

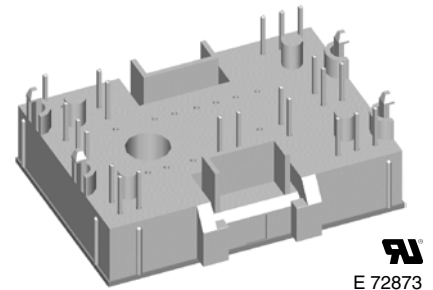
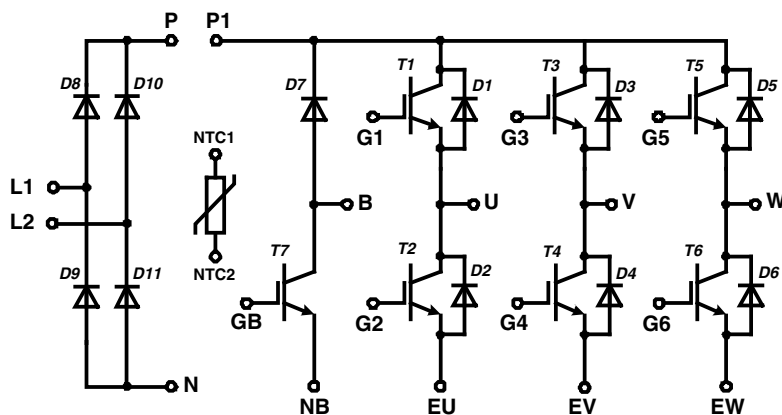
Converter - Brake - Inverter Module

NPT IGBT

Single Phase Rectifier	Brake Chopper	Three Phase Inverter
$V_{RRM} = 1600 \text{ V}$	$V_{CES} = 600 \text{ V}$	$V_{CES} = 600 \text{ V}$
$I_{DAVM25} = 65 \text{ A}$	$I_{C25} = 23 \text{ A}$	$I_{C25} = 23 \text{ A}$
$I_{FSM} = 550 \text{ A}$	$V_{CE(sat)} = 2.1 \text{ V}$	$V_{CE(sat)} = 2.1 \text{ V}$

Part name (Marking on product)

MIAA15WE600TMH



E 72873

Pin configuration see outlines.

Features:

- High level of integration - only one power semiconductor module required for the whole drive
- Inverter with NPT IGBTs
 - low saturation voltage
 - positive temperature coefficient
 - fast switching
 - short tail current
- Epitaxial free wheeling diodes with hiperfast soft reverse recovery
- Temperature sense included

Application:

- AC motor drives
- Pumps, Fans
- Washing machines
- Air-conditioning system
- Inverter and power supplies

Package:

- "Mini" package
- Assembly height is 17 mm
- Insulated base plate
- Pins suitable for wave soldering and PCB mounting
- Assembly clips available
 - IXKU 5-505 screw clamp
 - IXRB 5-506 click clamp
- UL registered E72873

