

IGBT Modules

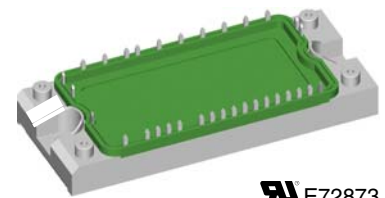
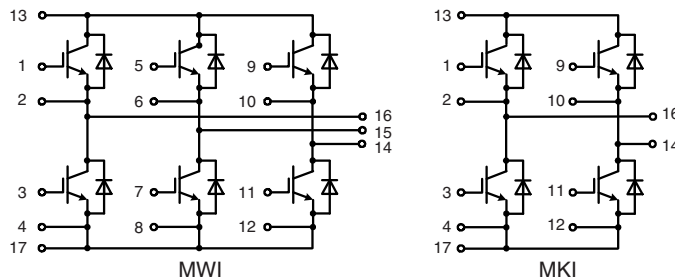
Sixpack, H Bridge

Short Circuit SOA Capability
Square RBSOA

$$I_{C25} = 90 \text{ A}$$

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

$$V_{CE(sat) \text{ typ.}} = 1.9 \text{ V}$$



E72873

See outline drawing for pin arrangement

IGBTs

Symbol	Conditions	Maximum Ratings	
V_{CES}	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$	1200	V
V_{GES}		± 20	V
I_{C25}	$T_C = 25^{\circ}\text{C}$	90	A
I_{C80}	$T_C = 80^{\circ}\text{C}$	62	A
I_{CM}	$V_{GE} = \pm 15 \text{ V}; R_G = 22 \Omega; T_{VJ} = 125^{\circ}\text{C}$	100	A
V_{CEK}	RBSOA; clamped inductive load; $L = 100 \mu\text{H}$	V_{CES}	
t_{SC}	$V_{CE} = 900 \text{ V}; V_{GE} = \pm 15 \text{ V}; R_G = 22 \Omega; T_{VJ} = 125^{\circ}\text{C}$ SCSOA; non-repetitive	10	μs
P_{tot}	$T_C = 25^{\circ}\text{C}$	350	W

Features

- NPT³ IGBTs
 - low saturation voltage
 - positive temperature coefficient for easy paralleling
 - fast switching
 - short tail current for optimized performance also in resonant circuits
- HiPerFREDTM diode:
 - fast reverse recovery
 - low operating forward voltage
 - low leakage current
- Industry Standard Package
 - solderable pins for PCB mounting
 - isolated copper base plate
 - UL registered

Typical Applications

- MWI
 - AC drives
 - power supplies with power factor correction
- MKI
 - motor control
 - . DC motor amature winding
 - . DC motor excitation winding
 - . synchronous motor excitation winding
 - supply of transformer primary winding
 - . power supplies
 - . welding
 - . X-ray
 - . battery charger

Symbol	Conditions	Characteristic Values ($T_{VJ} = 25^{\circ}\text{C}$, unless otherwise specified)		
		min.	typ.	max.
$V_{CE(sat)}$	$I_C = 50 \text{ A}; V_{GE} = 15 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		1.9 2.1	2.4 V
$V_{GE(th)}$	$I_C = 2 \text{ mA}; V_{GE} = V_{CE}$	4.5		6.5 V
I_{CES}	$V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		0.8	0.8 mA
I_{GES}	$V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$			200 nA
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off}	Inductive load, $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 600 \text{ V}; I_C = 50 \text{ A}$ $V_{GE} = \pm 15 \text{ V}; R_G = 22 \Omega$		80 50 680 30 6.0 4.0	ns ns ns ns mJ mJ
C_{ies}			3.8	nF
Q_{Gon}			350	nC
R_{thJC}				0.35 K/W

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

20070912a

Diodes

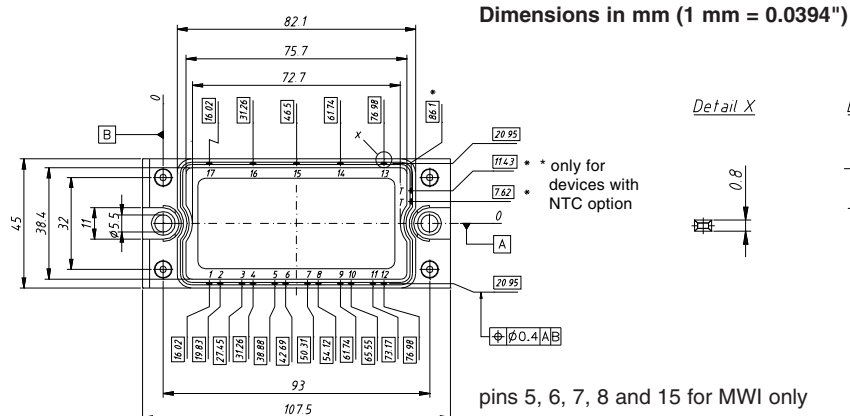
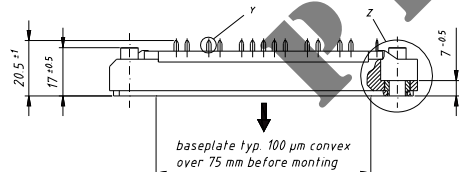
Symbol	Conditions	Maximum Ratings	
I_{F25}	$T_C = 25^{\circ}C$	110	A
I_{F80}	$T_C = 80^{\circ}C$	70	A

