

IGBT Module

Sixpack

Short Circuit SOA Capability
Square RBSOA

$$I_{C25} = 51 \text{ A}$$

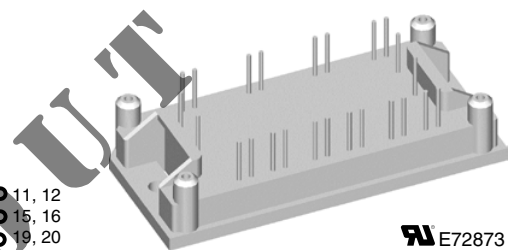
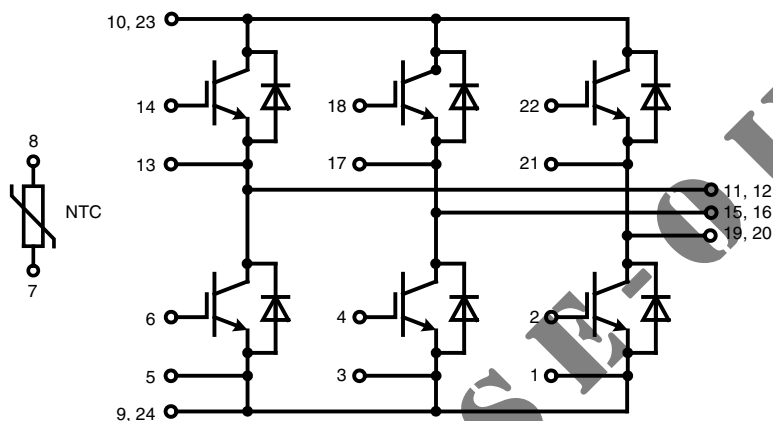
$$V_{CES} = 1200 \text{ V}$$

$$V_{CE(sat) \text{ typ.}} = 2.4 \text{ V}$$

Preliminary data

Part name (Marking on product)

MWI 50-12E6K



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

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		$T_C = 25^{\circ}\text{C}$			51	A	
I_{C80}			$T_C = 80^{\circ}\text{C}$			36	A	
P_{tot}	total power dissipation		$T_C = 25^{\circ}\text{C}$			210	W	
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 35\text{ A}; V_{GE} = 15\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			2.4	V	
			$T_{VJ} = 125^{\circ}\text{C}$			2.8	V	
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 1\text{ mA}; V_{GE} = V_{CE}$	$T_{VJ} = 25^{\circ}\text{C}$	4.5		6.5	V	
I_{CES}	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$				0.3	mA
			$T_{VJ} = 125^{\circ}\text{C}$			1.2	mA	
I_{GES}	gate emitter leakage current	$V_{CE} = 0\text{ V}; V_{GE} = \pm 20\text{ V}$				200	nA	
C_{ies}	input capacitance	$V_{CE} = 25\text{ V}; V_{GE} = 0\text{ V}; f = 1\text{ MHz}$		2000			pF	
$Q_{G(on)}$	total gate charge	$V_{CE} = 600\text{ V}; V_{GE} = 15\text{ V}; I_C = 35\text{ A}$		150			nC	
$t_{d(on)}$	turn-on delay time	} inductive load $V_{CE} = 600\text{ V}; I_C = 35\text{ A}$ $V_{GE} = \pm 15\text{ V}; R_G = 39\ \Omega$	$T_{VJ} = 125^{\circ}\text{C}$			90	ns	
t_r	current rise time		50	ns				
$t_{d(off)}$	turn-off delay time		440	ns				
t_f	current fall time		50	ns				
E_{on}	turn-on energy per pulse		5.4	mJ				
E_{off}	turn-off energy per pulse		2.6	mJ				
I_{CM}	reverse bias safe operating area	RBSOA; $V_{GE} = \pm 15\text{ V}; R_G = 39\ \Omega$ L = 100 μH ; clamped induct. load $V_{CEmax} = V_{CES} - L_S di/dt$	$T_{VJ} = 125^{\circ}\text{C}$			70	A	
t_{SC} (SCSOA)	short circuit safe operating area	$V_{CE} = 900\text{ V}; V_{GE} = \pm 15\text{ V};$ $R_G = 39\ \Omega$; non-repetitive	$T_{VJ} = 125^{\circ}\text{C}$			10	μs	
R_{thJC}	thermal resistance junction to case	(per IGBT)			0.6	K/W		
R_{thCH}	thermal resistance case to heatsink	(per IGBT)		0.2		K/W		

Diodes

Symbol	Definitions	Conditions	Maximum Ratings				
			min.	max.			
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

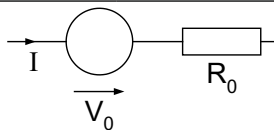
Symbol	Conditions	Characteristic Values						
		min.	typ.	max.				
V_F	forward voltage	$I_F = 35\text{ A}$			$T_{VJ} = 25^{\circ}\text{C}$	2.6	2.9	V
					$T_{VJ} = 125^{\circ}\text{C}$	1.8		V
I_{RM}	max. reverse recovery current	} $V_R = 600\text{ V}; I_F = 35\text{ A}$ $di_F/dt = -600\text{ A}/\mu\text{s}$	$T_{VJ} = 100^{\circ}\text{C}$			35		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			Unit
			min.	typ.	max.	
R_{25}	resistance	$T_c = 25^\circ\text{C}$	4.45	4.7	5.0	k Ω
$B_{25/85}$				3510		K

Module

Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
T_{VJ}	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	IGBT	$T_{VJ} = 125^\circ\text{C}$		1.0		V
R_0				44		m Ω
V_0	free wheeling diode	$T_{VJ} = 125^\circ\text{C}$		1.5		V
R_0				14		m Ω