Output Inverter T1 - T6

Symbol	Definitions	Conditions	Ratings			Unit	
			min.	typ.	max.		
V_{CES}	collector emitter voltage		$T_{VJ} = 150^{\circ}\text{C}$		600	V	
V_{GES}	max. DC gate voltage	continuous			± 20	V	
V_{GEM}	max. transient collector gate voltage	transient			± 30	V	
I_{C25}	collector current		$T_C = 25^{\circ}\text{C}$		23	A	
I_{C80}			$T_C = 80^{\circ}\text{C}$		16	A	
P_{tot}	total power dissipation		$T_C = 25^{\circ}\text{C}$		80	W	
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 15\text{ A}; V_{GE} = 15\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	2.1 2.3	2.5	V V	
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 0.4\text{ A}; V_{GE} = V_{CE}$	$T_{VJ} = 25^{\circ}\text{C}$	4.5	5.5	6.5	V
I_{CES}	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		1.0	0.6	mA mA
I_{GES}	gate emitter leakage current	$V_{GE} = \pm 20\text{ V}$			150	nA	
C_{ies}	input capacitance	$V_{CE} = 25\text{ V}; V_{GE} = 0\text{ V}; f = 1\text{ MHz}$			700	pF	
$Q_{G(on)}$	total gate charge	$V_{CE} = 300\text{ V}; V_{GE} = 15\text{ V}; I_C = 15\text{ A}$			57	nC	
$t_{d(on)}$	turn-on delay time	inductive load $V_{CE} = 300\text{ V}; I_C = 15\text{ A}$ $V_{GE} = \pm 15\text{ V}; R_G = 68\ \Omega$	$T_{VJ} = 25^{\circ}\text{C}$		40	ns	
t_r	current rise time				45	ns	
$t_{d(off)}$	turn-off delay time				155	ns	
t_f	current fall time				95	ns	
E_{on}	turn-on energy per pulse				0.35	mJ	
E_{off}	turn-off energy per pulse				0.27	mJ	
$t_{d(on)}$	turn-on delay time	inductive load $V_{CE} = 300\text{ V}; I_C = 15\text{ A}$ $V_{GE} = \pm 15\text{ V}; R_G = 68\ \Omega$	$T_{VJ} = 125^{\circ}\text{C}$		40	ns	
t_r	current rise time				45	ns	
$t_{d(off)}$	turn-off delay time				160	ns	
t_f	current fall time				120	ns	
E_{on}	turn-on energy per pulse				0.55	mJ	
E_{off}	turn-off energy per pulse				0.4	mJ	
RBSOA	reverse bias safe operating area	$V_{GE} = \pm 15\text{ V}; R_G = 68\ \Omega; I_C = 30\text{ A}$	$T_{VJ} = 125^{\circ}\text{C}$		$V_{CEK} \leq V_{CES} - L_S \cdot di/dt$	V	
I_{SC} (SCSOA)	short circuit safe operating area	$V_{CE} = 360\text{ V}; V_{GE} = \pm 15\text{ V};$ $R_G = 68\ \Omega; t_p = 10\ \mu\text{s};$ non-repetitive	$T_{VJ} = 125^{\circ}\text{C}$		65	A	
R_{thJC}	thermal resistance junction to case	(per IGBT)			1.6	K/W	
R_{thCH}	thermal resistance case to heatsink			0.55		K/W	

Output Inverter D1 - D6

Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
V_{RRM}	max. repetitive reverse voltage		$T_{VJ} = 150^{\circ}\text{C}$		600	V
I_{F25}	forward current		$T_C = 25^{\circ}\text{C}$		37	A
I_{F80}			$T_C = 80^{\circ}\text{C}$		24	A
V_F	forward voltage	$I_F = 15\text{ A}; V_{GE} = 0\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	1.8 1.3	2.1	V V
Q_{rr}	reverse recovery charge	$V_R = 300\text{ V}$ $di_F/dt = -380\text{ A}/\mu\text{s}$ $I_F = 15\text{ A}; V_{GE} = 0\text{ V}$	$T_{VJ} = 125^{\circ}\text{C}$		0.58	μC
I_{RM}	max. reverse recovery current				11.5	A
t_{rr}	reverse recovery time				115	ns
E_{rec}	reverse recovery energy				50	μJ
R_{thJC}	thermal resistance junction to case	(per diode)			1.6	K/W
R_{thCH}	thermal resistance case to heatsink			0.55		K/W

