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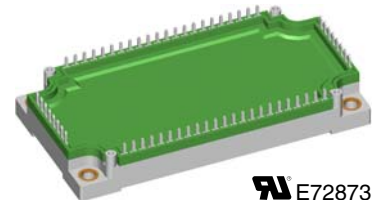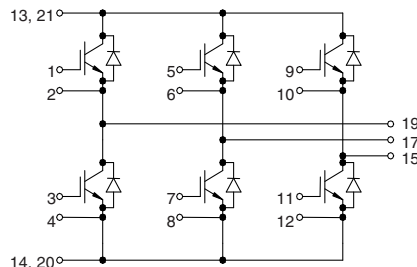
IGBT Modules
Sixpack

Short Circuit SOA Capability
Square RBSOA

I_{C25} = 160 A
V_{CES} = 1200 V
$V_{CE(sat) typ.}$ = 2.2 V

® E72873

See outline drawing for pin arrangement

IGBTs

Symbol	Conditions	Maximum Ratings	
V_{CES}	T_{VJ} = 25°C to 150°C	1200	V
V_{GES}		± 20	V
I_{C25}	T_C = 25°C	160	A
I_{C80}	T_C = 80°C	110	A
RBSOA	V_{GE} = ±15 V; R_G = 6.8 Ω; T_{VJ} = 125°C $\quad I_{CM}$ = 200	A	
	Clamped inductive load; L = 100 µH $\quad V_{CEK} \leq V_{CES}$		
t_{SC} (SCSOA)	V_{CE} = V_{CES}; V_{GE} = ±15 V; R_G = 6.8 Ω; T_{VJ} = 125°C non-repetitive	10	µs
P_{tot}	T_C = 25°C	640	W

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified)			
		min.	typ.	max.	
$V_{CE(sat)}$	I_C = 100 A; V_{GE} = 15 V; T_{VJ} = 25°C		2.2	2.6	V
	T_{VJ} = 125°C		2.5		V
$V_{GE(th)}$	I_C = 4 mA; V_{GE} = V_{CE}	4.5		6.5	V
I_{CES}	V_{CE} = V_{CES}; V_{GE} = 0 V; T_{VJ} = 25°C			6.3	mA
	T_{VJ} = 125°C		4		mA
I_{GES}	V_{CE} = 0 V; V_{GE} = ± 20 V			400	nA
$t_{d(on)}$			100		ns
t_r	Inductive load, T_{VJ} = 125°C		60		ns
$t_{d(off)}$	V_{CE} = 600 V; I_C = 100 A		600		ns
t_f	V_{GE} = ±15 V; R_G = 6.8 Ω		90		ns
E_{on}			16.1		mJ
E_{off}			14.6		mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz		6.5		nF
Q_{Gon}	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 100 A		475		nC
R_{thJC}	(per IGBT)			0.19	K/W

Features

€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
€solderable pins for PCB mounting
€package with copper base plate

Advantages

€space savings
€reduced protection circuits
€package designed for wave soldering

Typical Applications

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

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Diodes

Symbol	Conditions	Maximum Ratings	
I_{F25}	$T_C = 25°C$	200	A
I_{F80}	$T_C = 80°C$	130	A

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
V_F	$I_F = 100\ A$; $V_{GE} = 0\ V$; $T_{VJ} = 25°C$		2.3	2.6	V
	$T_{VJ} = 125°C$		1.7		V
I_{RM}	$I_F = 120\ A$; $di_F/dt = -750\ A/\mu s$; $T_{VJ} = 125°C$		82		A
t_{rr}	$V_R = 600\ V$; $V_{GE} = 0\ V$		200		ns
R_{thJC}	(per diode)			0.3	K/W

Module

Symbol	Conditions	Maximum Ratings	
T_{VJ}	operating	-40...+125	°C
T_{JM}		+150	°C
T_{stg}		-40...+125	°C
V_{ISOL}	$I_{ISOL} \leq 1\ mA$; 50/60 Hz	2500	V~
M_d	Mounting torque (M5)	3 - 6	Nm

