IGBT Module

Sixpack

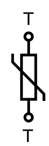
Short Circuit SOA Capability
Square RBSOA

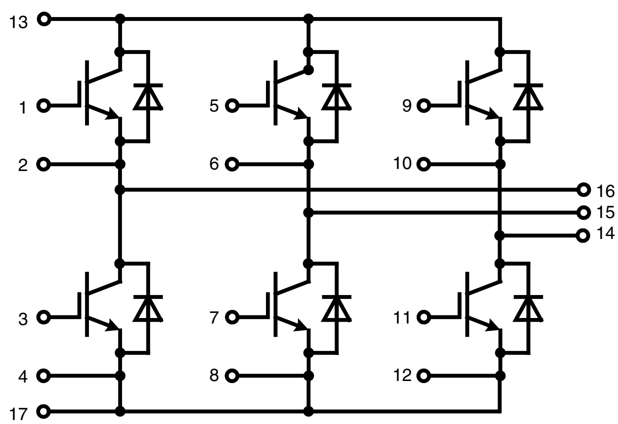
I_{C25}	=	50 A
V_{CES}	=	1200 V
$V_{CE(sat)\ typ.}$	=	2.2 V

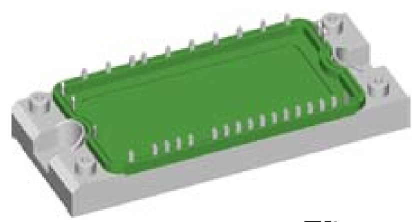
Part name (Marking on product)

MWI25-12A7
MWI25-12A7T

T version







E72873

Pin configuration see outlines.

Features:

- NPT IGBT technology
- low saturation voltage
- positive temperature coefficient for easy paralleling
- low switching losses
- switching frequency up to 30 kHz
- square RBSOA, no latch up
- high short circuit capability
- MOS input, voltage controlled
- ultra fast free wheeling diodes
- solderable pins for PCB mounting
- space savings
- reduced protection circuits

Application:

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

Package:

- UL registered
- Industry standard E2-pack
- package with copper base plate
- package designed for wave soldering

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

20080805a

IGBTs

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°C to 150°C			1200	V
V_{GES} V_{GEM}	*max. DC gate voltage* *max. transient collector gate voltage*	continuous transient				±20 ±30	V V
I_{C25} I_{C80}	*collector current*		T_C = 25°C T_C = 80°C			50 35	A A
P_{tot}	*total power dissipation*		T_C = 25°C			225	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 25 A; V_{GE} = 15 V	T_{VJ} = 25°C T_{VJ} = 125°C		2.2 2.6	2.7	V V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 1 mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	4.5		6.5	V
I_{CES}	*collector emitter leakage current*	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C T_{VJ} = 125°C		 2	2	mA mA
I_{GES}	*gate emitter leakage current*	V_{CE} = 0 V; V_{GE} = ±20 V				200	nA
C_{ies}	*input capacitance*	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz			1650		pF
$Q_{G(on)}$	*total gate charge*	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 35 A			120		nC
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off}	*turn-on delay time* *current rise time* *turn-off delay time* *current fall time* *turn-on energy per pulse* *turn-off energy per pulse*	inductive load V_{CE} = 600 V; I_C = 25 A V_{GE} = ±15 V; R_G = 47 Ω	T_{VJ} = 125°C		100 70 500 70 3.8 2.8		ns ns ns ns mJ mJ
I_{CM}	*reverse bias safe operating area*	RBSOA; V_{GE} = ±15 V; R_G = 47 Ω L = 100 µH; clamped induct. load V_{CEmax} = V_{CES} - L_S·di/dt	T_{VJ} = 125°C		70		A
t_{SC} **(SCSOA)**	*short circuit safe operating area*	V_{CE} = V_{CES}; V_{GE} = ±15 V; R_G = 47 Ω; non-repetitive	T_{VJ} = 125°C		10		µs
R_{thJC}	*thermal resistance junction to case*	(per IGBT)				0.55	K/W