 $T_C = 25^{\circ}\text{C}$ unless otherwise stated

Brake T7

Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
V_{CES}	collector emitter voltage	$T_{VJ} = 150^{\circ}\text{C}$			600	V
V_{GES}	max. DC gate voltage	continuous			± 20	V
V_{GEM}	max. transient collector gate voltage	transient			± 30	V
I_{C25}	collector current	$T_C = 25^{\circ}\text{C}$			23	A
I_{C80}		$T_C = 80^{\circ}\text{C}$			16	A
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$			80	W
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 15\text{ A}; V_{GE} = 15\text{ V}$			2.1 2.3	V V
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 0.4\text{ A}; V_{GE} = V_{CE}$	4.5	5.5	6.5	V
I_{CES}	collector emitter leakage current	$V_{CE} = V_{CES}; V_{GE} = 0\text{ V}$			0.5	mA
					0.6	mA
I_{GES}	gate emitter leakage current	$V_{GE} = \pm 20\text{ V}$			150	nA
C_{ies}	input capacitance	$V_{CE} = 25\text{ V}; V_{GE} = 0\text{ V}; f = 1\text{ MHz}$			700	pF
$Q_{G(on)}$	total gate charge	$V_{CE} = 300\text{ V}; V_{GE} = 15\text{ V}; I_C = 15\text{ A}$			57	nC
$t_{d(on)}$	turn-on delay time	inductive load $V_{CE} = 300\text{ V}; I_C = 15\text{ A}$ $V_{GE} = \pm 15\text{ V}; R_G = 68\ \Omega$	$T_{VJ} = 25^{\circ}\text{C}$		40	ns
t_r	current rise time				45	ns
$t_{d(off)}$	turn-off delay time				155	ns
t_f	current fall time				95	ns
E_{on}	turn-on energy per pulse				0.35	mJ
E_{off}	turn-off energy per pulse				0.27	mJ
$t_{d(on)}$	turn-on delay time	inductive load $V_{CE} = 300\text{ V}; I_C = 15\text{ A}$ $V_{GE} = \pm 15\text{ V}; R_G = 68\ \Omega$	$T_{VJ} = 125^{\circ}\text{C}$		40	ns
t_r	current rise time				45	ns
$t_{d(off)}$	turn-off delay time				160	ns
t_f	current fall time				120	ns
E_{on}	turn-on energy per pulse				0.55	mJ
E_{off}	turn-off energy per pulse				0.4	mJ
RBSOA	reverse bias safe operating area	$V_{GE} = \pm 15\text{ V}; R_G = 68\ \Omega; I_C = 30\text{ A}$	$T_{VJ} = 125^{\circ}\text{C}$		$V_{CEK} \leq V_{CES} - L_S \cdot di/dt$	V
I_{SC} (SCSOA)	short circuit safe operating area	$V_{CE} = 360\text{ V}; V_{GE} = \pm 15\text{ V};$ $R_G = 68\ \Omega; t_p = 10\ \mu\text{s};$ non-repetitive	$T_{VJ} = 125^{\circ}\text{C}$		65	A
R_{thJC}	thermal resistance junction to case	(per IGBT)			1.6	K/W
R_{thCH}	thermal resistance case to heatsink				0.55	K/W

Brake Chopper D7

Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
V_{RRM}	max. repetitive reverse voltage	$T_{VJ} = 150^{\circ}\text{C}$			600	V
I_{F25}	forward current	$T_C = 25^{\circ}\text{C}$			37	A
I_{F80}		$T_C = 80^{\circ}\text{C}$			24	A
V_F	forward voltage	$I_F = 15\text{ A}; V_{GE} = 0\text{ V}$			1.8 1.3	V V
I_R	reverse current	$V_R = V_{RRM}$			0.1	mA
					0.4	mA
Q_{rr}	reverse recovery charge	$V_R = 300\text{ V}$ $di_F/dt = -380\text{ A}/\mu\text{s}$ $I_F = 15\text{ A}; V_{GE} = 0\text{ V}$	$T_{VJ} = 125^{\circ}\text{C}$		0.58	μC
I_{RM}	max. reverse recovery current				11.5	A
t_{rr}	reverse recovery time				115	ns
E_{rec}	reverse recovery energy				50	μJ
R_{thJC}	thermal resistance junction to case	(per diode)			1.6	K/W
R_{thCH}	thermal resistance case to heatsink				0.55	K/W

 $T_C = 25^{\circ}\text{C}$ unless otherwise stated

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

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Input Rectifier Bridge D8 - D11

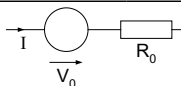
Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
V_{RRM}	max. repetitive reverse voltage		$T_{VJ} = 25^{\circ}\text{C}$		1600	V
I_{FAV}	average forward current	sine 180°	$T_C = 80^{\circ}\text{C}$		39	A
I_{DAVM}	max. average DC output current	rect.; $d = 1/2$	$T_C = 80^{\circ}\text{C}$		42	A
I_{FSM}	max. forward surge current	$t = 10$ ms; sine 50 Hz	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		550 tbd	A A
I^2t	I^2t value for fusing	$t = 10$ ms; sine 50 Hz	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		1270 tbd	A^2s A^2s
P_{tot}	total power dissipation		$T_C = 25^{\circ}\text{C}$		100	W
V_F	forward voltage	$I_F = 30$ A	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	1.2 1.3	1.5	V V
I_R	reverse current	$V_R = V_{RRM}$	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	0.3	0.03	mA mA
R_{thJC}	thermal resistance junction to case	(per diode)		0.4	1.2	K/W
R_{thCH}	thermal resistance case to heatsink	(per diode)				K/W

Temperature Sensor NTC

Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
R_{25}	resistance		$T_C = 25^{\circ}\text{C}$	4.75	5.0	5.25 k Ω
$B_{25/50}$					3375	K

