C}$ inductive load $V_{CE} = 600 \text{ V}; I_C = 20 \text{ A}$ $V_{GE} = \pm 15 \text{ V}; R_G = 56 \Omega$	90			ns
$t_r$	current rise time		50			ns
$t_{d(off)}$	turn-off delay time		320			ns
$t_f$	current fall time		90			ns
$E_{on}$	turn-on energy per pulse		2.8			mJ
$E_{off}$	turn-off energy per pulse		1.8			mJ
$I_{CM}$	reverse bias safe operating area	RBSOA; $V_{GE} = \pm 15 \text{ V}; R_G = 56 \Omega$ $L = 100 \mu\text{H}$ ; clamped induct. load $V_{CEmax} = V_{CES} - L_S \cdot di/dt$	45			A
$t_{sc}$ (SCSOA)	short circuit safe operating area	$V_{CE} = 900 \text{ V}; V_{GE} = \pm 15 \text{ V}; R_G = 56 \Omega$ ; non-repetitive	$T_{VJ} = 125^\circ\text{C}$	10		μs
$R_{thJC}$	thermal resistance junction to case	(per IGBT)			0.95	K/W
$R_{thCH}$	thermal resistance case to heatsink	(per IGBT)		0.35		K/W

## Diodes

## Maximum Ratings

Symbol	Definitions	Conditions	Maximum Ratings
$V_{RRM}$	max. repetitive reverse voltage		1600 V
$I_{F25}$	forward current	$T_C = 25^\circ\text{C}$	24 A
$I_{F80}$		$T_C = 80^\circ\text{C}$	16 A

## Symbol Conditions

## Characteristic Values

Symbol	Conditions	min.	typ.	max.		
$V_F$	forward voltage	$I_F = 20 \text{ A}$	$T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	2.6 2.0	2.9	V V
$I_{RM}$ $t_{rr}$	max. reverse recovery current reverse recovery time	$V_R = 600 \text{ V}; I_F = 20 \text{ A}$ $di_F/dt = -400 \text{ A}/\mu\text{s}$	$T_{VJ} = 100^\circ\text{C}$	18 130		A ns
$R_{thJC}$	thermal resistance junction to case	(per diode)	$T_{VJ} = 25^\circ\text{C}$		1.6	K/W
$R_{thCH}$	thermal resistance case to heatsink	(per diode)		0.55		K/W

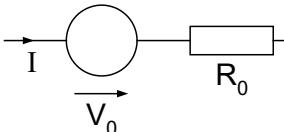
## Temperature Sensor NTC

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

## Module

Ratings						
Symbol	Definitions	Conditions	min.	typ.	max.	Unit
$T_{VJ}$	operating temperature		-40		125	°C
$T_{VJM}$	max. virtual junction temperature				150	°C
$T_{stg}$	storage temperature		-40		125	°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

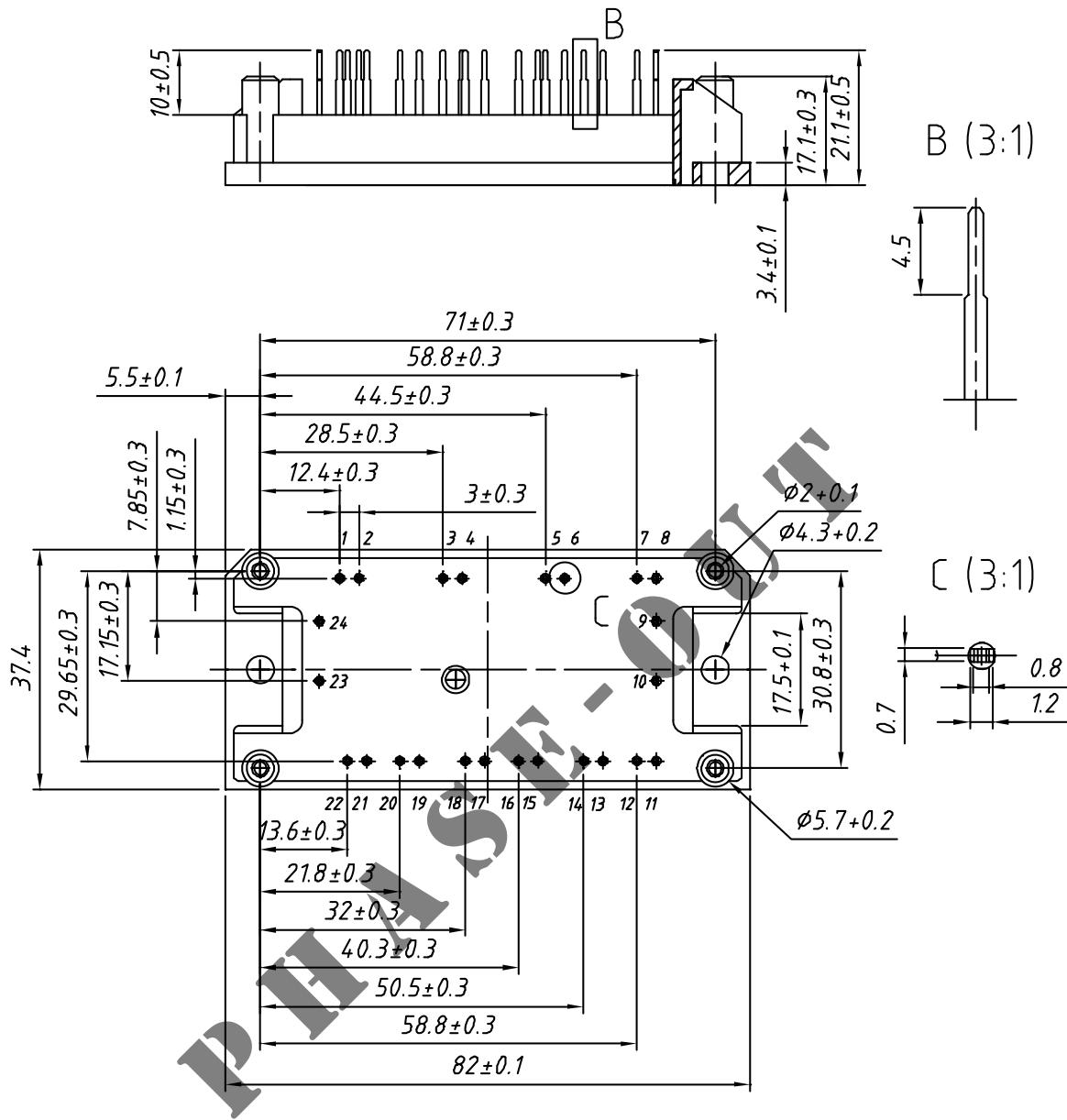


## Ratings

Symbol	Definitions	Conditions	min.	typ.	max.	Unit
$V_0$	IGBT	$T_{VJ} = 125^\circ C$		1.1		V
$R_0$				83		mΩ
$V_0$	free wheeling diode	$T_{VJ} = 125^\circ C$		1.45		V
$R_0$				38		mΩ

## 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 30-12E6K	MWI30-12E6K	Box	10	500 138