IGBT Modules
H-Bridge
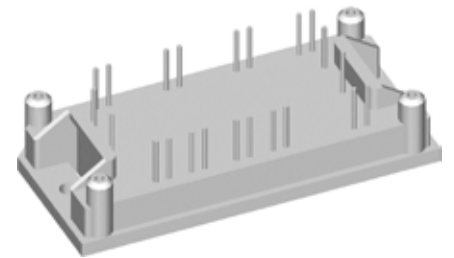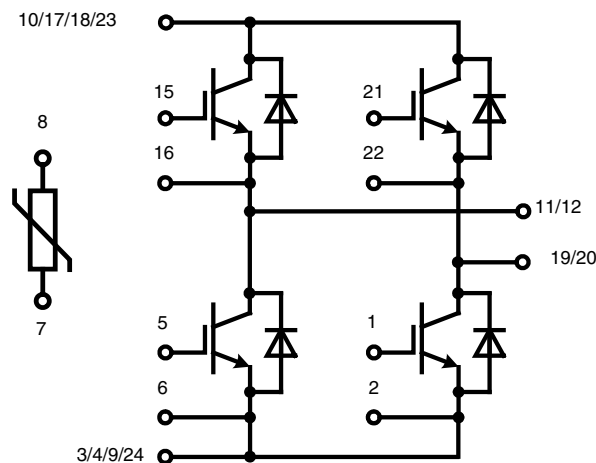### Trench IGBT

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

IXYS reserves the right to change limits, test conditions and dimensions.

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IGBTs

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
			Ratings				
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; $T_{VJ} = 125°C$; $V_{CE} = 300$ V; $I_C = 75$ A; $V_{GE} = ±15$ V; $R_G = 5.1 \Omega$			30		ns
t_r	current rise time				20		ns
$t_{d(off)}$	turn-off delay time				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; $R_G = 5.1 \Omega$; $L = 100$ 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; $R_G = 5.1 \Omega$; 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			min.	typ.	max.	
			Characteristic Values				
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

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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				175	°C
T_{stg}	storage temperature		-40		125	°C
V_{ISOL}	isolation voltage	$I_{ISOL} ≤ 1$ 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
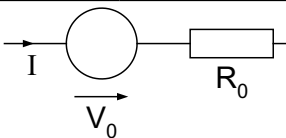
Symbol	Definitions	Conditions	min.	typ.	max.	Unit
V_0	IGBT	$T_{VJ} = 125°C$		0.9		V
R_0				14.3		mΩ
V_0	free wheeling diode	$T_{VJ} = 125°C$		1.25		V
R_0				3		mΩ