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
$R_{pin-chip}$			1.8		mΩ
d_S	Creepage distance on surface	10			mm
d_A	Strike distance in air	10			mm
R_{thCH}	with heatsink compound		0.01		K/W
Weight			300		g

Equivalent Circuits for Simulation

Conduction

IGBT (typ. at $V_{GE} = 15\ V$; $T_J = 125°C$)
$V_0 = 1.3\ V$; $R_0 = 12\ m\Omega$

Free Wheeling Diode (typ. at $T_J = 125°C$)
$V_0 = 1.27\ V$; $R_0 = 4.3\ m\Omega$

Thermal Response

IGBT (typ.)
$C_{th1} = 0.397\ J/K$; $R_{th1} = 0.141\ K/W$
$C_{th2} = 2.243\ J/K$; $R_{th2} = 0.049\ K/W$

Free Wheeling Diode (typ.)
$C_{th1} = 0.301\ J/K$; $R_{th1} = 0.238\ K/W$
$C_{th2} = 2.005\ J/K$; $R_{th2} = 0.062\ K/W$

Dimensions in mm (1 mm = 0.0394")

* = für Version MWI/MKI...A8T

baseplate convex over 97,5 mm before mounting

Detail X   Detail Y   Detail Z

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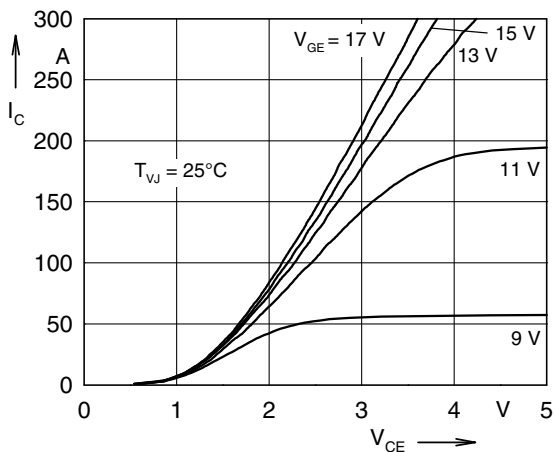
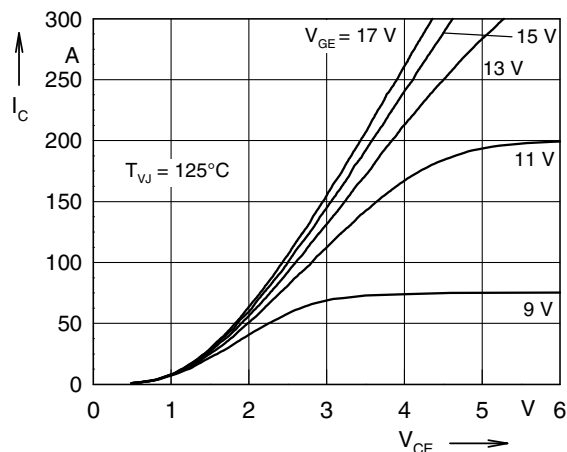20070912a

