IGBT Modules

H-Bridge

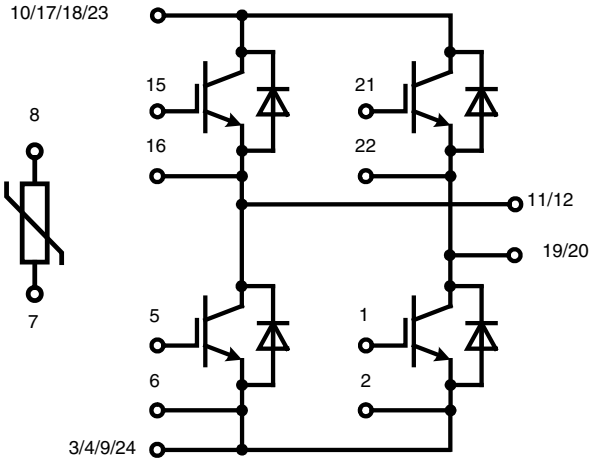
Trench IGBT

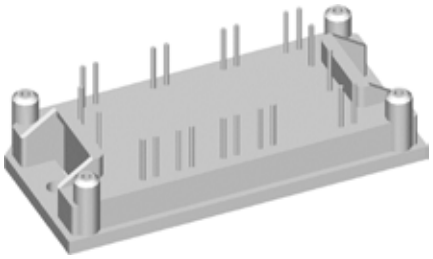
I_{C25} = 89 A
V_{CES} = 600 V
$V_{CE(sat)\ typ.}$ = 1.8 V

Preliminary data

Part name (Marking on product)

MKI 80-06T6K





Features:

- Trench IGBT technology
- Low saturation voltage
- Low switching losses
- Square RBSOA, no latch up
- High short circuit capability
- Positive temperature coefficient for easy parallelling
- MOS input, voltage controlled
- Ultra fast free wheeling diodes
- Solderable pins for PCB mounting
- Space saving
- Reduced protection circuits

Application:

- AC motor control
- AC servo and robot drives
- Power supplies

Package:

- Industry standard E1-pack
- Designed for wave soldering
- With copper base plate

IGBTs

Symbol	Definitions	Conditions		Ratings min.	typ.	max.	Unit
V_{CES}	*collector emitter voltage*	T_{VJ} = 25°C to 150°C				600	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			89	A
I_{C80}			T_C = 80°C			67	A
P_{tot}	*total power dissipation*		T_C = 25°C			210	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 75 A; V_{GE} = 15 V	T_{VJ} = 25°C		1.8	2.3	V
			T_{VJ} = 125°C		2.1		V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 1.2 mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	5		6.5	V
I_{CES}	*collector emitter leakage current*	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C			0.5	mA
			T_{VJ} = 125°C		1		mA
I_{GES}	*gate emitter leakage current*	V_{CE} = 0 V; V_{GE} = ±20 V				400	nA
C_{ies}	*input capacitance*	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz			4620		pF
$Q_{G(on)}$	*total gate charge*	V_{CE} = 480 V; V_{GE} = 15 V; I_C = 75 A			470		nC
$t_{d(on)}$	*turn-on delay time*	inductive load	T_{VJ} = 125°C		30		ns
t_r	*current rise time*	V_{CE} = 300 V; I_C = 75 A			20		ns
$t_{d(off)}$	*turn-off delay time*	V_{GE} = ±15 V; R_G = 5.1 Ω			250		ns
t_f	*current fall time*				70		ns
E_{on}	*turn-on energy per pulse*				2.5		mJ
E_{off}	*turn-off energy per pulse*				2.8		mJ
I_{CM}	*reverse bias safe operating area*	RBSOA; V_{GE} = ±15 V; R_G = 5.1 Ω; L = 100 µH			150		A
V_{CEK}		clamped inductive load;	T_{VJ} = 125°C		0.9x	V_{CES}	
t_{SC} (SCSOA)	*short circuit safe operating area*	V_{CE} = 480 V; V_{GE} = ±15 V; R_G = 5.1 Ω; non-repetitive	T_{VJ} = 125°C		6		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	
V_{RRM}	*max. repetitive reverse voltage*			600	V
I_{F25}	*forward current*		T_C = 25°C	105	A
I_{F80}			T_C = 80°C	67	A

