IGBT (NPT) Module

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

Buck Chopper + free wheeling Diode

Part number

MDI75-12A3
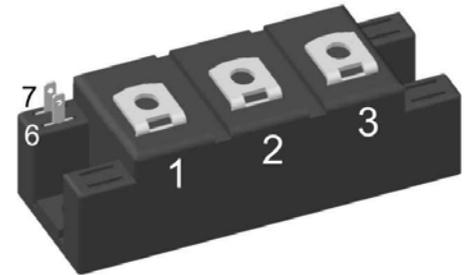
Backside: isolated

UL E72873
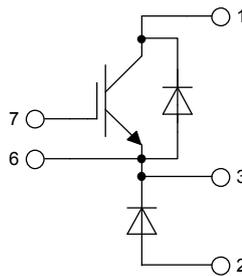
Features / Advantages:
- NPT IGBT technology
- low saturation voltage
- low switching losses
- switching frequency up to 30 kHz
- square RBSOA, no latch up
- high short circuit capability
- positive temperature coefficient for easy paralleling
- MOS input, voltage controlled
- ultra fast free wheeling 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

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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	inductive load T_{VJ} = 125°C V_{CE} = 600 V; I_C = 50 A V_{GE} = ±15 V; R_G = 22 Ω			100		ns
t_r	current rise time				70		ns
$t_{d(off)}$	turn-off delay time				500		ns
t_f	current fall time				70		ns
E_{on}	turn-on energy per pulse				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 V_{CEmax} = 1200 V					
I_{CM}						100	A
SCSOA	short circuit safe operating area	V_{CEmax} = 1200 V V_{CE} = 1200 V; V_{GE} = ±15 V T_{VJ} = 125°C R_G = 22 Ω; non-repetitive					
t_{SC}	short circuit duration					10	μs
I_{SC}	short circuit current				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

Symbol	Definition	Conditions		min.	typ.	max.	Unit
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 -di$_F$/dt = 400 A/μs T_{VJ} = 125°C I_F = 50A; V_{GE} = 0 V			3.5		μC
I_{RM}	max. reverse recovery current				40		A
t_{rr}	reverse recovery time				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

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; $I_{ISOL} \le 1$ mA		3600			V
		t = 1 minute			3000			V
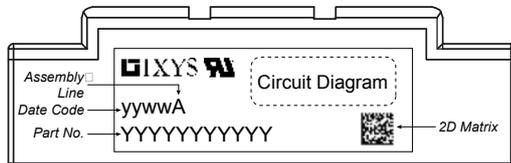
Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDI75-12A3	MDI75-12A3	Box	6	474207

