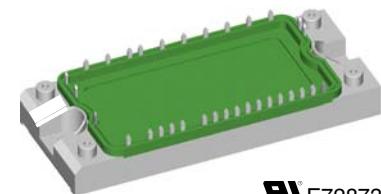
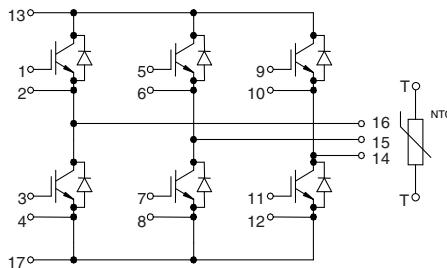


IGBT Modules

Sixpack

Short Circuit SOA Capability
Square RBSOA

Type:	NTC - Option:
MWI 50-12 A7	without NTC
MWI 50-12 A7T	with NTC



E72873

See outline drawing for pin arrangement

IGBTs

Symbol	Conditions	Maximum Ratings		
V_{CES}	$T_{VJ} = 25^\circ\text{C}$ to 150°C	1200		V
V_{GES}		± 20		V
I_{C25}	$T_C = 25^\circ\text{C}$	85		A
I_{C80}	$T_C = 80^\circ\text{C}$	60		A
RBSOA	$V_{GE} = \pm 15 \text{ V}$; $R_G = 22 \Omega$; $T_{VJ} = 125^\circ\text{C}$ Clamped inductive load; $L = 100 \mu\text{H}$	$I_{CM} = 100$ $V_{CEK} \leq V_{CES}$		A
t_{sc} (SCSOA)	$V_{CE} = V_{CES}$; $V_{GE} = \pm 15 \text{ V}$; $R_G = 22 \Omega$; $T_{VJ} = 125^\circ\text{C}$ non-repetitive	10	μs	
P_{tot}	$T_C = 25^\circ\text{C}$	350		W

Symbol	Conditions	Characteristic Values		
		$(T_{VJ} = 25^\circ\text{C}$, unless otherwise specified)		
$V_{CE(sat)}$	$I_C = 50 \text{ A}$; $V_{GE} = 15 \text{ V}$; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	2.2 2.5	2.7	V
$V_{GE(th)}$	$I_C = 2 \text{ mA}$; $V_{GE} = V_{CE}$	4.5	6.5	V
I_{CES}	$V_{CE} = V_{CES}$; $V_{GE} = 0 \text{ V}$; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	3	4	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}	$\left. \begin{array}{l} \text{Inductive load, } T_{VJ} = 125^\circ\text{C} \\ V_{CE} = 600 \text{ V}; I_C = 50 \text{ A} \\ V_{GE} = \pm 15 \text{ V}; R_G = 22 \Omega \end{array} \right\}$	100 70 500 70 7.6 5.6	ns ns ns ns mJ mJ	
C_{ies}		3300		pF
Q_{Gon}		230		nC
R_{thJC}			0.35	K/W

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	110	A	
I _{F80}	T _C = 80°C	70	A	

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
V _F	I _F = 50 A; V _{GE} = 0 V; T _{VJ} = 25°C T _{VJ} = 125°C	2.2	2.6	V
		1.6	1.8	V
I _{RM} t _{rr}	I _F = 50 A; di _F /dt = -400 A/μs; T _{VJ} = 125°C V _R = 600 V; V _{GE} = 0 V	40		A
		200		ns
R _{thJC}	(per diode)		0.61	K/W

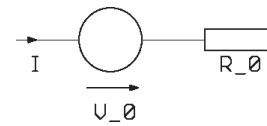
Temperature Sensor NTC (MWI ... A7T version only)

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
R ₂₅	T = 25°C	4.75	5.0	5.25 kΩ
B _{25/50}			3375	K

Module

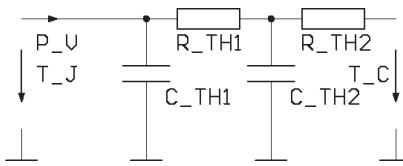
Symbol	Conditions	Maximum Ratings		
T _{VJ}		-40...+150		°C
T _{stg}		-40...+125		°C
V _{ISOL}	I _{ISOL} ≤ 1 mA; 50/60 Hz	2500		V~
M _d	Mounting torque (M5)	2.7 - 3.3		Nm

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
R _{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

Equivalent Circuits for Simulation
Conduction


IGBT (typ. at V_{GE} = 15 V; T_J = 125°C)
V₀ = 1.5 V; R₀ = 20.7 mΩ

Free Wheeling Diode (typ. at T_J = 125°C)
V₀ = 1.3 V; R₀ = 6 mΩ

Thermal Response


IGBT (typ.)

