IGBT (NPT) Module

V_{CES} = 1200V
I_{C25} = 90A
$V_{CE(sat)}$ = 2.2V

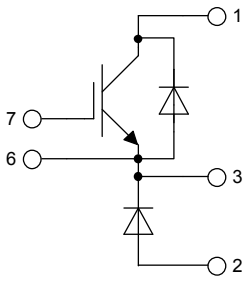
Buck Chopper + free wheeling Diode

Part number

MDI75-12A3

Backside: isolated

E72873



Features / Advantages:

- NPT IGBT technology
- low saturation voltage
- low switching losses
- switching frequency up to 30 kHz
- square RBSOA, no latch up
- high short circuit capability
- positive temperature coefficient for easy parallelling
- MOS input, voltage controlled
- ultra fast free wheeling diodes

Applications:

- AC motor drives
- Solar inverter
- Medical equipment
- Uninterruptible power supply
- Air-conditioning systems
- Welding equipment
- Switched-mode and resonant-mode power supplies
- Inductive heating, cookers
- Pumps, Fans

Package: Y4

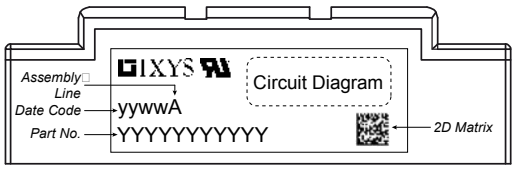
- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

Free Wheeling Diode FWD				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	*max. non-repetitive reverse blocking voltage*		T_{VJ} = 25°C			1200	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			1200	V
I_R	*reverse current, drain current*	V_R = 1200 V	T_{VJ} = 25°C			650	µA
		V_R = 1200 V	T_{VJ} = 125°C			2	mA
V_F	*forward voltage drop*	I_F = 50 A	T_{VJ} = 25°C			2.50	V
		I_F = 100 A				3.00	V
		I_F = 50 A	T_{VJ} = 125°C			1.90	V
		I_F = 100 A				2.30	V
I_{FAV}	*average forward current*	T_C = 80°C	T_{VJ} = 150°C			60	A
		DC current d = 1					
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 150°C			1.30	V
r_F	*slope resistance* }					12	mΩ
R_{thJC}	*thermal resistance junction to case*					0.66	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.66		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			190	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine; V_R = 0 V	T_{VJ} = 45°C			400	A
C_J	*junction capacitance*	V_R = 600 V f = 1 MHz	T_{VJ} = 25°C		30		pF

Buck IGBT				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{CES}	*collector emitter voltage*		T_{VJ} = 25°C			1200	V
V_{GES}	*max. DC gate voltage*					±20	V
V_{GEM}	*max. transient gate emitter voltage*					±30	V
I_{C25}	*collector current*		T_C = 25°C			90	A
I_{C80}			T_C = 80°C			60	A
P_{tot}	*total power dissipation*		T_C = 25°C			370	W
$V_{CE(sat)}$	*collector emitter saturation voltage*	I_C = 50A; V_{GE} = 15 V	T_{VJ} = 25°C		2.2	2.7	V
			T_{VJ} = 125°C		2.7		V
$V_{GE(th)}$	*gate emitter threshold voltage*	I_C = 2mA; V_{GE} = V_{CE}	T_{VJ} = 25°C	4.5	5.5	6.5	V
I_{CES}	*collector emitter leakage current*	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C			4	mA
			T_{VJ} = 125°C		6		mA
I_{GES}	*gate emitter leakage current*	V_{GE} = ±20 V				200	nA
$Q_{G(on)}$	*total gate charge*	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 50 A			240		nC
$t_{d(on)}$	*turn-on delay time*				100		ns
t_r	*current rise time*				70		ns
$t_{d(off)}$	*turn-off delay time*	inductive load	T_{VJ} = 125°C		500		ns
t_f	*current fall time*	V_{CE} = 600 V; I_C = 50 A			70		ns
E_{on}	*turn-on energy per pulse*	V_{GE} = ±15 V; R_G = 22 Ω			7.6		mJ
E_{off}	*turn-off energy per pulse*				5.6		mJ
RBSOA	*reverse bias safe operating area*	V_{GE} = ±15 V; R_G = 22 Ω	T_{VJ} = 125°C				
I_{CM}		V_{CEmax} = 1200 V				100	A
SCSOA	*short circuit safe operating area*	V_{CEmax} = 1200 V					
t_{SC}	*short circuit duration*	V_{CE} = 1200 V; V_{GE} = ±15 V	T_{VJ} = 125°C			10	µs
I_{SC}	*short circuit current*	R_G = 22 Ω; non-repetitive			180		A
R_{thJC}	*thermal resistance junction to case*					0.33	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.33		K/W