Symbol	Conditions		Characteristic Values min.	typ.	max.	
V_F	*forward voltage*	I_F = 75 A	T_{VJ} = 25°C	1.8	2.2	V
			T_{VJ} = 125°C	1.6		V
I_{RM}	*max. reverse recovery current*	V_R = 300 V; I_F = 75 A		36		A
t_{rr}	*reverse recovery time*	di_F/dt = -600 A/µs	T_{VJ} = 100°C	100		ns
R_{thJC}	*thermal resistance junction to case*	(per diode)	T_{VJ} = 25°C		0.65	K/W
R_{thCH}	*thermal resistance case to heatsink*	(per diode)		0.25		K/W

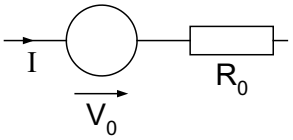
Temperature Sensor NTC

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

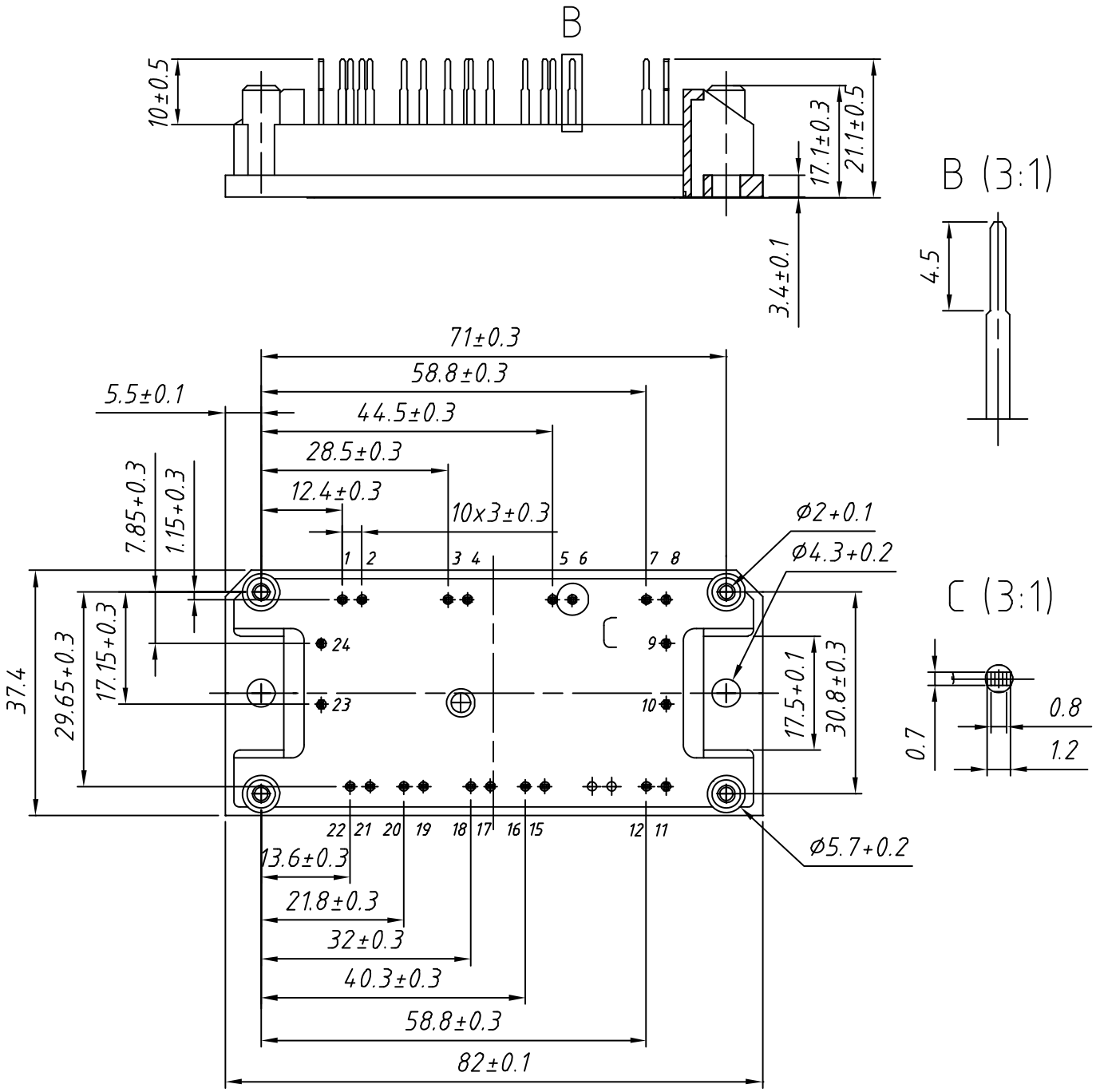
Symbol	Definitions	Conditions	Ratings min.	typ.	max.	Unit
T_{VJ}	*operating temperature*		-40		125	°C
T_{VJM}	*max. virtual junction temperature*				175	°C
T_{stg}	*storage temperature*		-40		125	°C
V_{ISOL}	*isolation voltage*	$I_{ISOL} \leq$ 1 mA; 50/60 Hz			2500	V~
M_d	*mounting torque*	(M4)	2.0		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		0.9		V
R_0				14.3		mΩ
V_0	*free wheeling diode*	T_{VJ} = 125°C		1.25		V
R_0				3		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	MKI 80-06T6K	MKI80-06T6K	Box	10	504061

