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IGBT Module

Sixpack

Short Circuit SOA Capability
Square RBSOA

Preliminary data

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

Part name (Marking on product)

MWI 30-12E6K
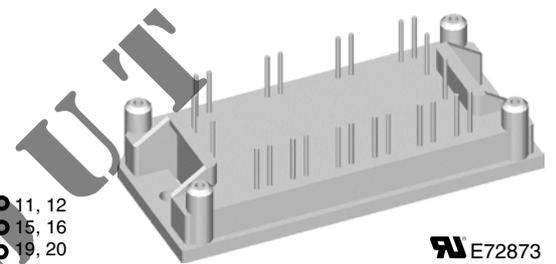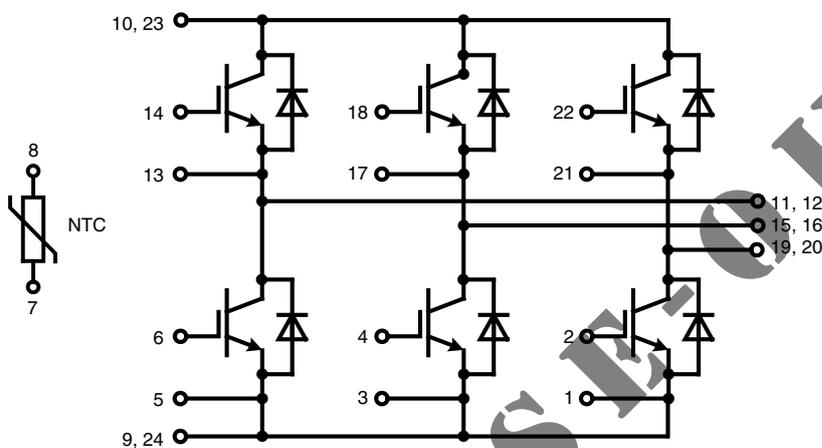
Pin configuration see outlines.

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

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IGBTs

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
V_{CES}	collector emitter voltage	T_{VJ} = 25°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°C			29	A
I_{C80}			T_C = 80°C			21	A
P_{tot}	total power dissipation		T_C = 25°C			130	W
$V_{CE(sat)}$	collector emitter saturation voltage	I_C = 20 A; V_{GE} = 15 V	T_{VJ} = 25°C		2.5	2.9	V
			T_{VJ} = 125°C		2.9		V
$V_{GE(th)}$	gate emitter threshold voltage	I_C = 0.6 mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	4.5		6.5	V
I_{CES}	collector emitter leakage current	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C			1	mA
			T_{VJ} = 125°C		0.6		mA
I_{GES}	gate emitter leakage current	V_{CE} = 0 V; V_{GE} = ±20 V				200	nA
C_{ies}	input capacitance	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz			1180		pF
$Q_{G(on)}$	total gate charge	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 20 A			100		nC
$t_{d(on)}$	turn-on delay time				90		ns
t_r	current rise time				50		ns
$t_{d(off)}$	turn-off delay time	inductive load	T_{VJ} = 125°C		320		ns
t_f	current fall time	V_{CE} = 600 V; I_C = 20 A			90		ns
E_{on}	turn-on energy per pulse	V_{GE} = ±15 V; R_G = 56 Ω			2.8		mJ
E_{off}	turn-off energy per pulse				1.8		mJ
I_{CM}	reverse bias safe operating area	RBSOA; V_{GE} = ±15 V; R_G = 56 Ω			45		A
		L = 100 µH; clamped induct. load	T_{VJ} = 125°C				
		V_{CEmax} = V_{CES} - L_S·di/dt					
t_{SC} (SCSOA)	short circuit safe operating area	V_{CE} = 900 V; V_{GE} = ±15 V; R_G = 56 Ω; non-repetitive	T_{VJ} = 125°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

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

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

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Temperature Sensor NTC

Symbol	Definitions	Conditions	min.	typ.	max.	Unit
R_{25}	resistance	$T_C =$ 25°C	4.45	4.7	5.0	kΩ
$B_{25/85}$				3510		K

Module

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	$I_{ISOL} \leq 1$ mA; 50/60 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
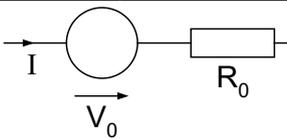
Symbol	Definitions	Conditions	min.	typ.	max.	Unit
V_0	IGBT	$T_{VJ} = 125°C$		1.1		V
R_0				83		mΩ
V_0	free wheeling diode	$T_{VJ} = 125°C$		1.45		V
R_0				38		mΩ

