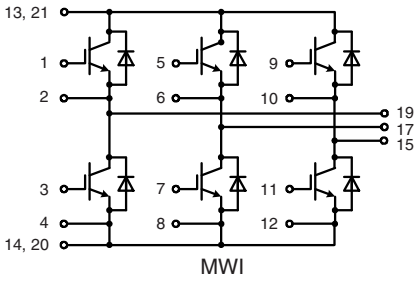
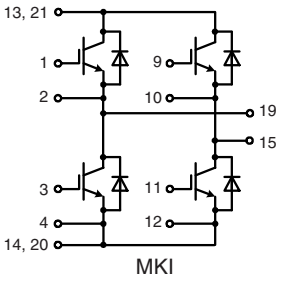
IGBT Modules
Sixpack, H Bridge

Short Circuit SOA Capability
Square RBSOA

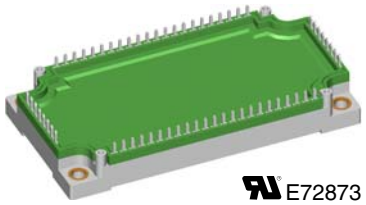
I_{C25} = 130 A
V_{CES} = 1200 V
$V_{CE(sat)\ typ.}$ = 2.0 V



MWI



MKI


E72873

See outline drawing for pin arrangement

IGBTs

Symbol	Conditions	Maximum Ratings	
V_{CES}	T_{VJ} = 25°C to 150°C	1200	V
V_{GES}		± 20	V
I_{C25}	T_C = 25°C	130	A
I_{C80}	T_C = 80°C	90	A
I_{CM}	V_{GE} = ±15 V; R_G = 15 Ω; T_{VJ} = 125°C	150	A
V_{CEK}	RBSOA; clamped inductive load; L = 100 µH	V_{CES}	
t_{SC}	V_{CE} = 900 V; V_{GE} = ±15 V; R_G = 15 Ω; T_{VJ} = 125°C SCSOA; non-repetitive	10	µs
P_{tot}	T_C = 25°C	500	W

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{CE(sat)}$	I_C = 75 A; V_{GE} = 15 V; T_{VJ} = 25°C		2.0	2.5	V
	T_{VJ} = 125°C		2.2		V
$V_{GE(th)}$	I_C = 3 mA; V_{GE} = V_{CE}	4.5		6.5	V
I_{CES}	V_{CE} = V_{CES}; V_{GE} = 0 V; T_{VJ} = 25°C			1.1	mA
	T_{VJ} = 125°C		1.1		mA
I_{GES}	V_{CE} = 0 V; V_{GE} = ± 20 V			400	nA
$t_{d(on)}$	Inductive load, T_{VJ} = 125°C		150		ns
t_r	V_{CE} = 600 V; I_C = 75 A		60		ns
$t_{d(off)}$	V_{GE} = ±15 V; R_G = 15 Ω		680		ns
t_f			50		ns
E_{on}			9		mJ
E_{off}			7.5		mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz		5.7		nF
Q_{Gon}	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 100 A		0.58		µC
R_{thJC}	(per IGBT)			0.25	K/W

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Features
- NPT³ 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

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

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

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Diodes

Symbol	Conditions	Maximum Ratings	
I_{F25}	T_C = 25°C	150	A
I_{F80}	T_C = 80°C	100	A

Symbol	Conditions	Characteristic Values min.	typ.	max.	
V_F	I_F = 75 A; V_{GE} = 0 V; T_{VJ} = 25°C		2.2	2.6	V
	T_{VJ} = 125°C		1.6		V
I_{RM}	I_F = 75 A; di_F/dt = -750 A/µs; T_{VJ} = 125°C		79		A
t_{rr}	V_R = 600 V; V_{GE} = 0 V		220		ns
R_{thJC}	(per diode)			0.41	K/W

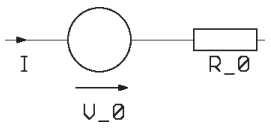
Module

Symbol	Conditions	Maximum Ratings	
T_{VJ}	operating	-40...+125	°C
T_{JM}		+150	°C
T_{stg}		-40...+125	°C
V_{ISOL}	I_{ISOL} ≤ 1 mA; 50/60 Hz	2500	V~
M_d	Mounting torque (M5)	3 - 6	Nm