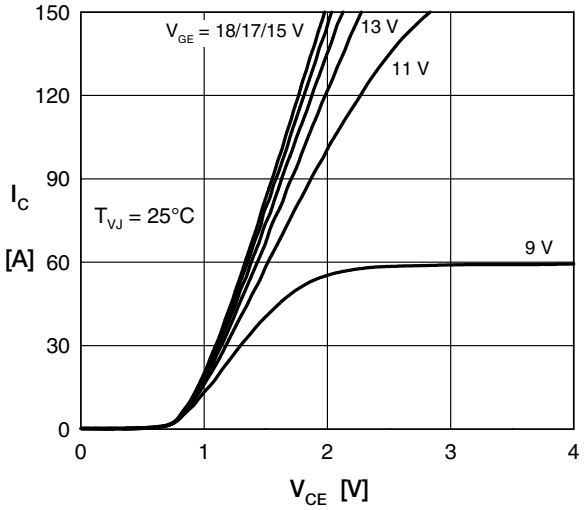


Fig. 1 Typical output characteristics

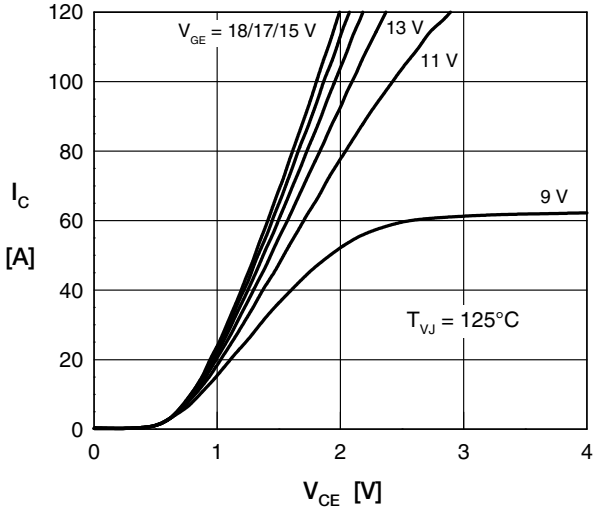


Fig. 2 Typical output characteristics

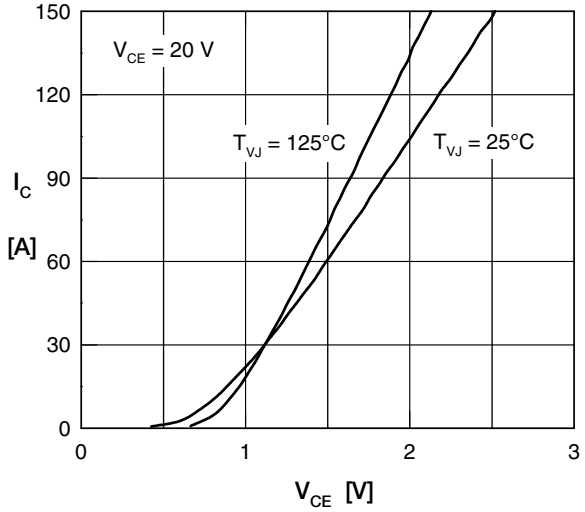


Fig. 3 Typical output characteristics

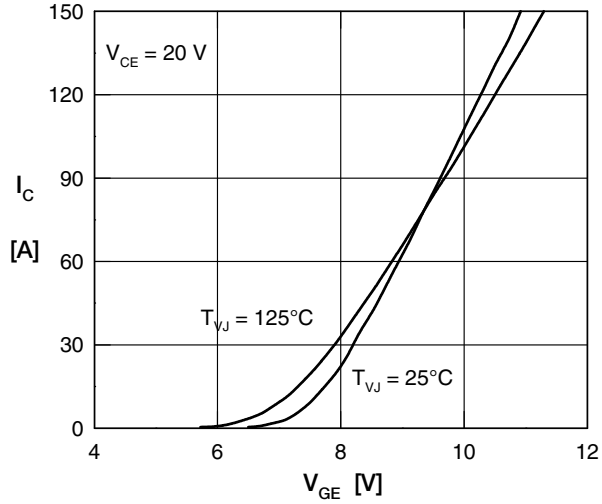


