

IGBT Module

Sixpack

Short Circuit SOA Capability
Square RBSOA

$$I_{C25} = 19 \text{ A}$$

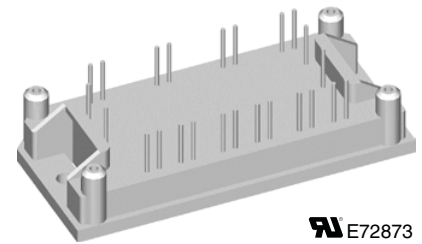
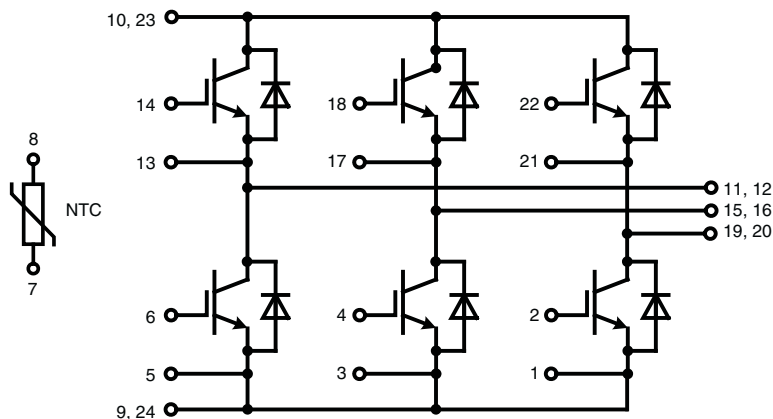
$$V_{CES} = 1200 \text{ V}$$

$$V_{CE(sat) \text{ typ.}} = 3.0 \text{ V}$$

Preliminary data

Part name (Marking on product)

MWI15-12A6K



E72873

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			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	$I_C = 15\text{ A}; V_{GE} = 15\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$			V V	
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 0.35\text{ mA}; V_{GE} = V_{CE}$	$T_{VJ} = 25^{\circ}\text{C}$	4.5	6.5	V	
I_{CES}	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$			0.8 0.9 mA mA	
I_{GES}	gate emitter leakage current	$V_{CE} = 0\text{ V}; V_{GE} = \pm 20\text{ V}$			100	nA	
C_{ies}	input capacitance	$V_{CE} = 25\text{ V}; V_{GE} = 0\text{ V}; f = 1\text{ MHz}$		600		pF	
$Q_{G(on)}$	total gate charge	$V_{CE} = 600\text{ V}; V_{GE} = 15\text{ V}; I_C = 10\text{ A}$		45		nC	
$t_{d(on)}$	turn-on delay time	} inductive load $V_{CE} = 600\text{ V}; I_C = 10\text{ A}$ $V_{GE} = \pm 15\text{ V}; R_G = 82\ \Omega$	$T_{VJ} = 125^{\circ}\text{C}$			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; $V_{GE} = \pm 15\text{ V}; R_G = 82\ \Omega$ $L = 100\ \mu\text{H};$ clamped induct. load $V_{CEmax} = V_{CES} - L_S \cdot di/dt$	$T_{VJ} = 125^{\circ}\text{C}$			30	A
t_{SC} (SCSOA)	short circuit safe operating area	$V_{CE} = 1200\text{ V}; V_{GE} = \pm 15\text{ V};$ $R_G = 82\ \Omega;$ non-repetitive	$T_{VJ} = 125^{\circ}\text{C}$			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			Unit	
			min.	typ.	max.		
V_{RRM}	max. repetitive reverse voltage		$T_{VJ} = 150^{\circ}\text{C}$			V	
I_{F25}	forward current		$T_C = 25^{\circ}\text{C}$			A	
I_{F80}			$T_C = 80^{\circ}\text{C}$			A	
V_F	forward voltage	$I_F = 15\text{ A}; V_{GE} = 0\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$			2.4 1.7 V V	
I_{RM}	max. reverse recovery current	} $V_R = 600\text{ V}$ $di_F/dt = -400\text{ A}/\mu\text{s}$ $I_F = 15\text{ A}; V_{GE} = 0\text{ V}$	$T_{VJ} = 125^{\circ}\text{C}$			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	

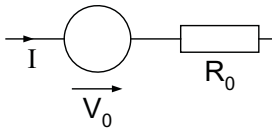
 $T_C = 25^{\circ}\text{C}$ unless otherwise stated

Temperature Sensor NTC

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

Module

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

Equivalent Circuits for Simulation

Ratings

Symbol	Definitions	Conditions	min.	typ.	max.	Unit
V_0	<i>IGBT</i>	$T_{VJ} = 125^\circ\text{C}$		tbd		V
R_0				tbd		m Ω
V_0	<i>free wheeling diode</i>	$T_{VJ} = 125^\circ\text{C}$		1.38		V
R_0				40		m Ω