Module

Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
T_{VJ}	operating temperature		-40		125	$^{\circ}\text{C}$
T_{VJM}	max. virtual junction temperature				150	$^{\circ}\text{C}$
T_{stg}	storage temperature		-40		125	$^{\circ}\text{C}$
V_{ISOL}	isolation voltage	$I_{ISOL} \leq 1$ mA; 50/60 Hz			2500	V~
CTI	comparative tracking index			-		
F_C	mounting force		40		80	N
d_S	creep distance on surface		12.7			mm
d_A	strike distance through air		12			mm
Weight				35		g

Equivalent Circuits for Simulation


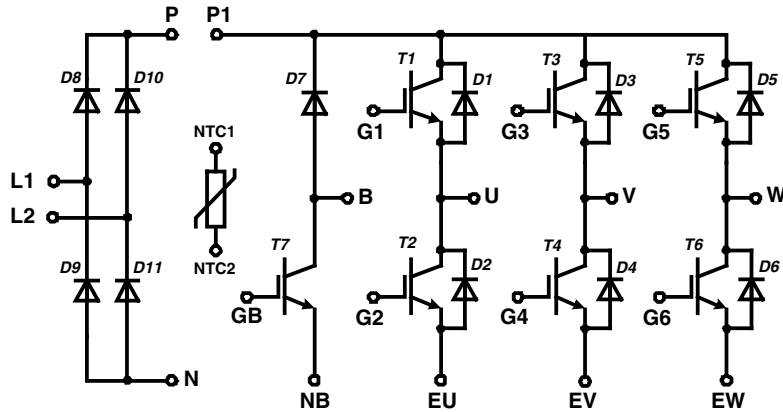
Symbol	Definitions	Conditions	Ratings			Unit
			min.	typ.	max.	
V_0	rectifier diode	D8 - D11	$T_{VJ} = 125^{\circ}\text{C}$	0.9		V
R_0				6		$\text{m}\Omega$
V_0	IGBT	T1 - T6	$T_{VJ} = 125^{\circ}\text{C}$	1.15		V
R_0				77		$\text{m}\Omega$
V_0	free wheeling diode	D1 - D6	$T_{VJ} = 125^{\circ}\text{C}$	1.05		V
R_0				30		$\text{m}\Omega$
V_0	IGBT	T7	$T_{VJ} = 125^{\circ}\text{C}$	1.15		V
R_0				77		$\text{m}\Omega$
V_0	free wheeling diode	D7	$T_{VJ} = 125^{\circ}\text{C}$	1.05		V
R_0				35		$\text{m}\Omega$

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 $T_C = 25^{\circ}\text{C}$ unless otherwise stated

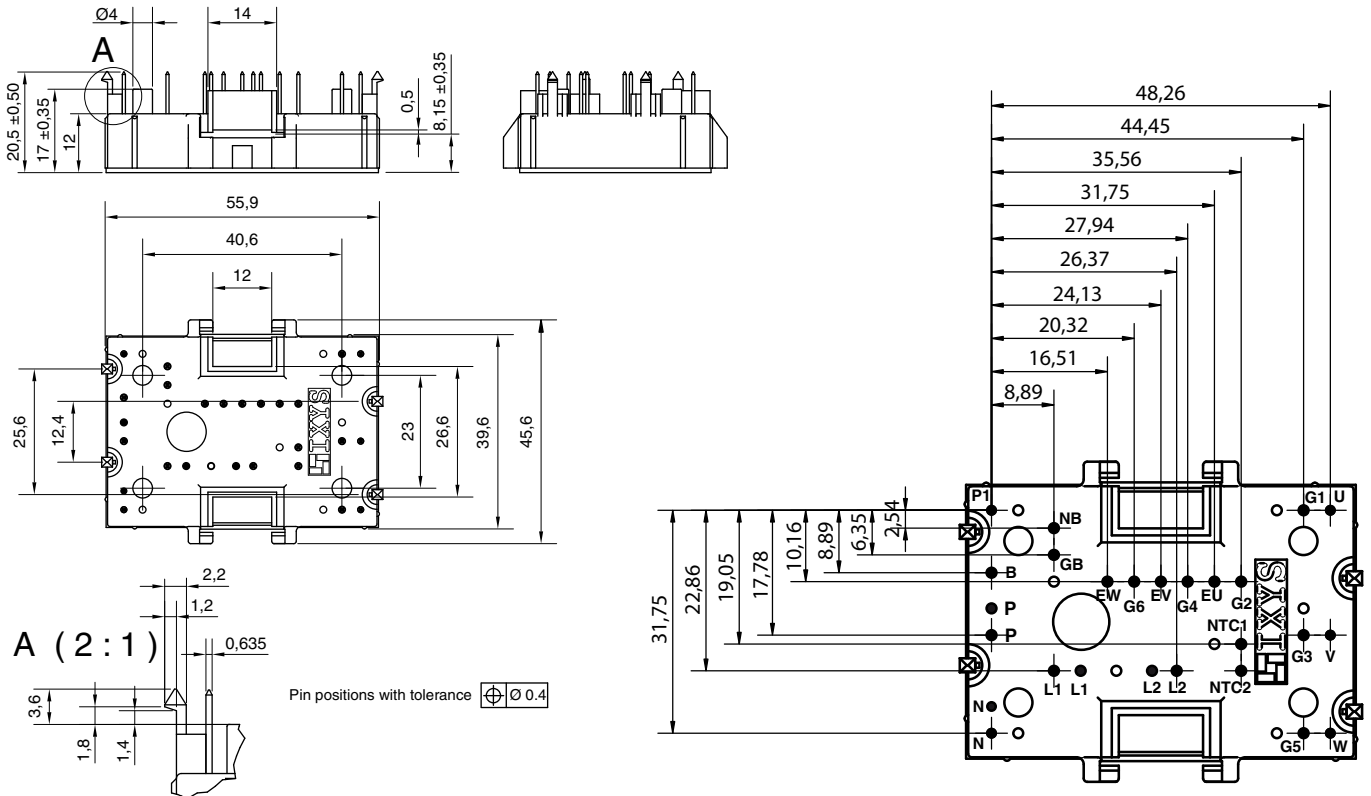
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Circuit Diagram

