IGBT Module

Sixpack

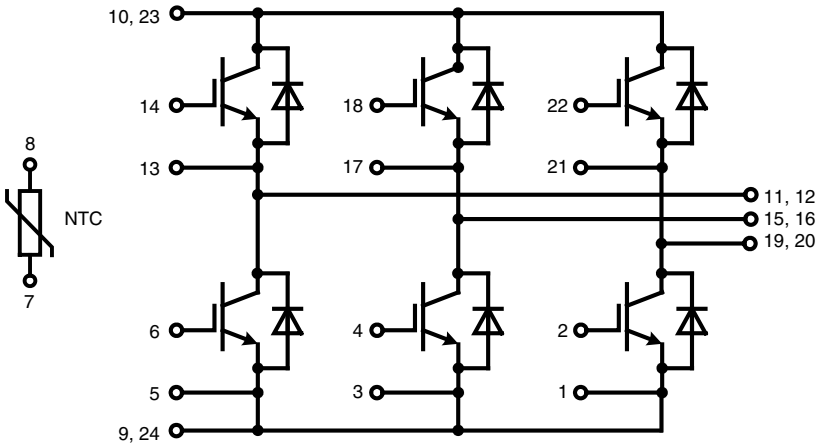
Short Circuit SOA Capability
Square RBSOA

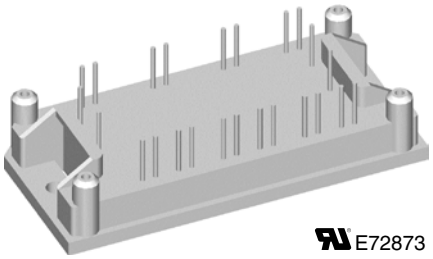
I_{C25} = 19 A
V_{CES} = 1200 V
$V_{CE(sat)\ typ.}$ = 3.0 V

Preliminary data

Part name (Marking on product)

MWI15-12A6K





Pin configuration see outlines.

Features:

- NPT 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 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			19	A
I_{C80}			T_C = 80°C			13	A
P_{tot}	*total power dissipation*		T_C = 25°C			90	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 15 A; V_{GE} = 15 V	T_{VJ} = 25°C		3.0	3.4	V
			T_{VJ} = 125°C		3.5		V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 0.35 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			0.9	mA
			T_{VJ} = 125°C		0.8		mA
I_{GES}	*gate emitter leakage current*	V_{CE} = 0 V; V_{GE} = ±20 V				100	nA
C_{ies}	*input capacitance*	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz			600		pF
$Q_{G(on)}$	*total gate charge*	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 10 A			45		nC
$t_{d(on)}$	*turn-on delay time*	inductive load V_{CE} = 600 V; I_C = 10 A V_{GE} = ±15 V; R_G = 82 Ω	T_{VJ} = 125°C		50		ns
t_r	*current rise time*				40		ns
$t_{d(off)}$	*turn-off delay time*				290		ns
t_f	*current fall time*				60		ns
E_{on}	*turn-on energy per pulse*				1.2		mJ
E_{off}	*turn-off energy per pulse*				1.1		mJ
I_{CM}	*reverse bias safe operating area*	RBSOA; V_{GE} = ±15 V; R_G = 82 Ω L = 100 µH; clamped induct. load V_{CEmax} = V_{CES} - L_S·di/dt	T_{VJ} = 125°C		30		A
t_{SC} (SCSOA)	*short circuit safe operating area*	V_{CE} = 1200 V; V_{GE} = ±15 V; R_G = 82 Ω; non-repetitive	T_{VJ} = 125°C		10		µs
R_{thJC}	*thermal resistance junction to case*	(per IGBT)				1.37	K/W
R_{thCH}	*thermal resistance case to heatsink*	(per IGBT)			0.5		K/W

Diodes

Symbol	Definitions	Conditions		Ratings min.	typ.	max.	Unit
V_{RRM}	*max. repetitve reverse voltage*		T_{VJ} = 150°C			1200	V
I_{F25}	*forward current*		T_C = 25°C			24	A
I_{F80}			T_C = 80°C			16	A
V_F	*forward voltage*	I_F = 15 A; V_{GE} = 0 V	T_{VJ} = 25°C		2.4	2.7	V
			T_{VJ} = 125°C		1.7		V
I_{RM}	*max. reverse recovery current*	V_R = 600 V di_F/dt = -400 A/µs I_F = 15 A; V_{GE} = 0 V	T_{VJ} = 125°C		16		A
t_{rr}	*reverse recovery time*				130		ns
$E_{rec(off)}$	*reverse recovery energy*				tbd		µJ
R_{thJC}	*thermal resistance junction to case*	(per diode)				1.6	K/W
R_{thCH}	*thermal resistance case to heatsink*	(per diode)			0.55		K/W