Symbol	Conditions	Characteristic Values min.	typ.	max.	
$R_{pin-chip}$			1.8		mΩ
d_S	Creepage distance on surface	10			mm
d_A	Strike distance in air	10			mm
R_{thCH}	with heatsink compound		0.01		K/W
Weight			300		g

Equivalent Circuits for Simulation

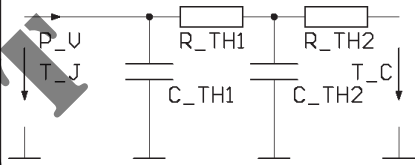
Conduction



IGBT (typ. at V_{GE} = 15 V; T_J = 125°C)
V_0 = 0.95 V; R_0 = 17 mΩ

Free Wheeling Diode (typ. at T_J = 125°C)
V_0 = 1.2 V; R_0 = 6 mΩ

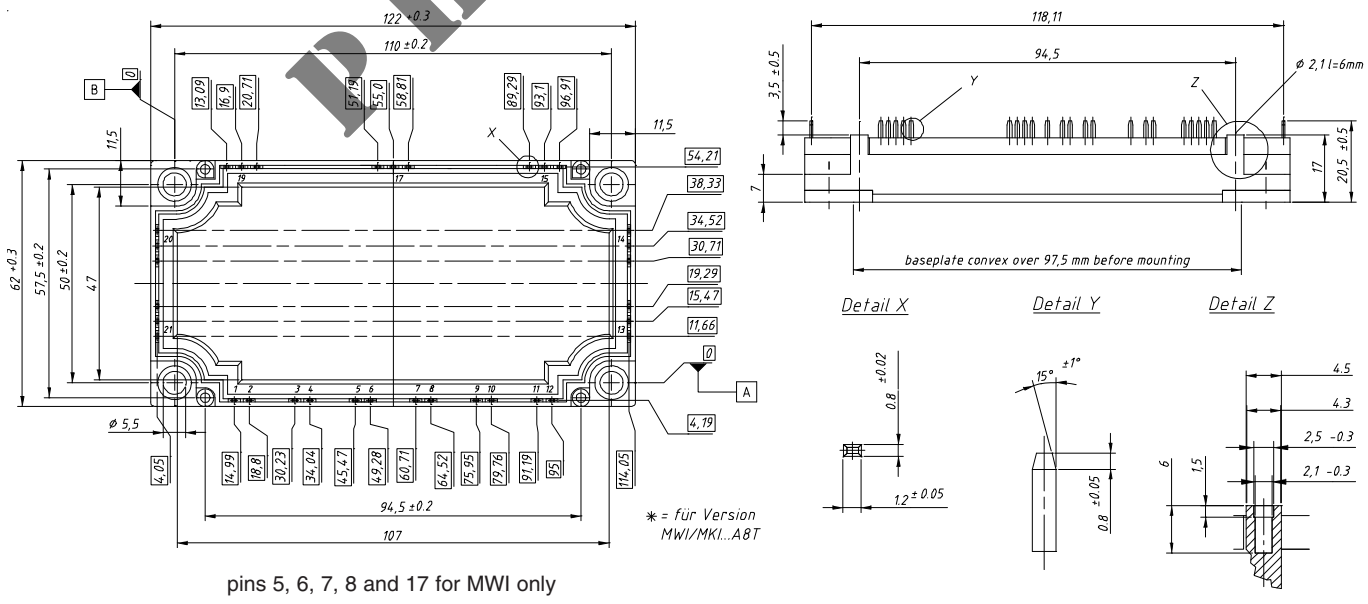
Thermal Response



IGBT (typ.)
C_{th1} = 0.294 J/K; R_{th1} = 0.184 K/W
C_{th2} = 1.789 J/K; R_{th2} = 0.064 K/W