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Outlines   Y4

67 ±0.2

2.8 x0.5

7.5

30 ±0.3

29.5 +0.5 -0.2

0.25

M5

Ø 6.5

5

7.7 +0.3 -0.1

94 ±0.3

80 ±0.2

M5 x10

34 ±0.2

15 ±0.2

Ø 12

18.5 ±0.15

28 ±0.15

17 ±0.2

40 ±0.2

63 ±0.2

7

6

1

2

3

11

10

5

4

9

8

General tolerances:
DIN ISO 2768-T1-m

1

7

6

3

2
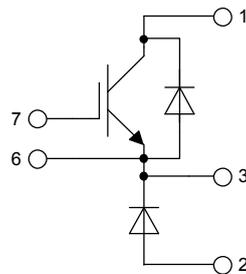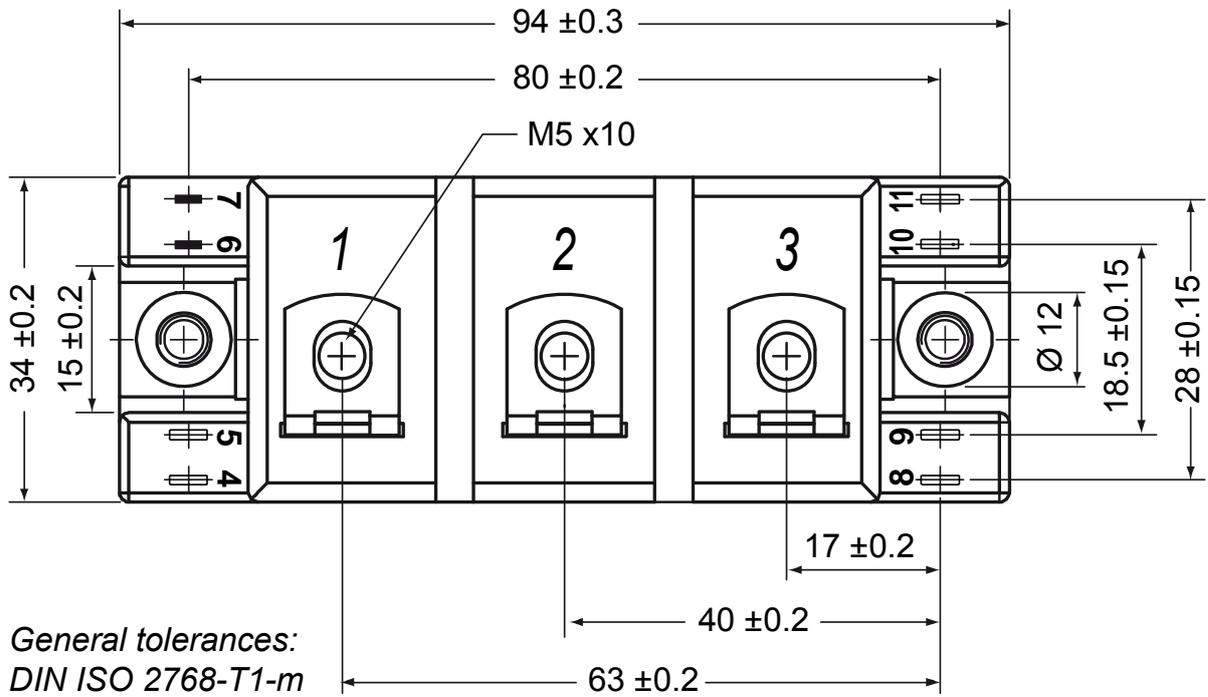
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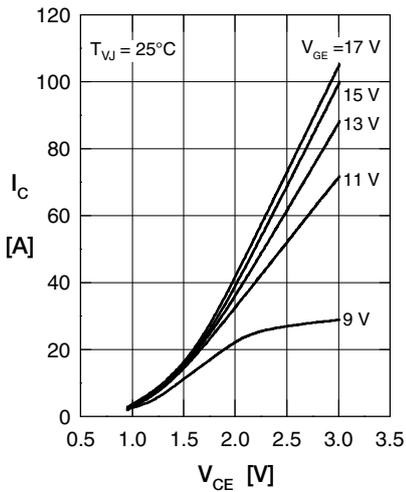