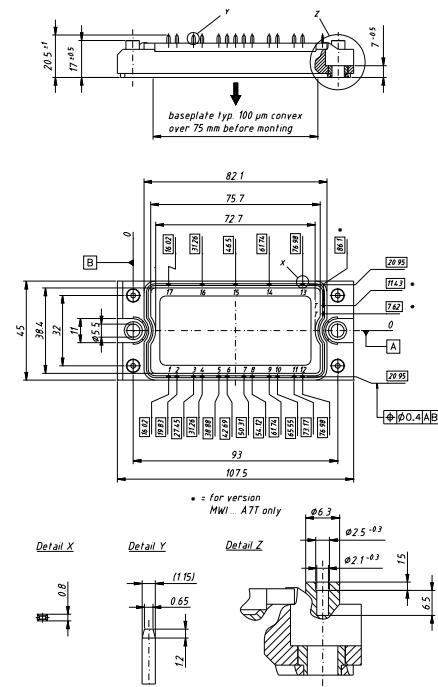
$$C_{th1} = 0.22 \text{ J/K}; R_{th1} = 0.26 \text{ K/W}$$

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

Free Wheeling Diode (typ.)

$$C_{th1} = 0.151 \text{ J/K}; R_{th1} = 0.482 \text{ K/W}$$

$$C_{th2} = 1.003 \text{ J/K}; R_{th2} = 0.124 \text{ K/W}$$

Dimensions in mm (1 mm = 0.0394")