Free Wheeling Diode (typ.)
C_{th1} = 0.227 J/K; R_{th1} = 0.321 K/W
C_{th2} = 1.328 J/K; R_{th2} = 0.089 K/W

Dimensions in mm (1 mm = 0.0394")



pins 5, 6, 7, 8 and 17 for MWI only

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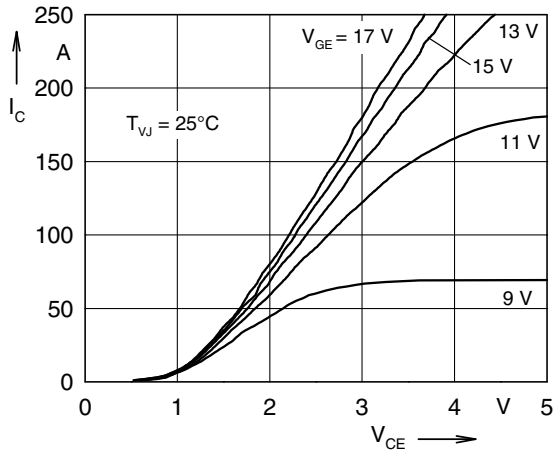


Fig. 1 Typ. output characteristics

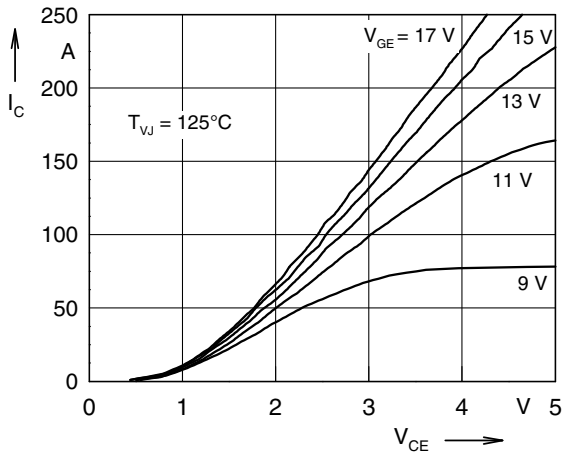


Fig. 2 Typ. output characteristics

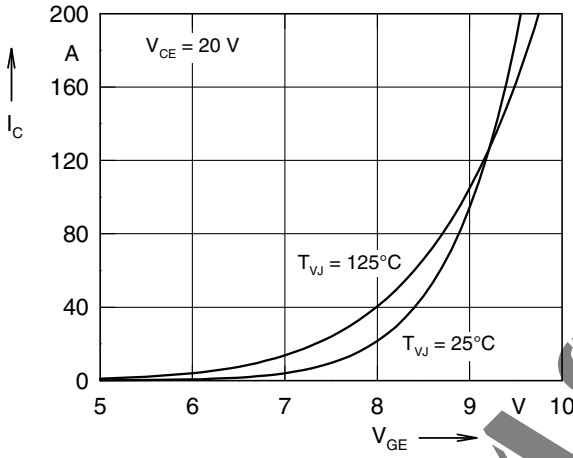