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
V_F	$I_F = 50 \text{ A}; V_{GE} = 0 \text{ V}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		2.2 1.6	2.6 V V
I_{RM} t_{rr}	$I_F = 50 \text{ A}; di_F/dt = -500 \text{ A}/\mu\text{s}; T_{VJ} = 125^\circ\text{C}$ $V_R = 600 \text{ V}; V_{GE} = 0 \text{ V}$		40 200	A ns
R_{thJC}	(per diode)			0.61 K/W

Module

Symbol	Conditions	Maximum Ratings
T_{VJ}	operating	-40...+125 °C
T_{VJM}		-40...+150 °C
T_{stg}		-40...+125 °C
V_{ISOL}	$I_{ISOL} \leq 1 \text{ mA}$; 50/60 Hz	2500 V~
M_d	Mounting torque (M5)	2.7 - 8.3 Nm

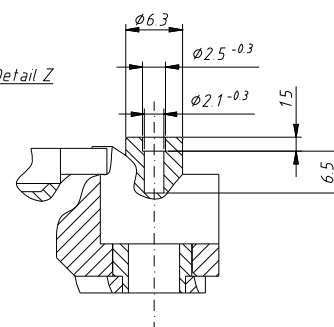
Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$R_{\text{pin-chip}}$			5	mΩ
d_s	Creepage distance on surface	6		mm
d_A	Strike distance in air	6		mm
R_{thCH}	with heatsink compound		0.02	K/W
Weight			180	g



Detail X

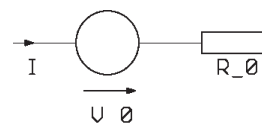
Detail Y

Detail Z



Equivalent Circuits for Simulation

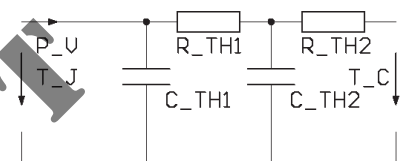
Conduction



IGBT (typ. at $V_{GE} = 15\text{ V}$; $T_J = 125^\circ\text{C}$)
 $V_\theta = 0.95\text{ V}$; $R_\theta = 24\text{ m}\Omega$

Free Wheeling Diode (typ. at $T_J = 125^\circ\text{C}$)
 $V_o = 1.3\text{ V}; R_o = 6\text{ m}\Omega$

Thermal Response



IGBT (typ.)

$$C_{th1} = 0.22 \text{ J/K}; R_{th1} = 0.26 \text{ K/W}$$

$$C_{th2} = 1.74 \text{ J/K}; R_{th2} = 0.09 \text{ K/W}$$

Free Wheeling Diode (typ.)