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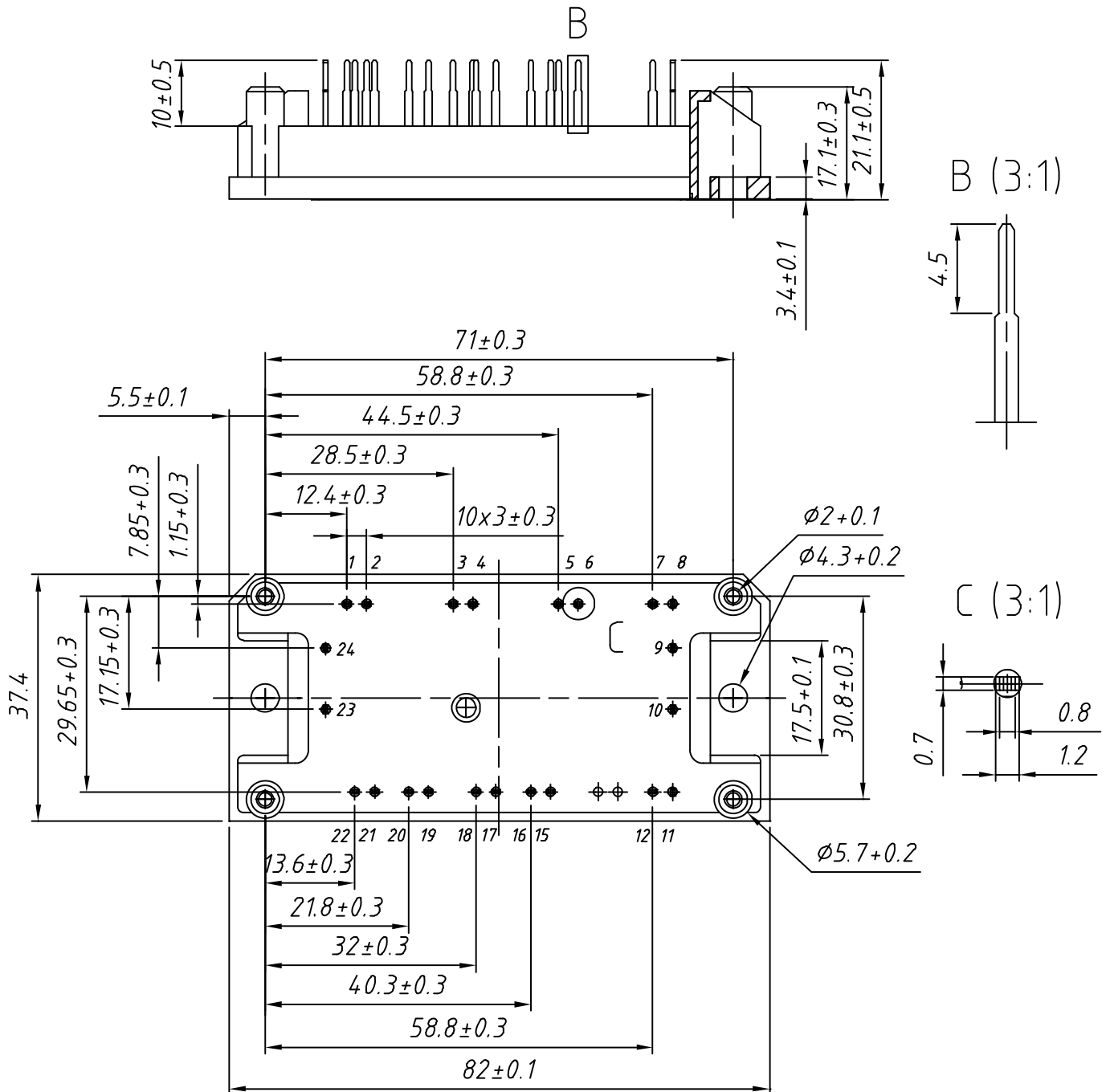
Product Marking

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MKI 80-06T6K	MKI80-06T6K	Box	10	504061