Fig. 3 Typ. transfer characteristics

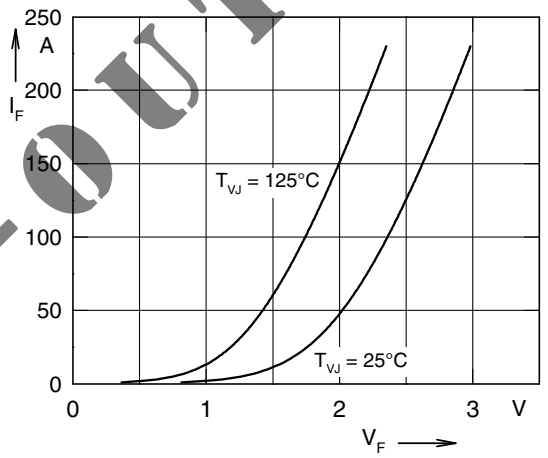


Fig. 4 Typ. forward characteristics of free wheeling diode

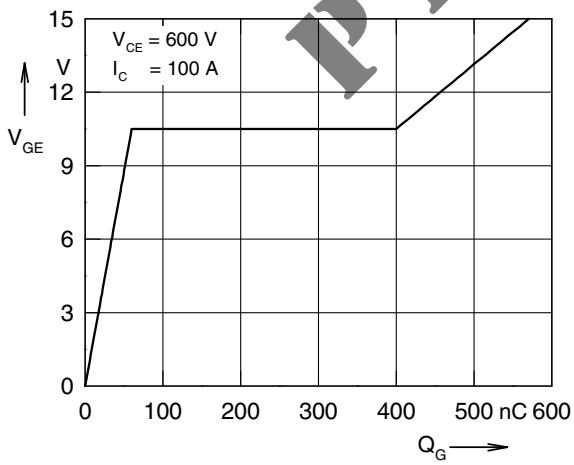


Fig. 5 Typ. turn on gate charge

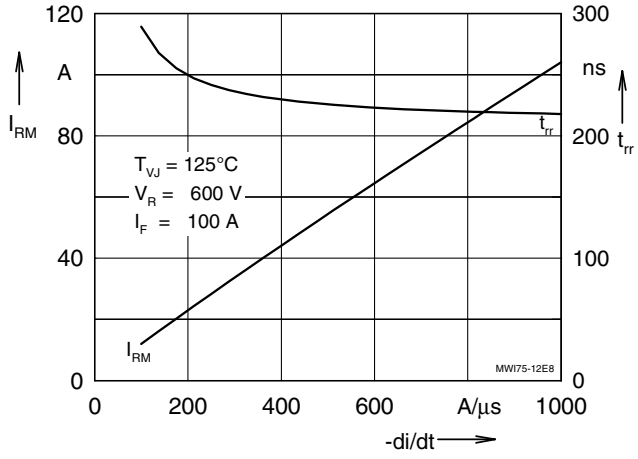


Fig. 6 Typ. turn off characteristics of free wheeling diode

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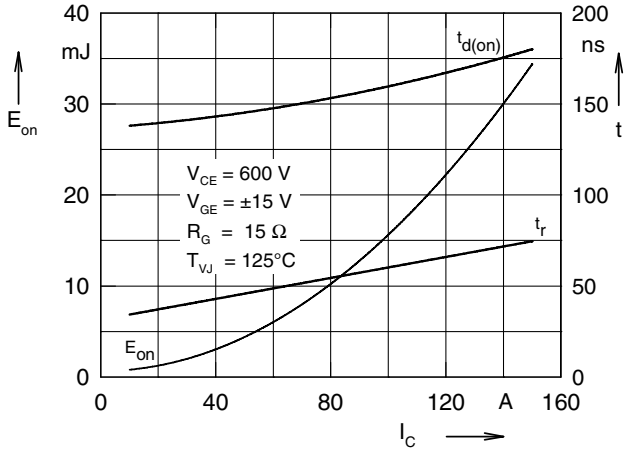