Diodes

Symbol	Definitions	Conditions		min.	typ.	max.	Unit
V_{RRM}	*max. repetitve reverse voltage*		T_{VJ} = 150°C			1200	V
I_{F25} I_{F80}	*forward current*		T_C = 25°C T_C = 80°C			50 33	A A
V_F	*forward voltage*	I_F = 25 A; V_{GE} = 0 V	T_{VJ} = 25°C T_{VJ} = 125°C		2.3 1.7	2.7	V V
I_{RM} t_{rr} $E_{rec(off)}$	*max. reverse recovery current* *reverse recovery time* *reverse recovery energy*	V_R = 600 V di_F/dt = -400 A/µs I_F = 25 A; V_{GE} = 0 V	T_{VJ} = 125°C		20 200 1.3		A ns mJ
R_{thJC}	*thermal resistance junction to case*	(per diode)				1.19	K/W

T_C = 25°C unless otherwise stated

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

20080805a

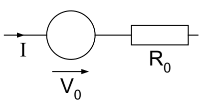
Module

Symbol	Definitions	Conditions	min.	typ.	max.	Unit
T_{VJ}	*operating temperature*		-40		125	°C
T_{VJM}	*max. virtual junction temperature*				150	°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)	2.7		3.3	Nm
d_S	*creep distance on surface*		6			mm
d_A	*strike distance through air*		6			mm
Weight				180		g
R_{thCH}	*thermal resistance case to heatsink*	with heatsink compound		0.02		K/W

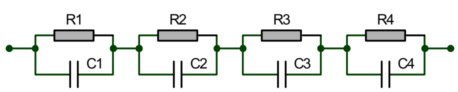
Temperature Sensor NTC

Symbol	Definitions	Conditions	min.	typ.	max.	Unit
R_{25}	*resistance*	T_C = 25°C	4.75	5.0	5.25	kΩ
$B_{25/50}$				3375		K

Equivalent Circuits for Simulation



Symbol	Definitions	Conditions		min.	typ.	max.	Unit
V_0	*IGBT*	T1 - T6	T_{VJ} = 125°C		1.5		V
R_0					40.7		mΩ
V_0	*Diode*	D1 - D6	T_{VJ} = 125°C		1.3		V
R_0					16		mΩ



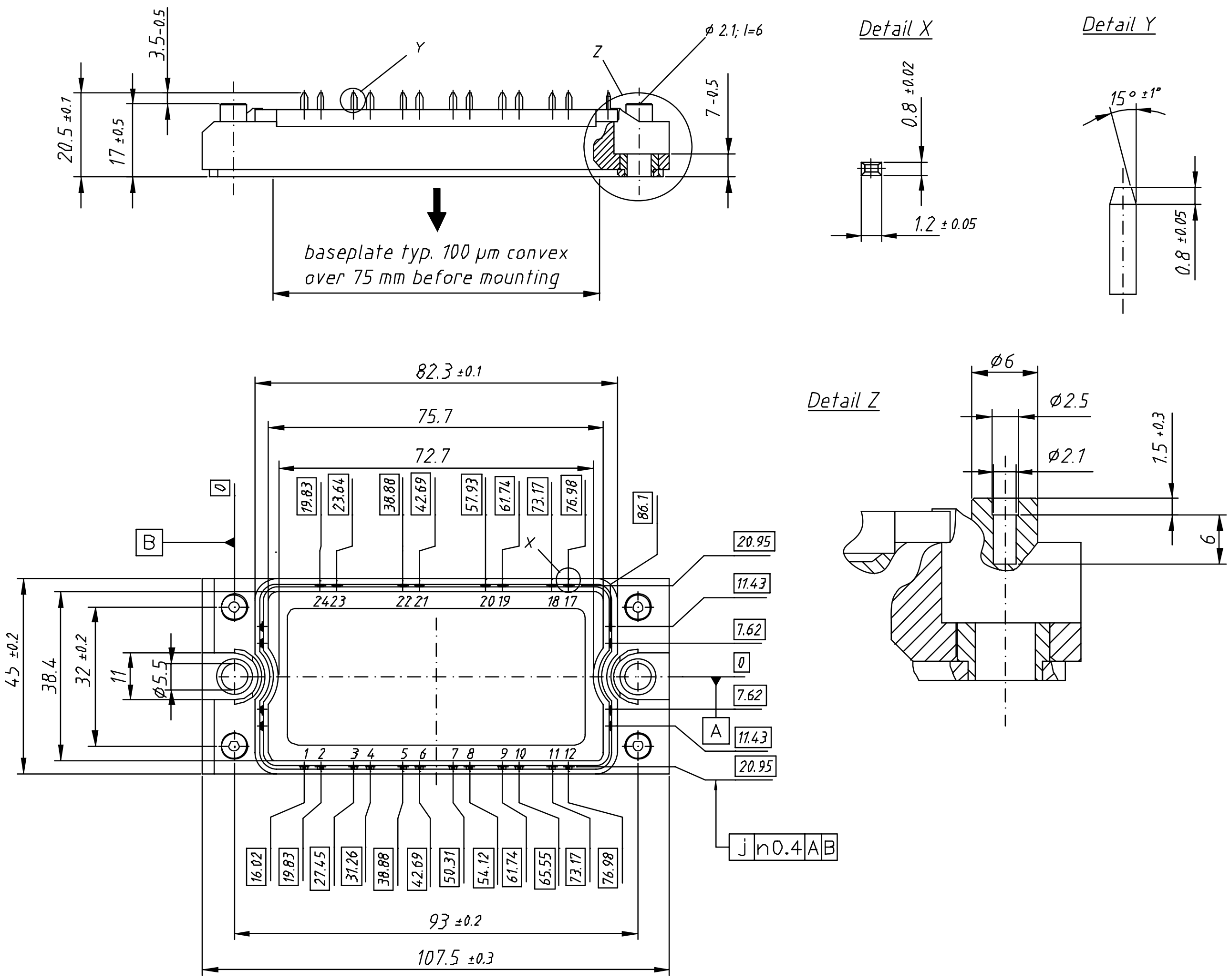
$$Z_{th}(t) = \sum_{i=1}^{n} \left[R_i \cdot \left(1 - \exp\left(-\frac{t}{\tau_i} \right) \right) \right]$$