Fig. 1 Typ. output characteristics
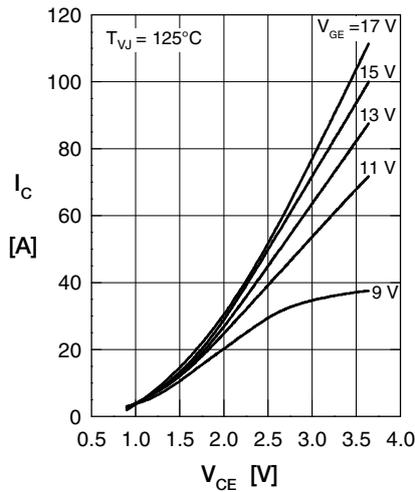
Fig. 2 Typ. output characteristics
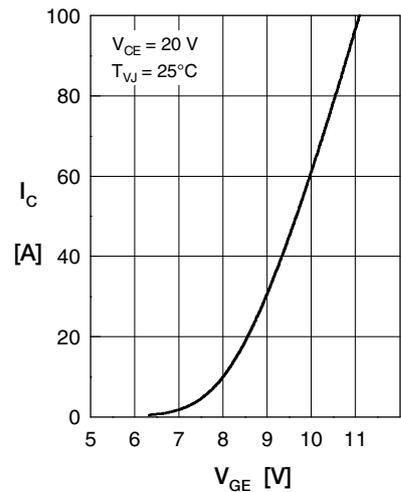
Fig. 3 Typ. transfer characteristics
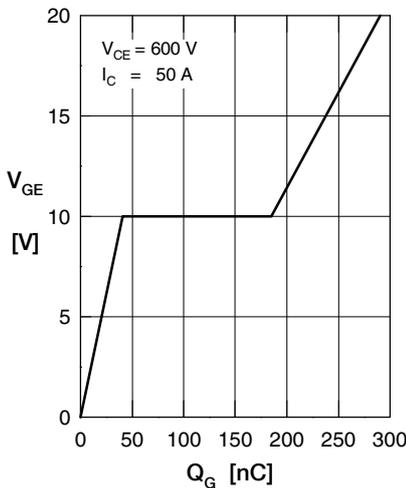
Fig. 4 Typ. turn-on gate charge
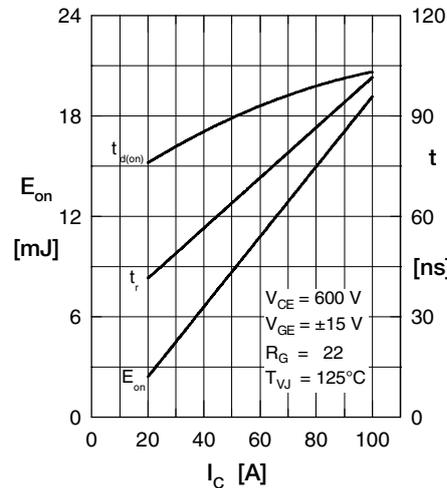
Fig. 5 Typ. turn on energy & switching times versus collector current
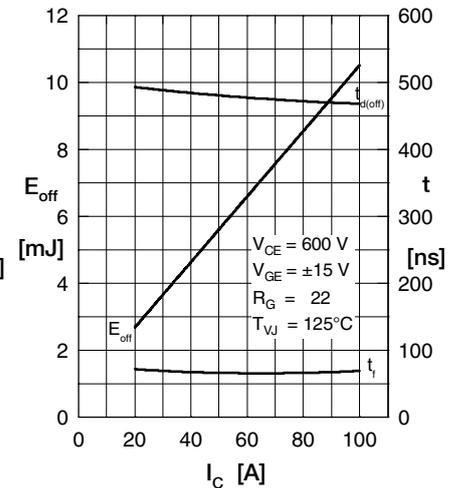
Fig.6 Typ. turn off energy & switching times versus collector current
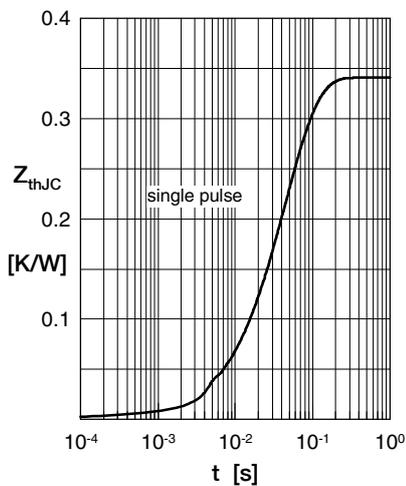