Fig. 7 Typ. turn on energy and switching times versus collector current

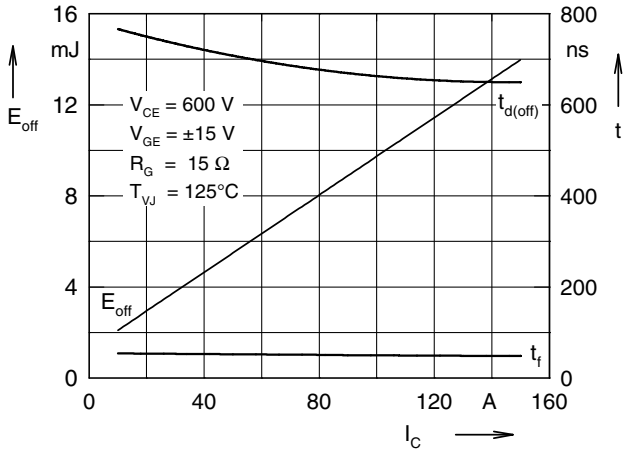


Fig. 8 Typ. turn off energy and switching times versus collector current

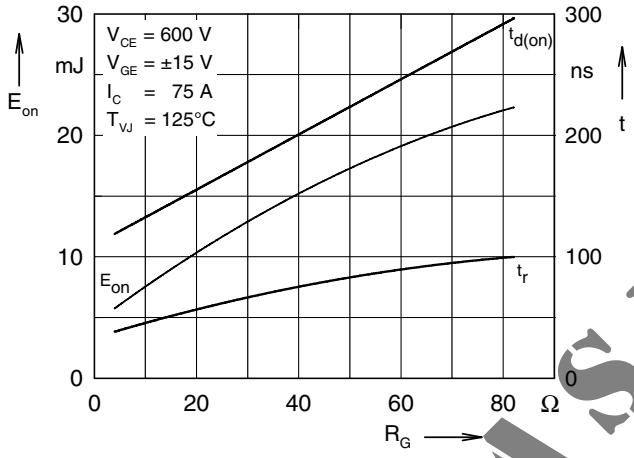


Fig. 9 Typ. turn on energy and switching times versus gate resistor

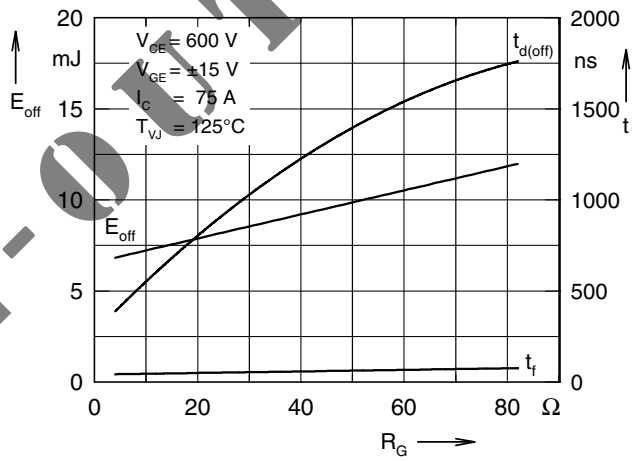


Fig.10 Typ. turn off energy and switching times versus gate resistor

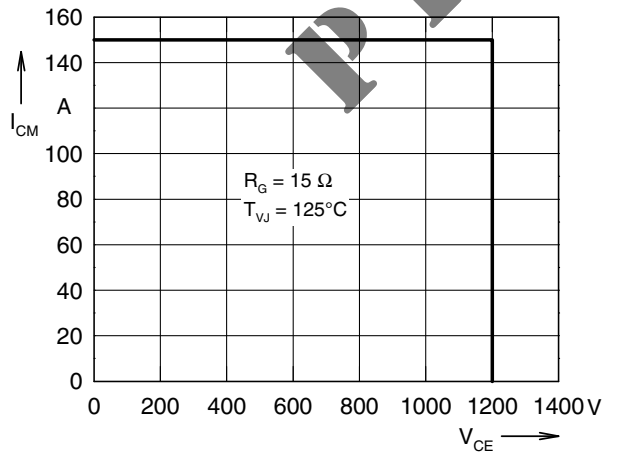


Fig. 11 Reverse biased safe operating area RBSOA

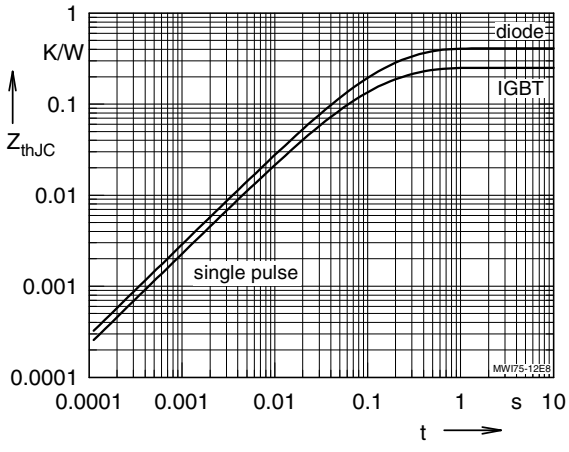


Fig. 12 Typ. transient thermal impedance

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