$$\tau_i = R_i \cdot C_i$$

	IGBT	Diode
R_1	-	-
R_2	-	-
C_1	-	-
C_2	-	-

IXYS reserves the right to change limits, test conditions and dimensions. 20080805a

Outline Drawing Dimensions in mm (1 mm = 0.0394“)



Product Marking

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MWI 15-12A7	MWI15-12A7	Box	10	482730
Standard	MWI 15-12A7T	MWI15-12A7T	Box	10	480819

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

20080805a

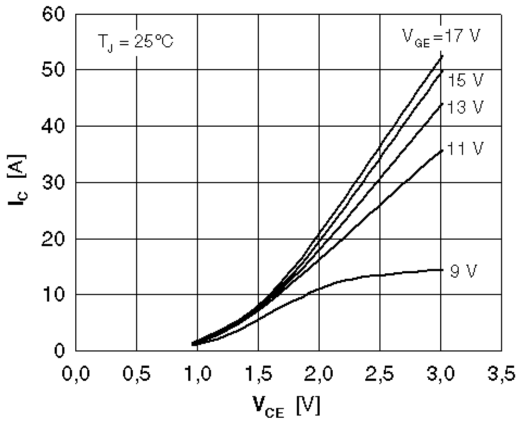


Fig. 1 Typ. output characteristics

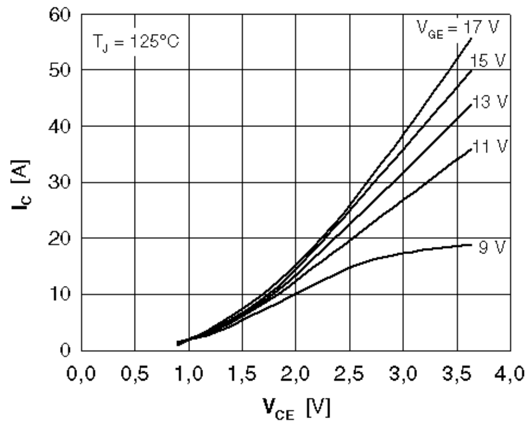