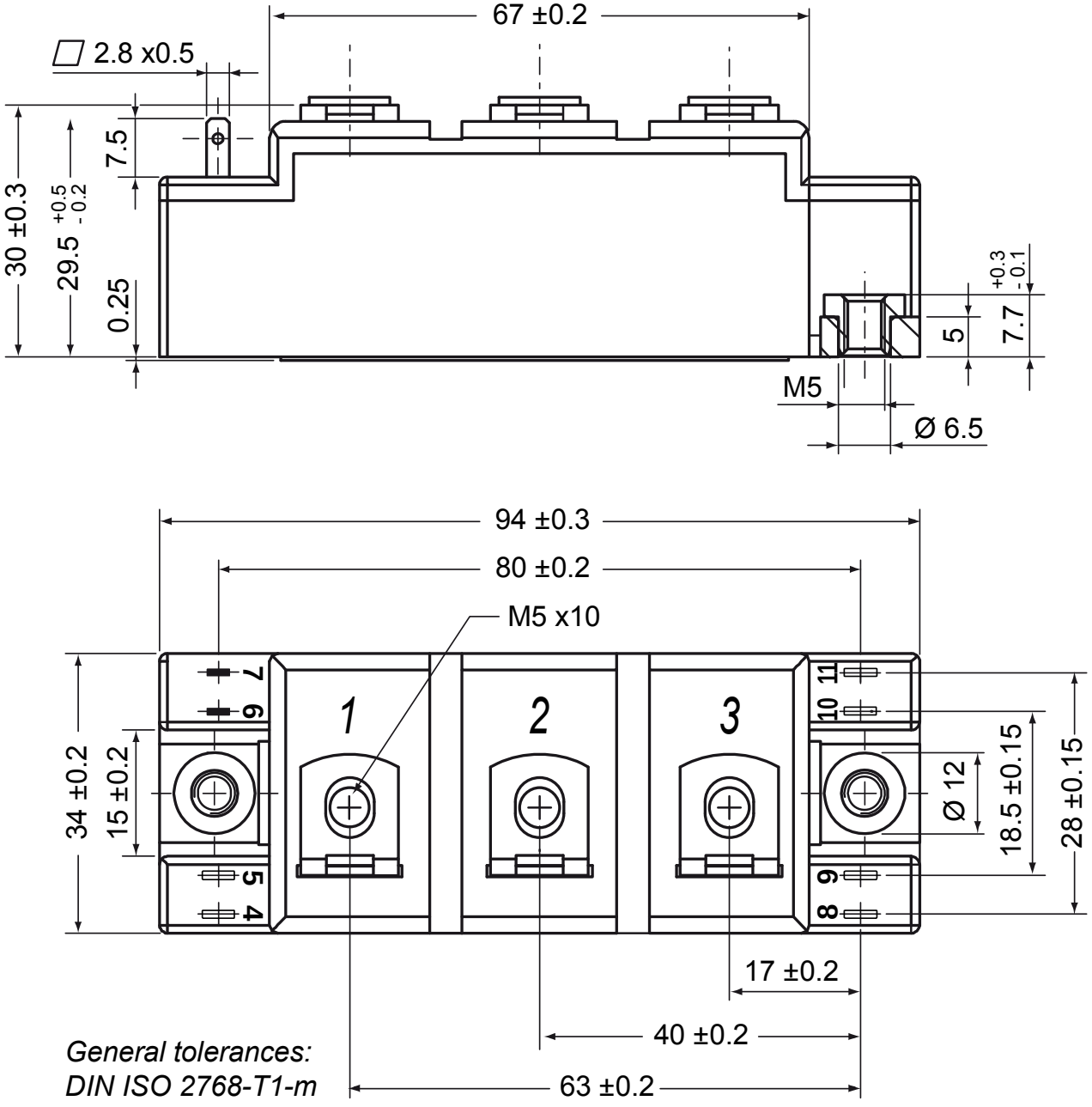
Buck Diode BD							
V_{RRM}	*max. repetitive reverse voltage*		T_{VJ} = 25°C			1200	V
I_{F25}	*forward current*		T_C = 25°C			100	A
I_{F80}			T_C = 80°C			60	A
V_F	*forward voltage*	I_F = 50A	T_{VJ} = 25°C			2.50	V
			T_{VJ} = 125°C		1.80		V
I_R	*reverse current*	V_R = V_{RRM}	T_{VJ} = 25°C			0.65	mA
			T_{VJ} = 125°C		1		mA
Q_{rr}	*reverse recovery charge*	V_R = 600 V			3.5		µC
I_{RM}	*max. reverse recovery current*	-di_F/dt = 400 A/µs	T_{VJ} = 125°C		40		A
t_{rr}	*reverse recovery time*	I_F = 50A; V_{GE} = 0 V			200		ns
E_{rec}	*reverse recovery energy*				1		mJ
R_{thJC}	*thermal resistance junction to case*					0.66	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.66		K/W