Fig. 12 Typical transient thermal impedance
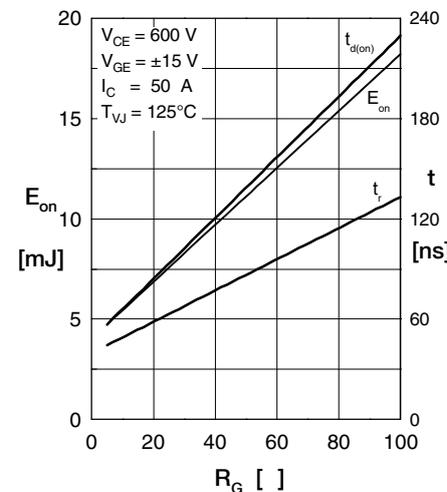
Fig. 9 Typ. turn on energy & switching times versus gate resistor

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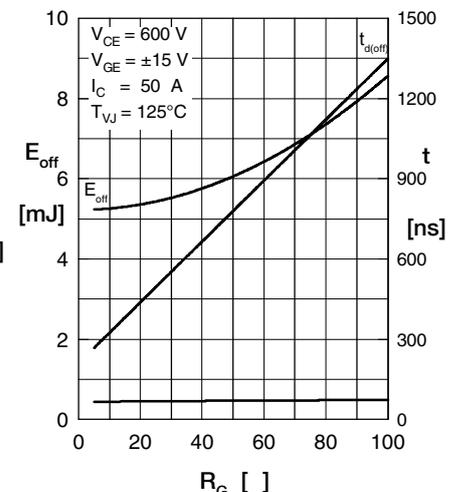
Buck Diode BD
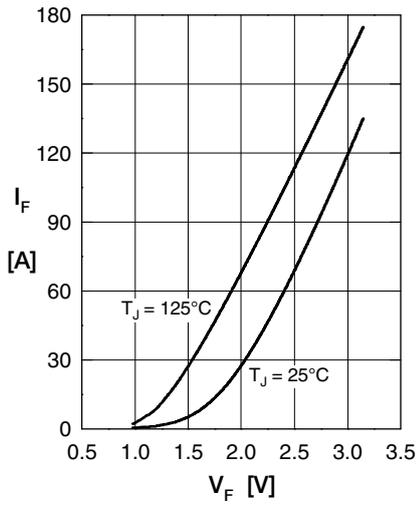
Fig. 1 Typ. Forward current vs. V_F
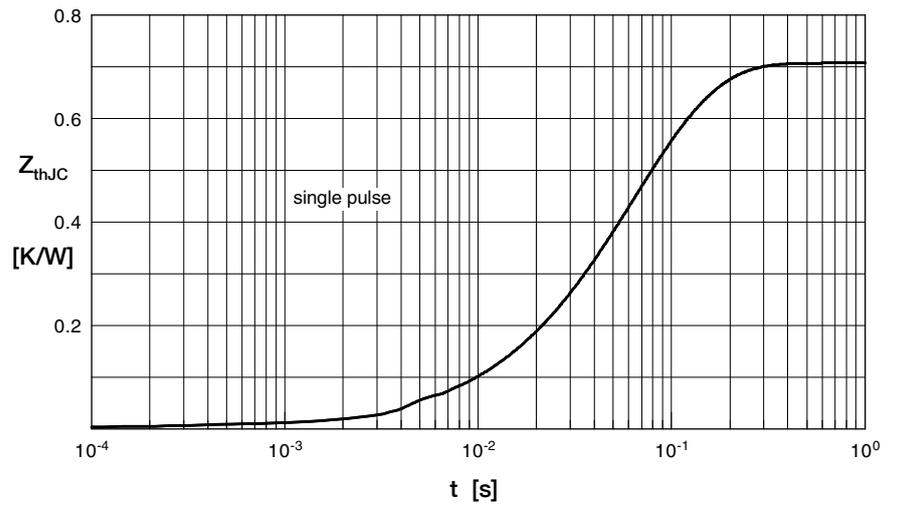
Fig. 2 Typ. transient thermal impedance junction to case