Fig. 1   Typ. output characteristics

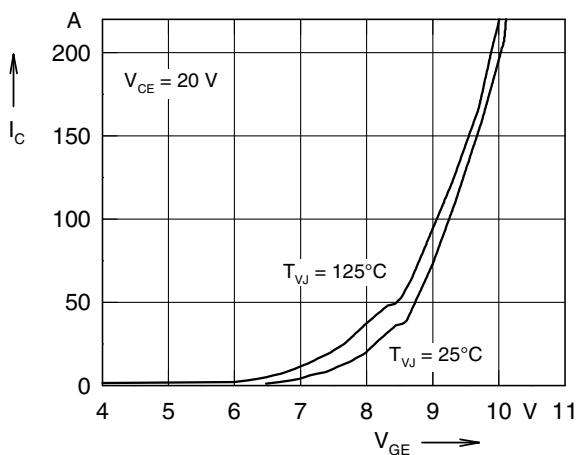Fig. 2   Typ. output characteristics

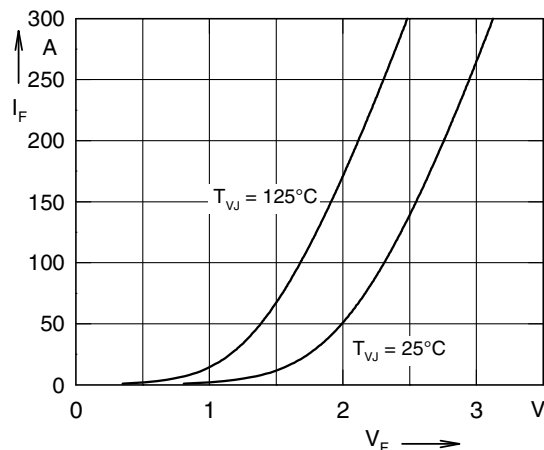Fig. 3   Typ. transfer characteristics

Fig. 4   Typ. forward characteristics
of free wheeling diode

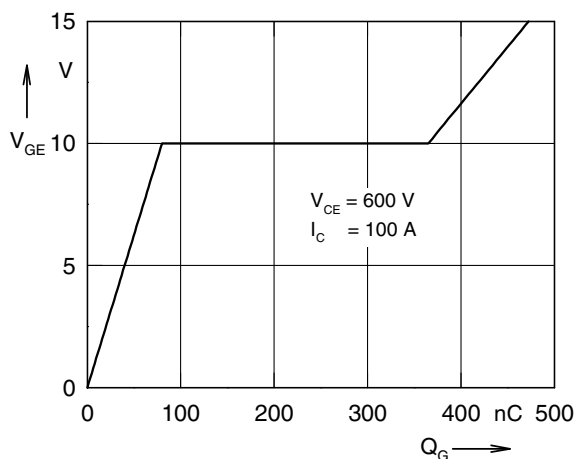Fig. 5   Typ. turn on gate charge

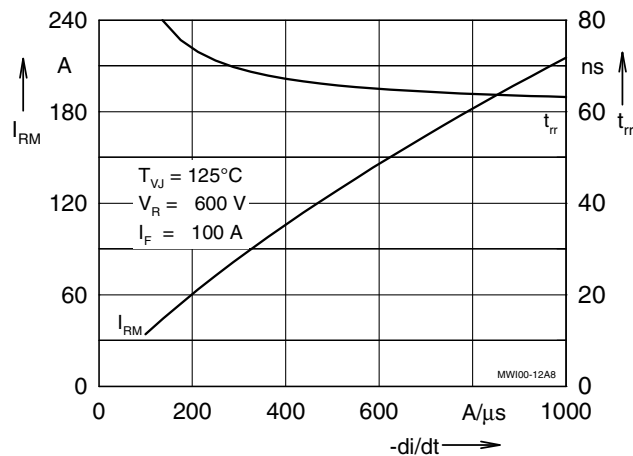Fig. 6   Typ. turn off characteristics
of free wheeling diode

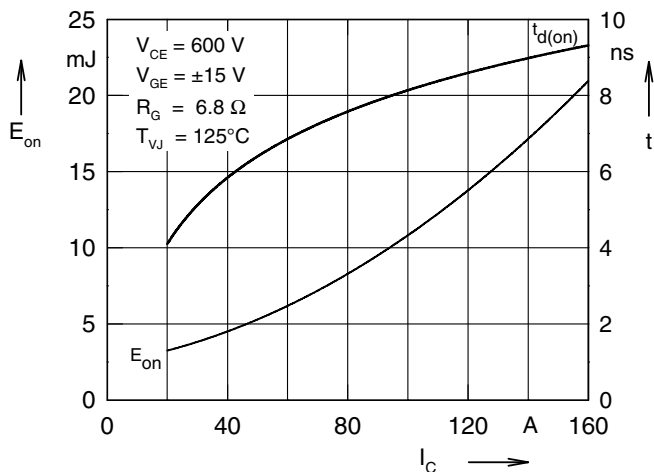IXYS reserves the right to change limits, test conditions and dimensions.