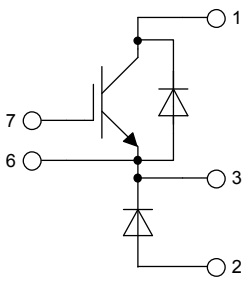
Package Y4					Ratings			
Symbol	Definition	Conditions			min.	typ.	max.	Unit
I_{RMS}	*RMS current*	per terminal					300	A
T_{VJ}	*virtual junction temperature*				-40		150	°C
T_{op}	*operation temperature*				-40		125	°C
T_{stg}	*storage temperature*				-40		125	°C
Weight						108		g
M_D	*mounting torque*				2.25		2.75	Nm
M_T	*terminal torque*				4.5		5.5	Nm
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*		*terminal to terminal*	14.0	10.0			mm
$d_{Spb/Apb}$			*terminal to backside*	16.0	16.0			mm
V_{ISOL}	*isolation voltage*	t = 1 second	50/60 Hz, RMS; I_{ISOL} ≤ 1 mA		3600			V
		t = 1 minute			3000			V



Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDI75-12A3	MDI75-12A3	Box	6	474207

Outlines Y4





Buck IGBT

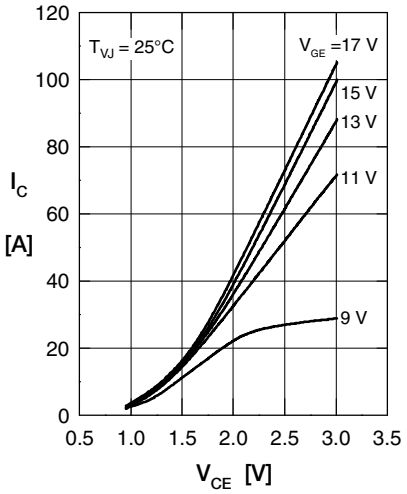


Fig. 1 Typ. output characteristics

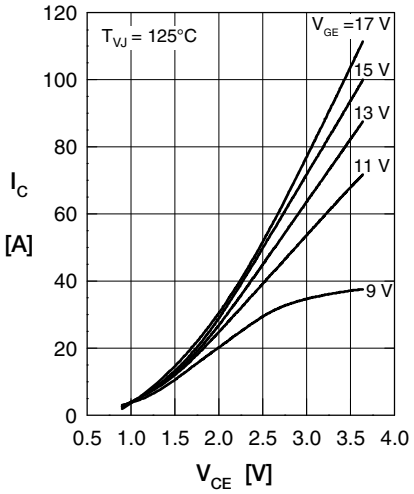


Fig. 2 Typ. output characteristics

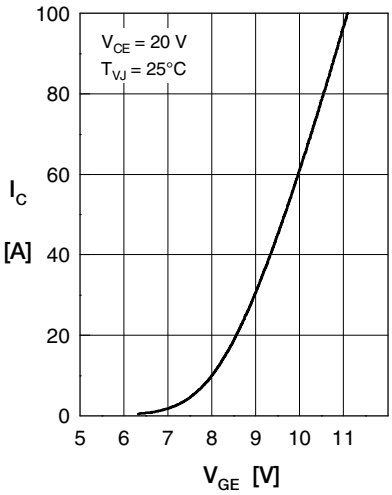


Fig. 3 Typ. transfer characteristics

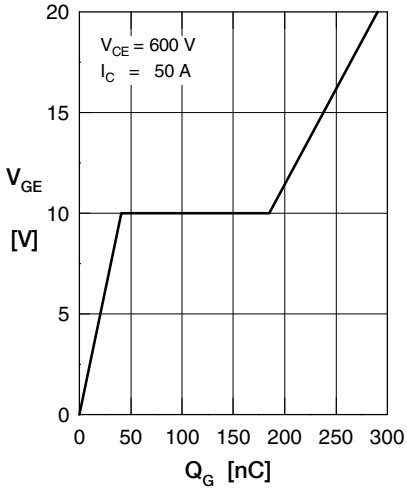


Fig. 4 Typ. turn-on gate charge

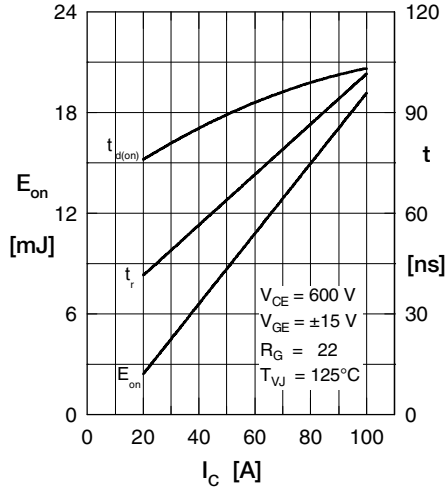


Fig. 5 Typ. turn on energy & switching times versus collector current