Higher magnification on page B3 - 72

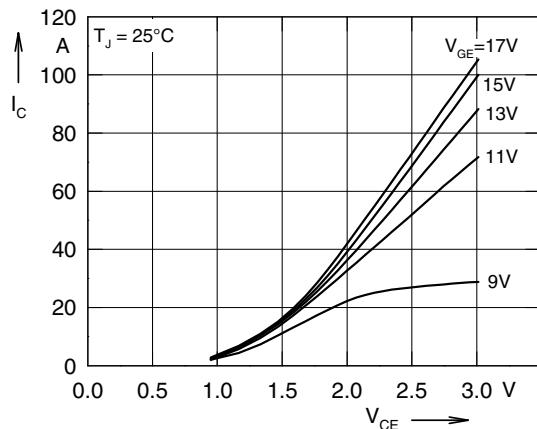


Fig. 1 Typ. output characteristics

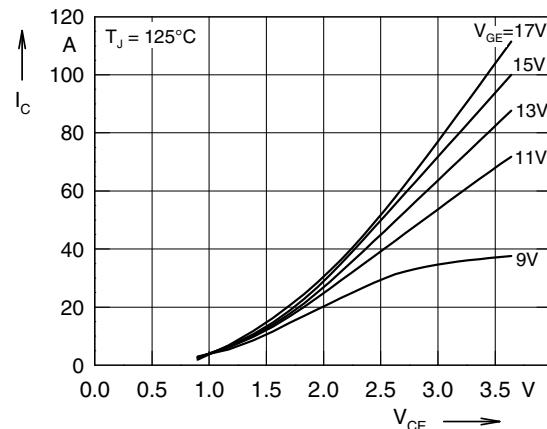


Fig. 2 Typ. output characteristics

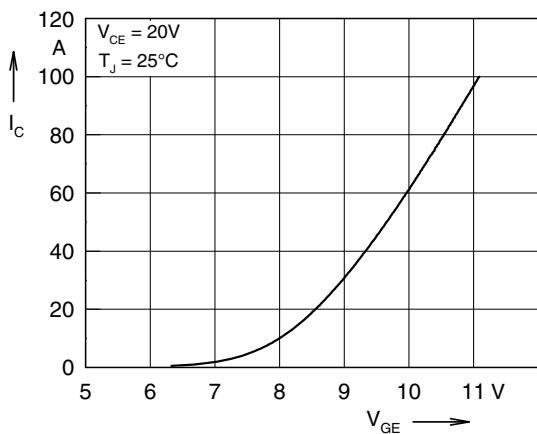


Fig. 3 Typ. transfer characteristics

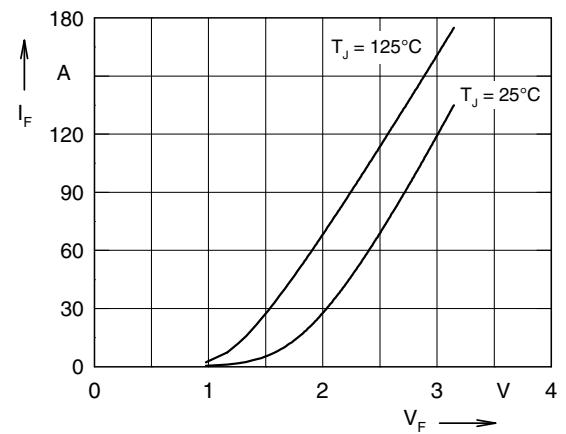


Fig. 4 Typ. forward characteristics of free wheeling diode

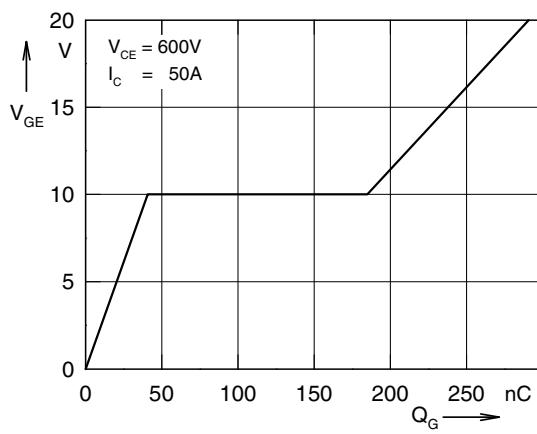


Fig. 5 Typ. turn on gate charge

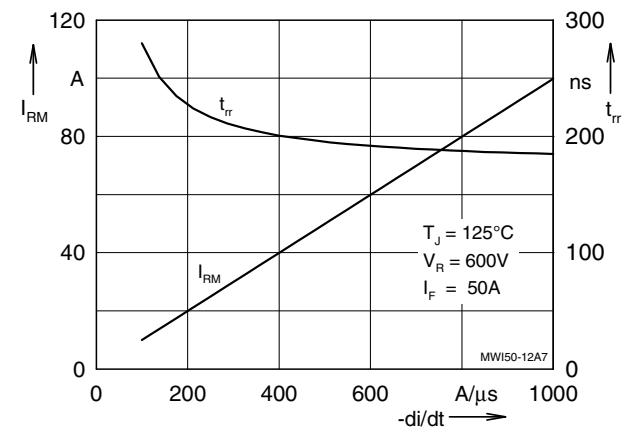


Fig. 6 Typ. turn off characteristics of free wheeling diode

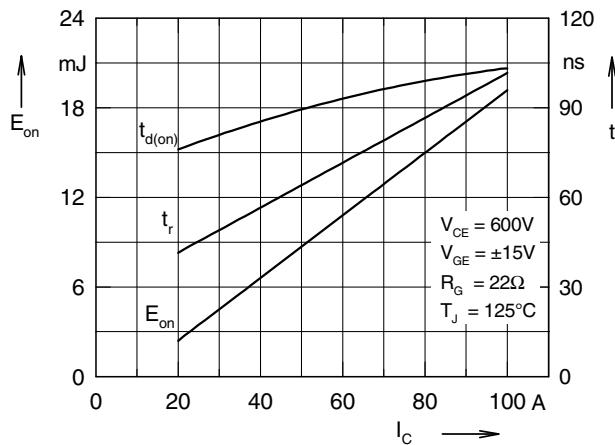