T_C = 25°C unless otherwise stated

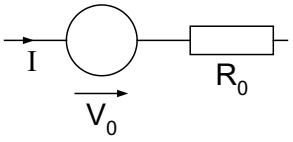
Temperature Sensor NTC

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

Module

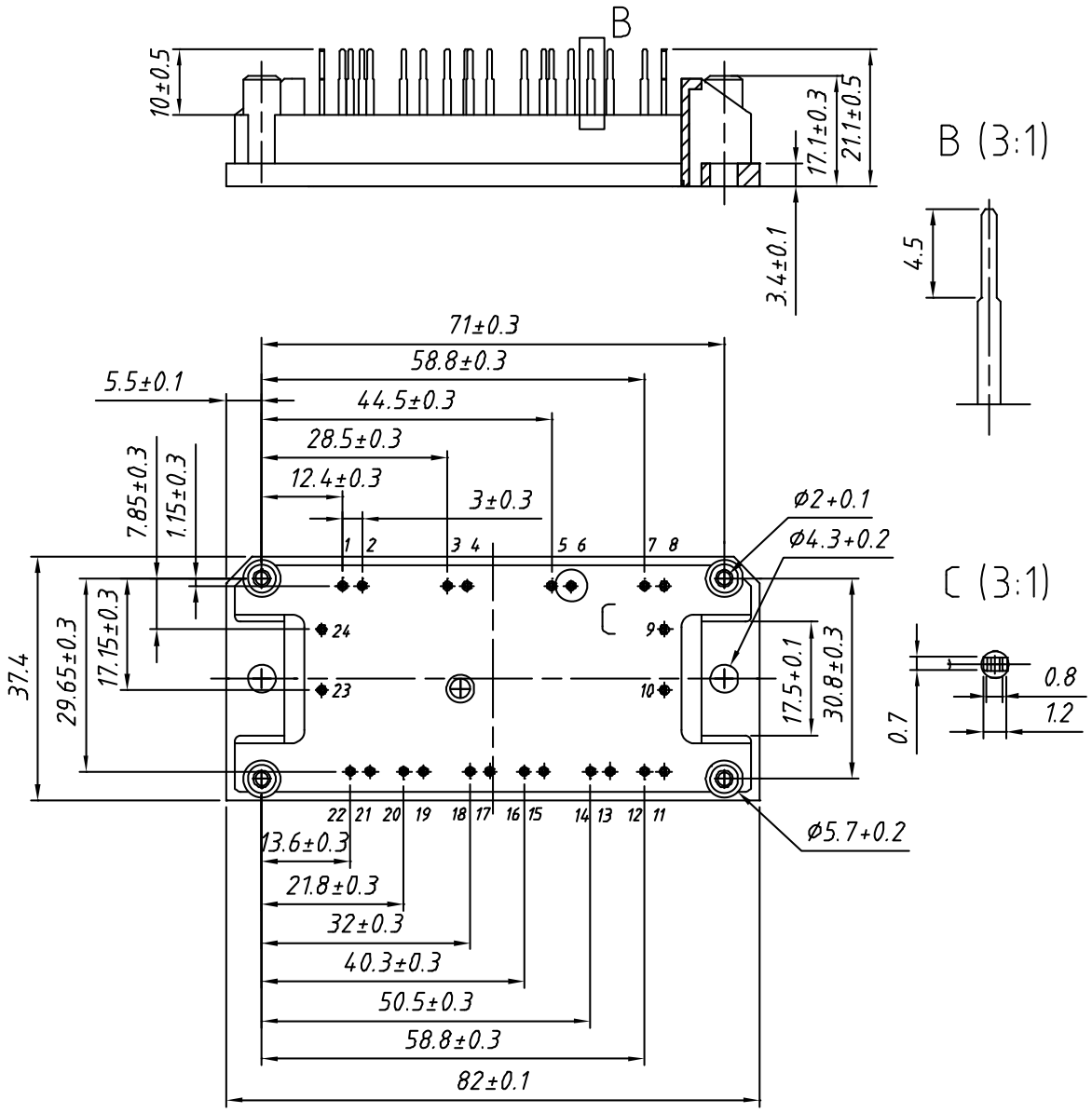
Symbol	Definitions	Conditions	Ratings min.	typ.	max.	Unit
T_{VJ}	*operating temperature*		-40		125	°C
T_{VJM}	*max. virtual junction temperature*				150	°C
T_{stg}	*storage temperature*		-40		125	°C
V_{ISOL}	*isolation voltage*	$I_{ISOL} \leq$ 1 mA; 50/60 Hz			2500	V~
M_d	*mounting torque*	(M4)	2.0		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	Ratings min.	typ.	max.	Unit
V_0	*IGBT*	T_{VJ} = 125°C		tbd		V
R_0				tbd		mΩ
V_0	*free wheeling diode*	T_{VJ} = 125°C		1.38		V
R_0				40		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 15-12A6K	MWI15-12A6K	Box	10	500308