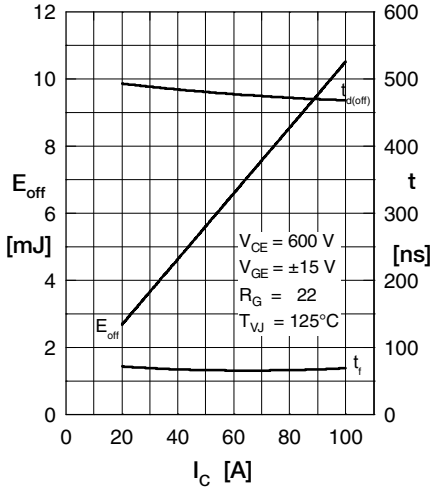


Fig.6 Typ. turn off energy & switching times versus collector current

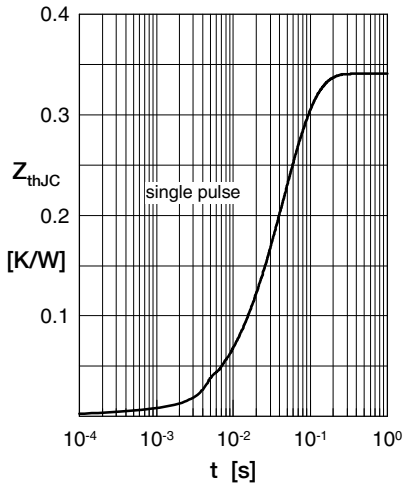


Fig. 12 Typical transient thermal impedance

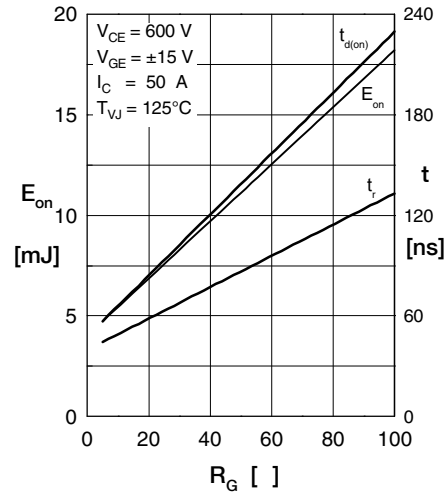


Fig. 9 Typ. turn on energy & switching times versus gate resistor

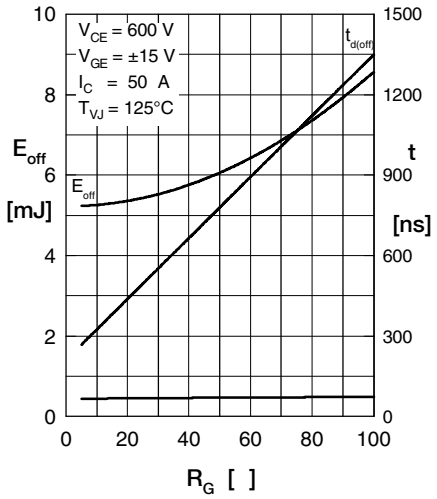


Fig. 9 Typ. turn off energy & switching times versus gate resistor

Buck Diode BD

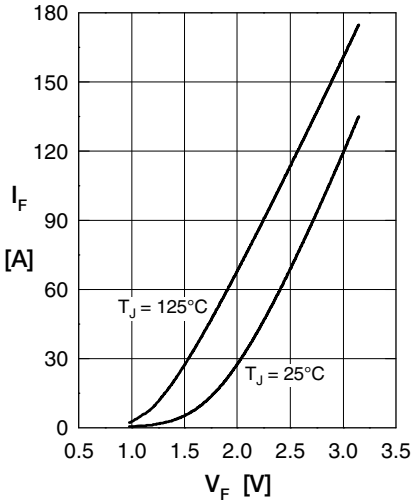


Fig. 1 Typ. Forward current vs. V_F

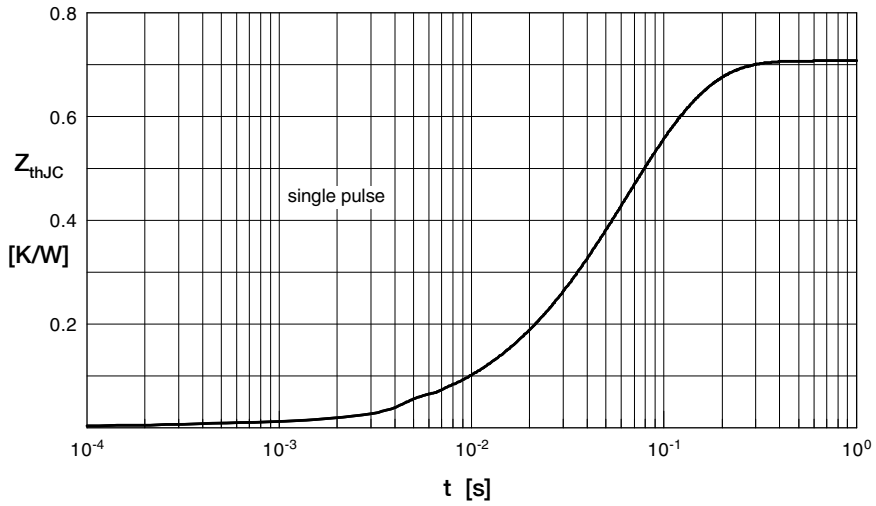


Fig. 2 Typ. transient thermal impedance junction to case