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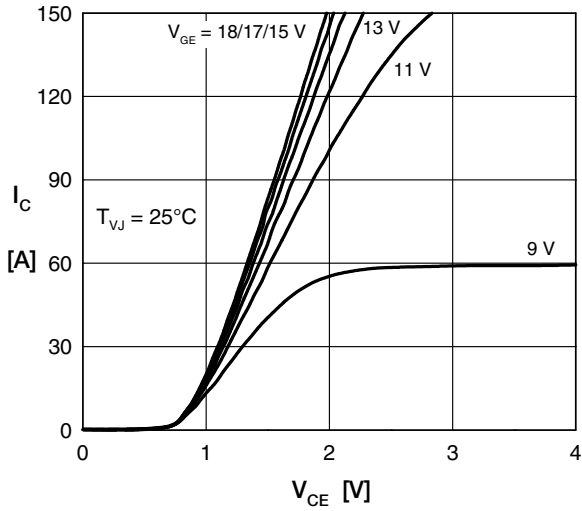
Fig. 1 Typical output characteristics
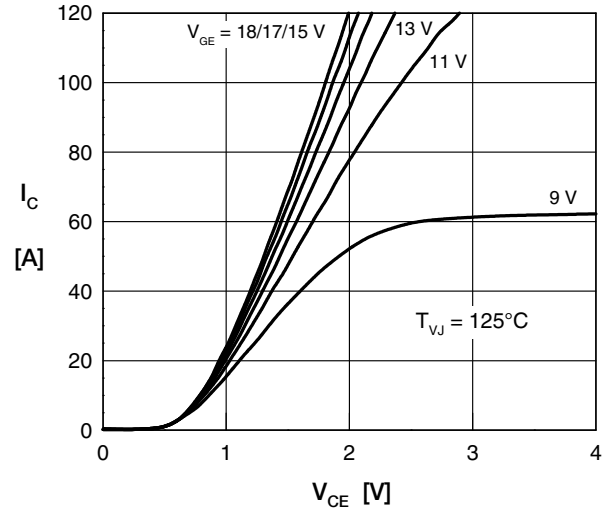
Fig. 2 Typical output characteristics
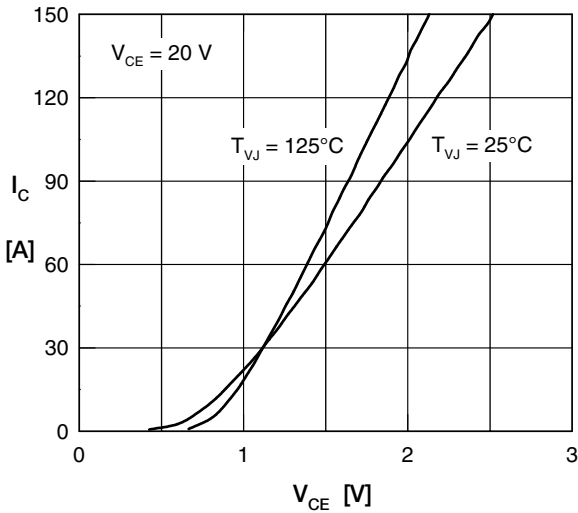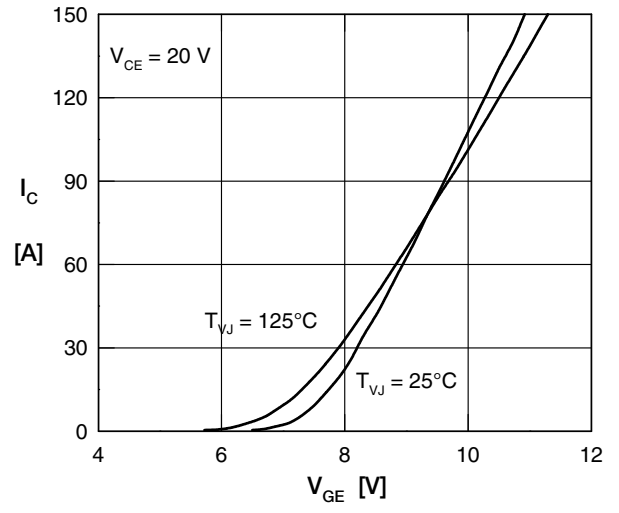
Fig. 3 Typical output characteristics

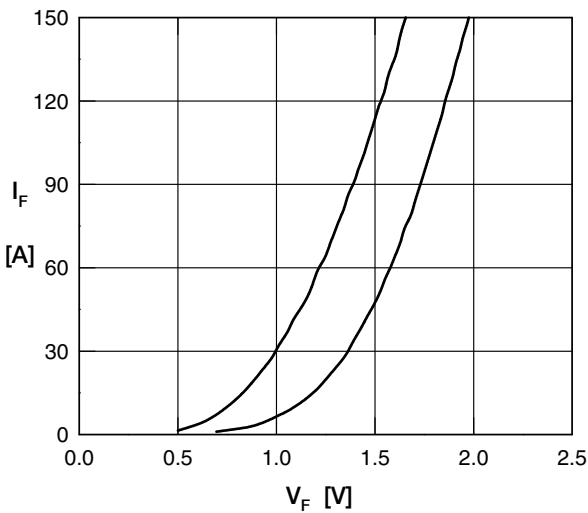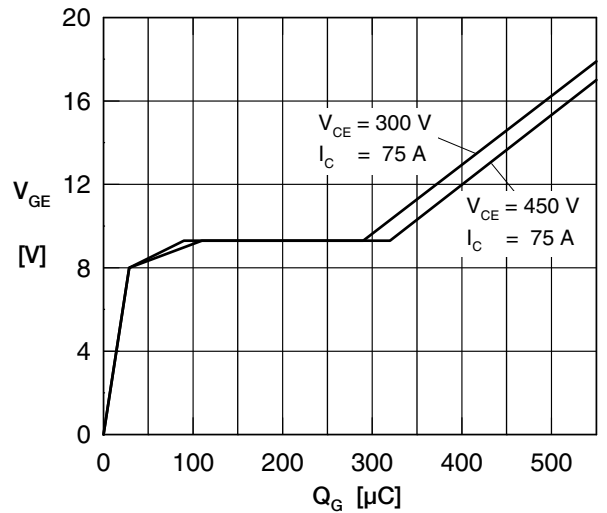Fig. 4 Typical transfer characteristics

Fig. 5 Typical forward characteristics FWD

Fig. 6 Typical turn-on gate charge

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