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Outline Drawing

Dimensions in mm (1 mm = 0.0394")
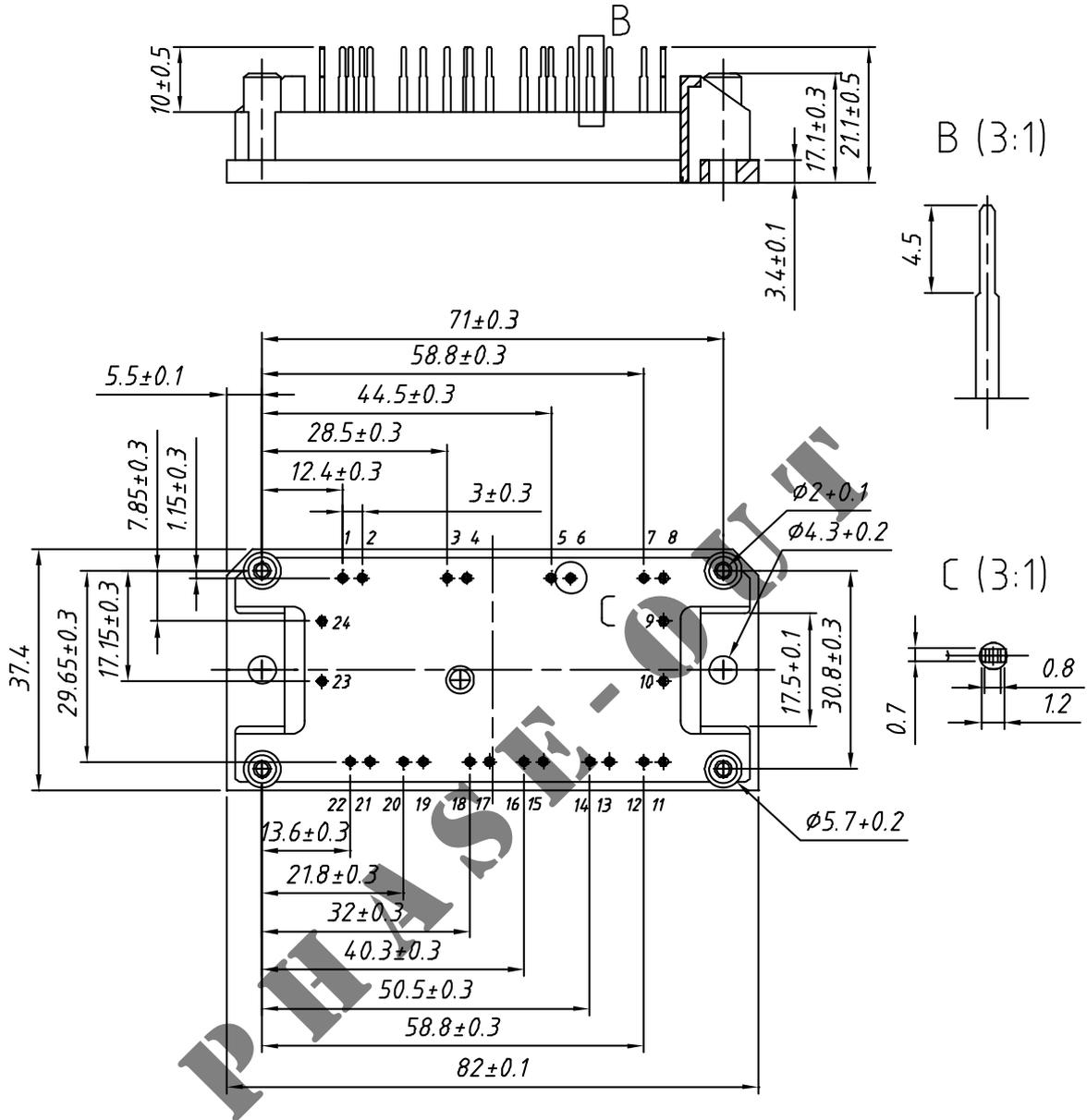
Product Marking

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MWI 30-12E6K	MWI30-12E6K	Box	10	500 138

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