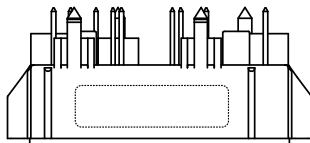


Outline Drawing

Dimensions in mm (1 mm = 0.0394")



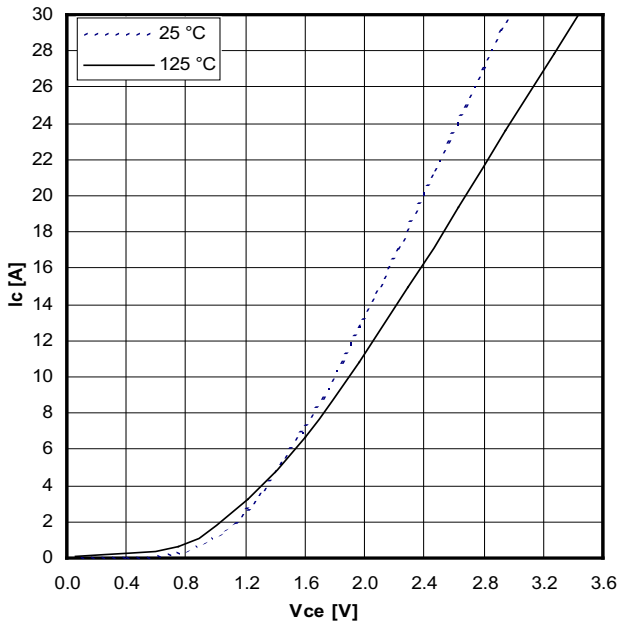
Product Marking



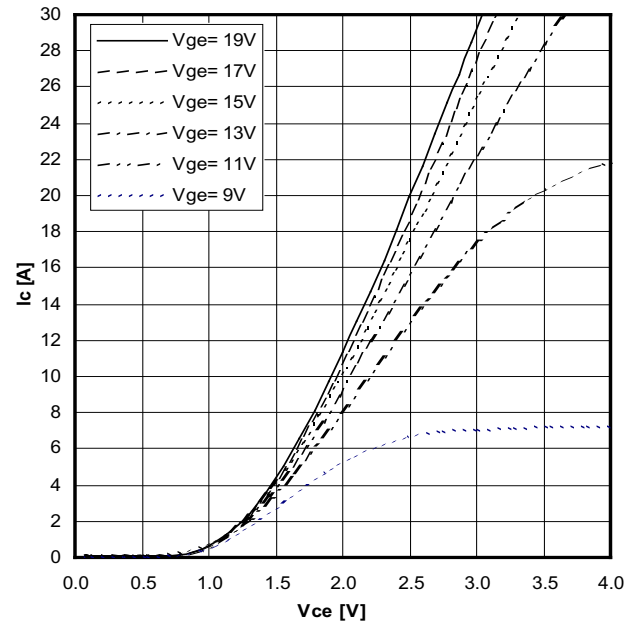
Part number

- M = Module
- I = IGBT
- A = IGBT (NPT)
- A = Gen 1 / std
- 15 = Current Rating [A]
- WE = 6-Pack + 1~ Rectifier Bridge & Brake Unit
- 600 = Reverse Voltage [V]
- T = NTC
- MH = MiniPack2