Fig. 7 Typ. turn on energy and switching times versus collector current

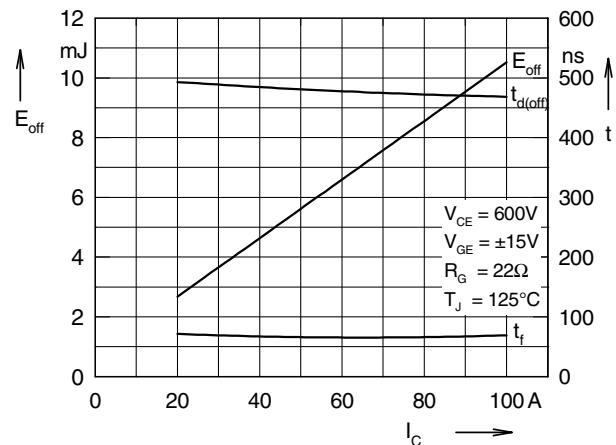


Fig. 8 Typ. turn off energy and switching times versus collector current

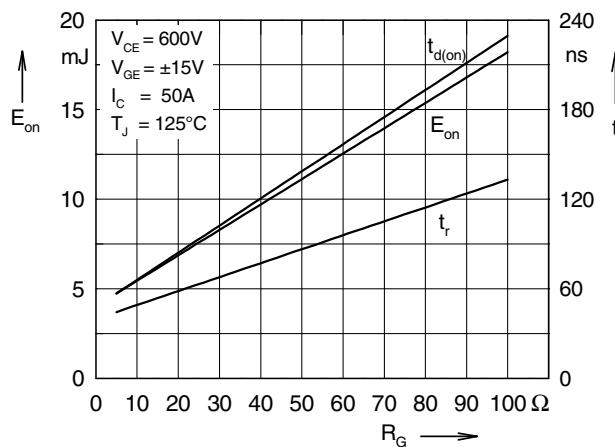


Fig. 9 Typ. turn on energy and switching times versus gate resistor

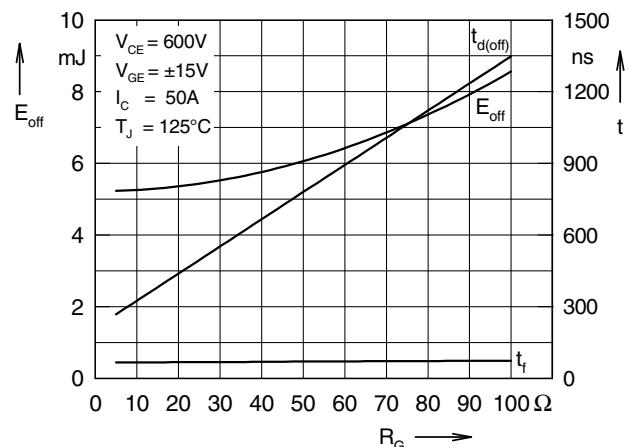


Fig. 10 Typ. turn off energy and switching times versus gate resistor

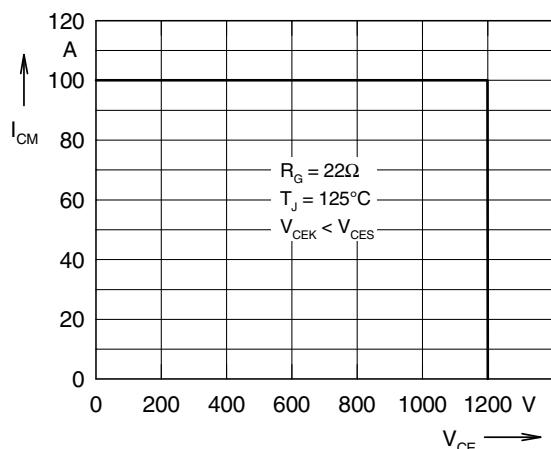


Fig. 11 Reverse biased safe operating area RBSOA

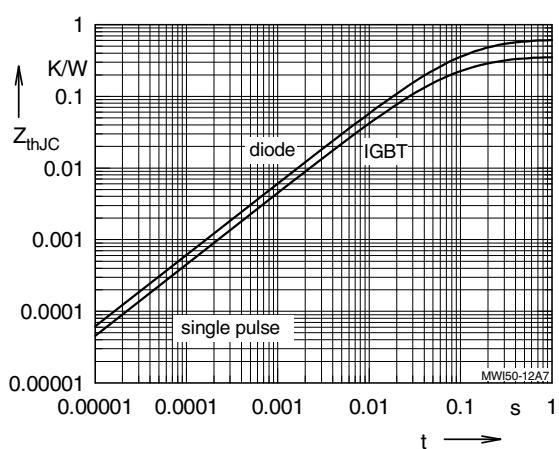


Fig. 12 Typ. transient thermal impedance