Fig. 2 Typ. output characteristics

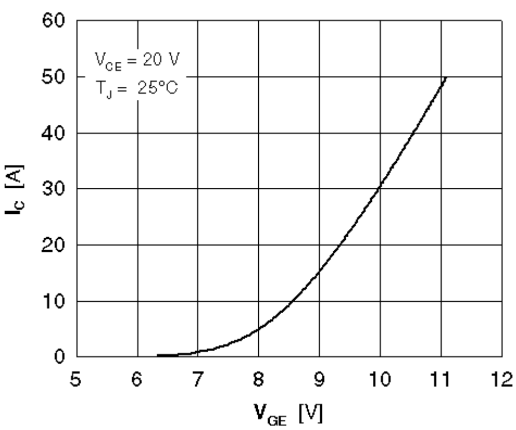


Fig. 3 Typ. transfer characteristics

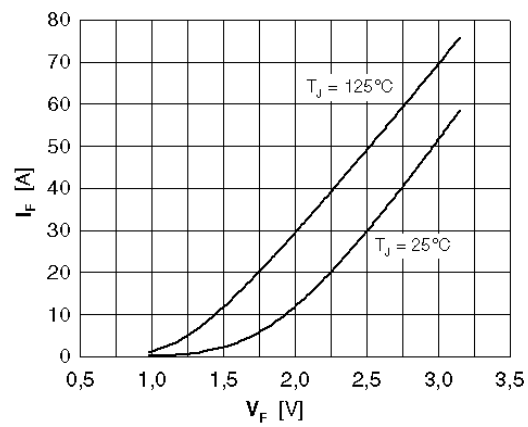


Fig. 4 Typ. forward characteristics of free wheeling diode

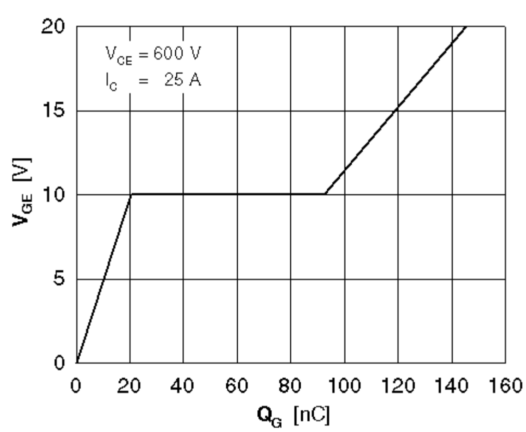


Fig. 5 Typ. turn on gate charge

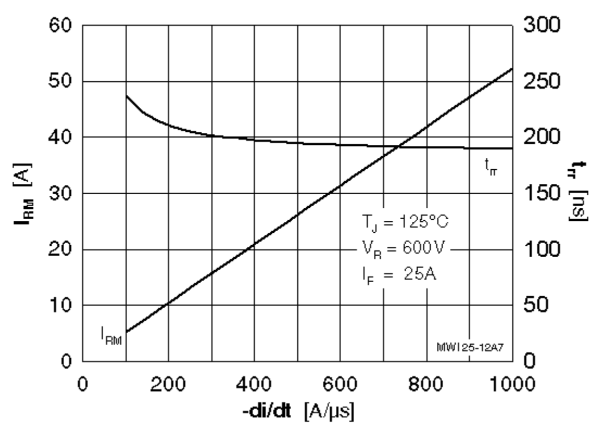


Fig. 6 Typ. turn off characteristics of free wheeling diode

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

20080805a

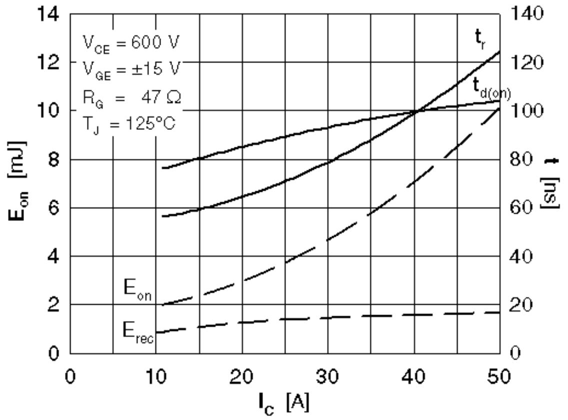


Fig. 7 Typ. turn on energy and switching times versus collector current