$$C_{th1} = 0.151 \text{ J/K}; R_{th1} = 0.483 \text{ K/W}$$

$$C_{th2} = 1.003 \text{ J/K}; R_{th2} = 0.127 \text{ K/W}$$

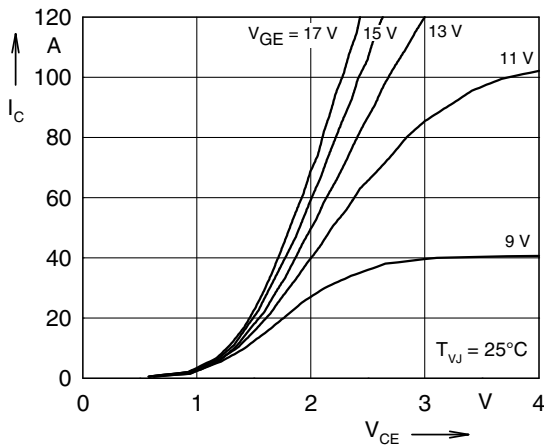


Fig. 1 Typ. output characteristics

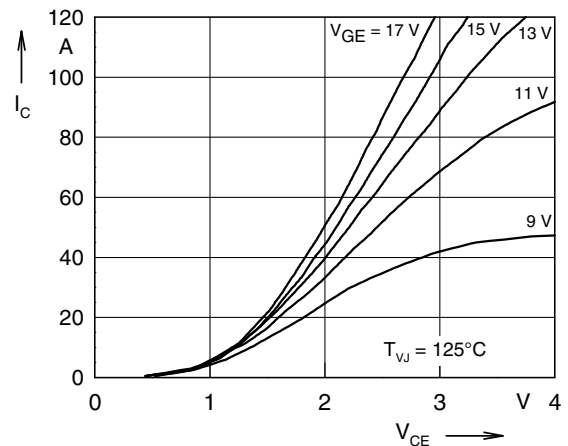


Fig. 2 Typ. output characteristics

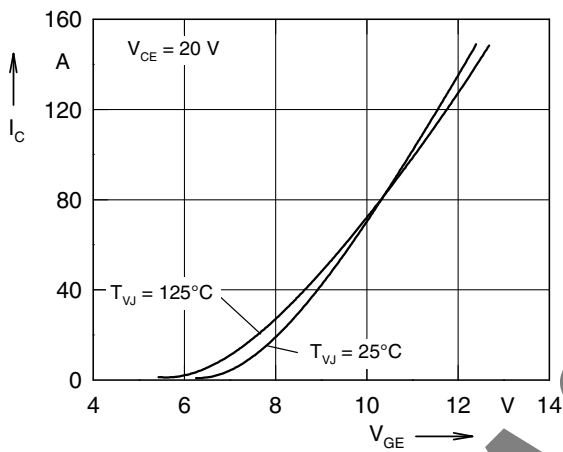


Fig. 3 Typ. transfer characteristics

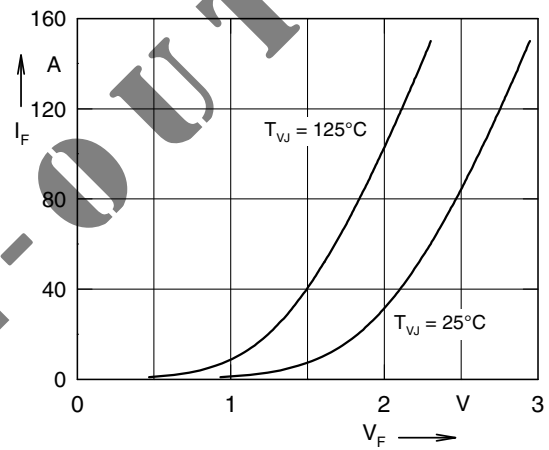


Fig. 4 Typ. forward characteristics of free wheeling diode

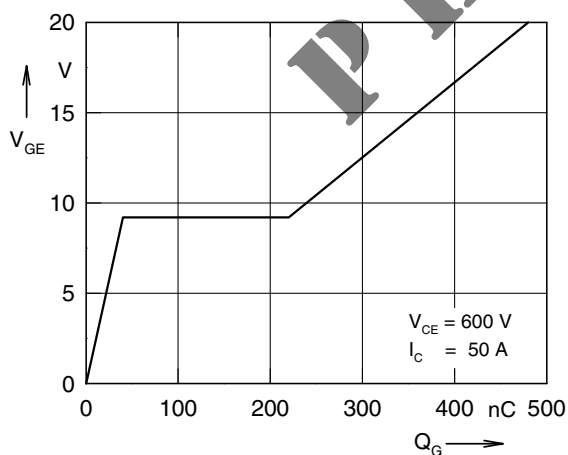


Fig. 5 Typ. turn on gate charge

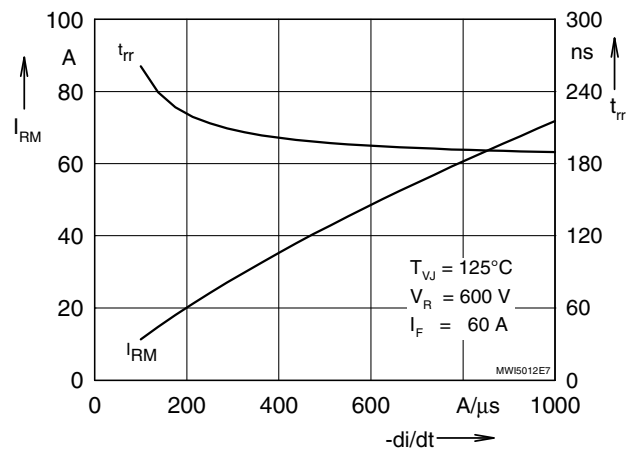


Fig. 6 Typ. turn off characteristics of free wheeling diode