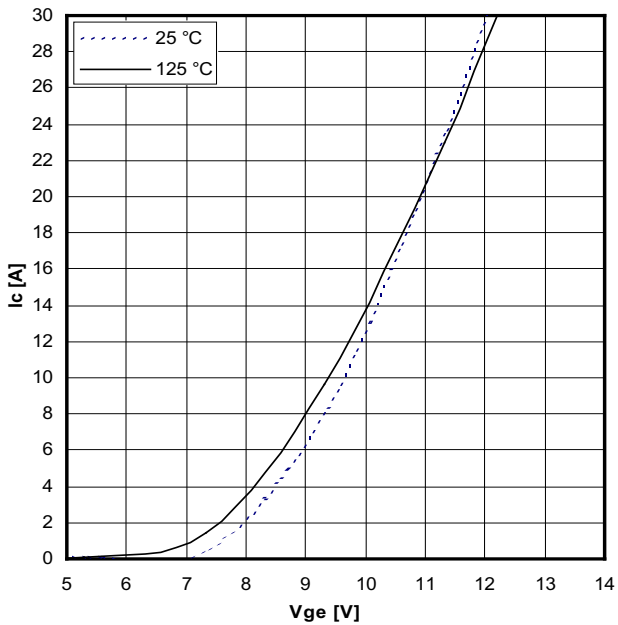
Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MIAA 15 WE 600 TMH	MIAA15WE600TMH	Box	20	504701



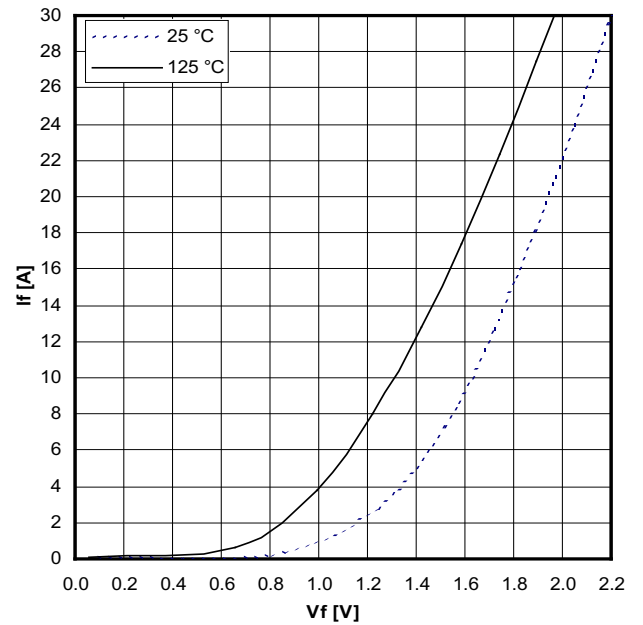
Typical output characteristics, $V_{GE} = 15\text{ V}$



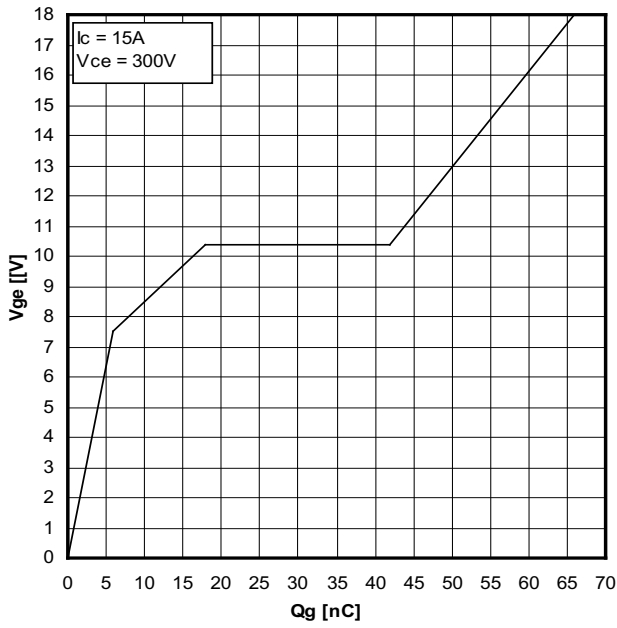
Typical output characteristics ($125\text{ }^\circ\text{C}$)