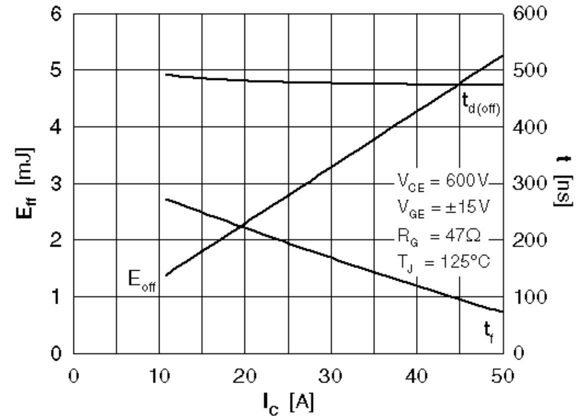


Fig. 8 Typ. turn off energy and switching times versus collector current

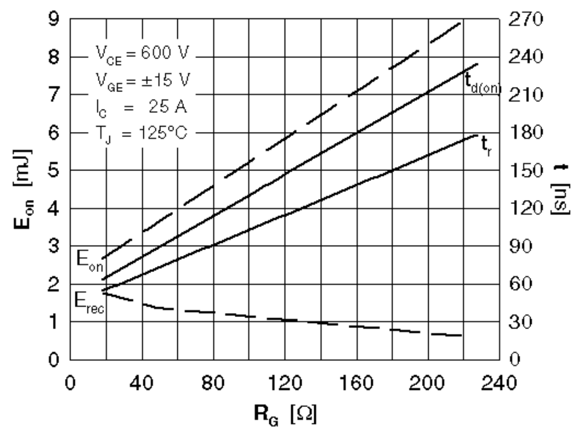


Fig. 9 Typ. turn on energy and switching times versus gate resistor

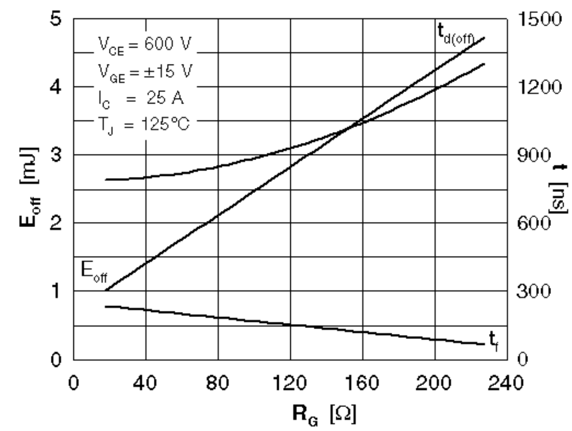


Fig.10 Typ. turn off energy and switching times versus gate resistor

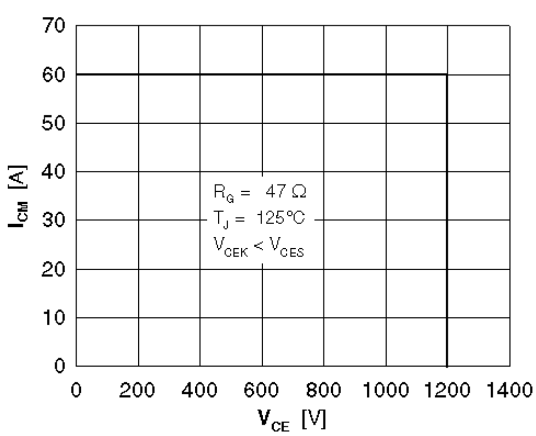


Fig. 11 Reverse biased safe operating area

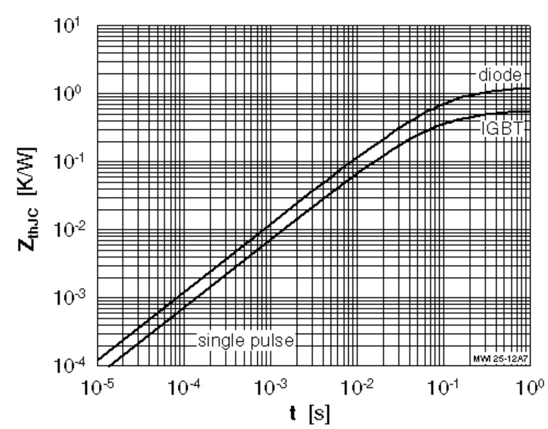


Fig. 12 Typ. transient thermal impedance

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

20080805a