Fig. 4 Typical transfer characteristics

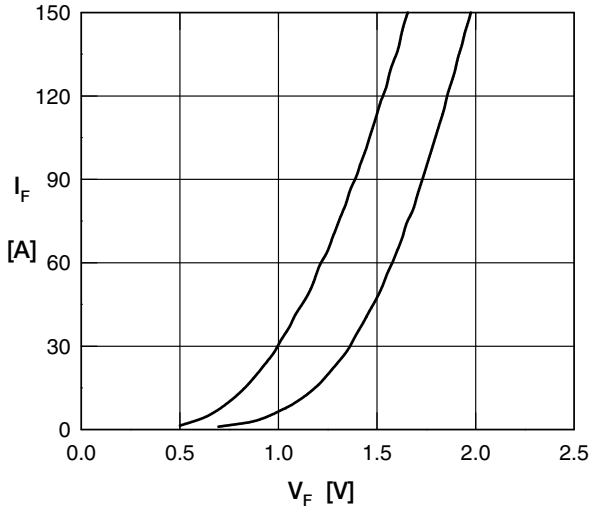


Fig. 5 Typical forward characteristics FWD

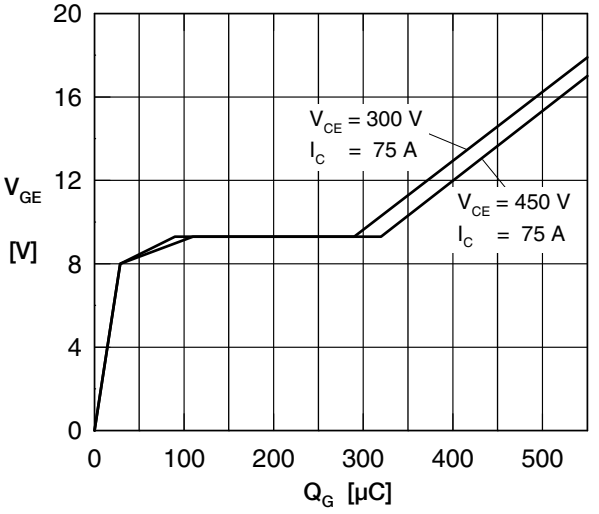


Fig. 6 Typical turn-on gate charge

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