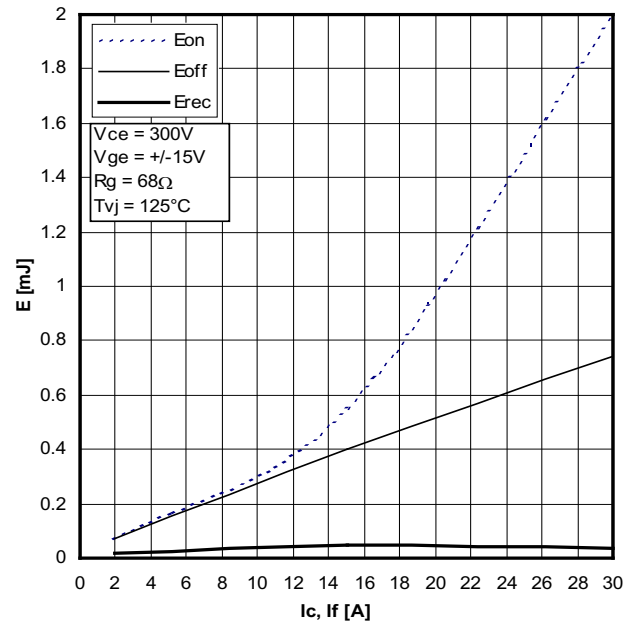
Typical transfer characteristics



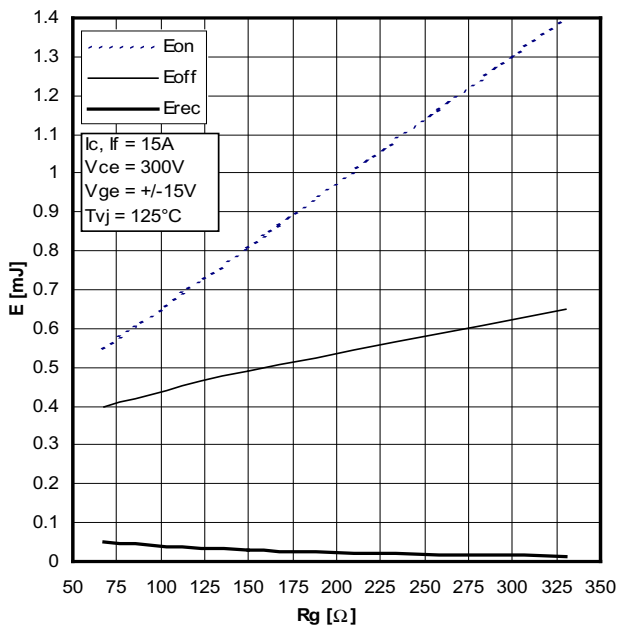
Typical forward characteristics of freewheeling diode



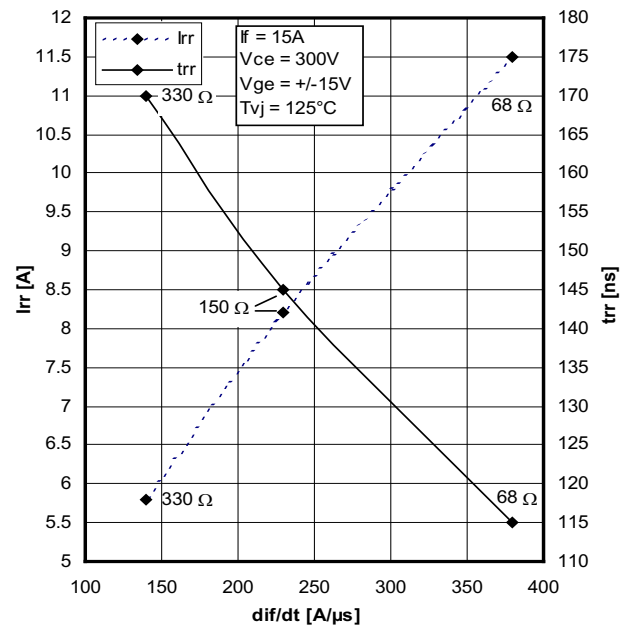
Typical turn on gate charge



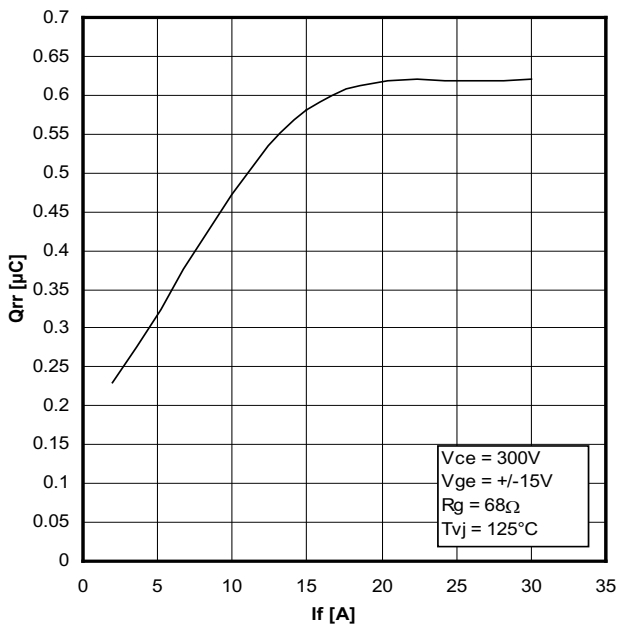
Typical switching energy versus collector current



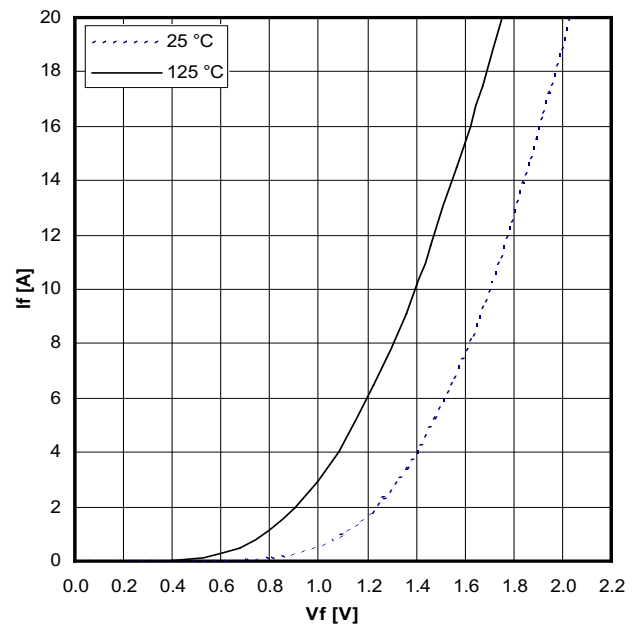
Typical switching energy versus gate resistance



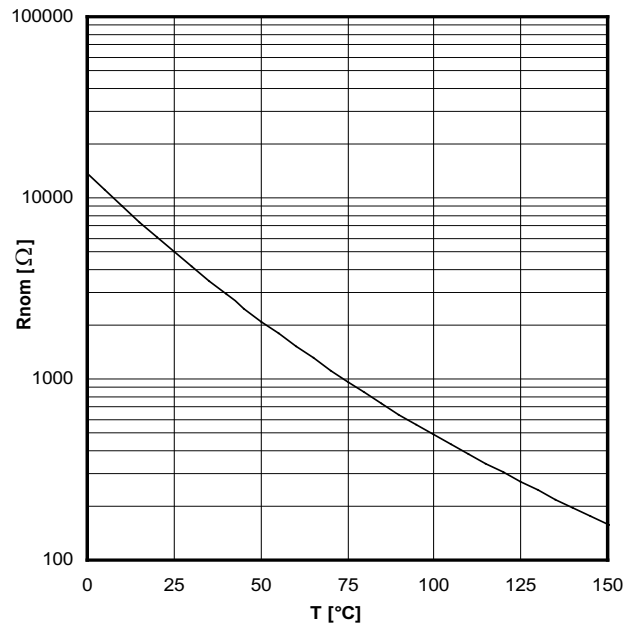
Typical turn-off characteristics of free wheeling diode



Typical turn-off characteristics of free wheeling diode



Typical forward characteristics of brake diode



Typical thermistor resistance versus temperature

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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