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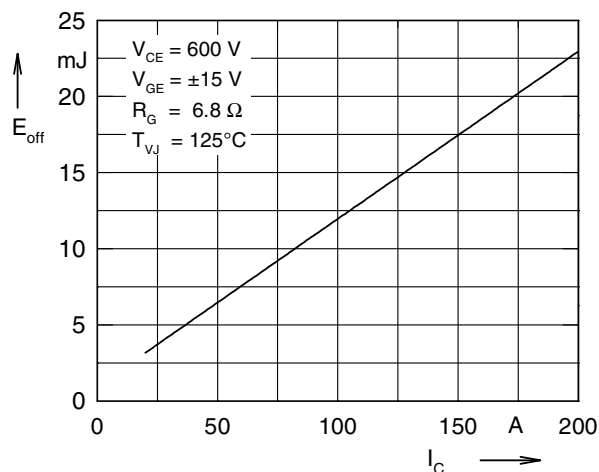

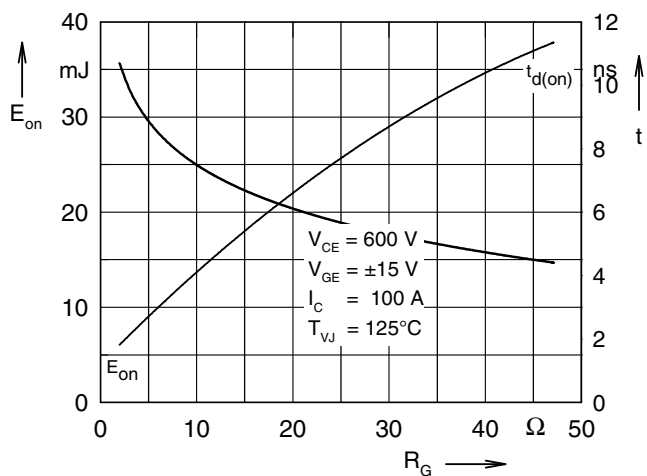Fig. 8 Typ. turn off energy and switching times versus collector current

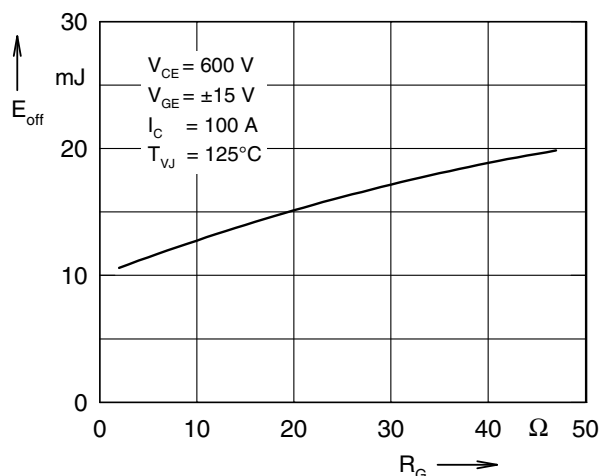Fig. 9 Typ. turn on energy and switching times versus gate resistor

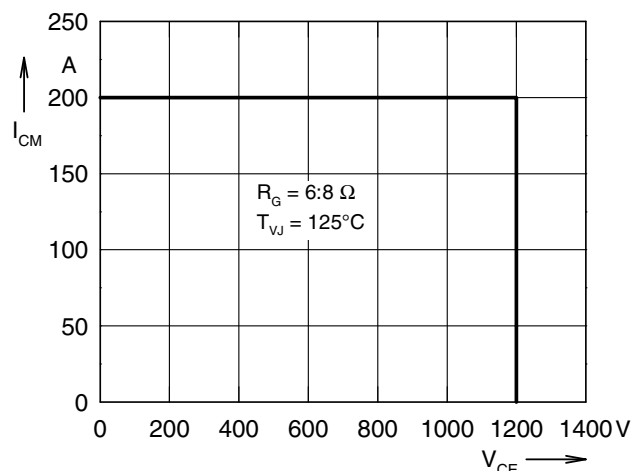Fig.10 Typ. turn off energy and switching times versus gate resistor
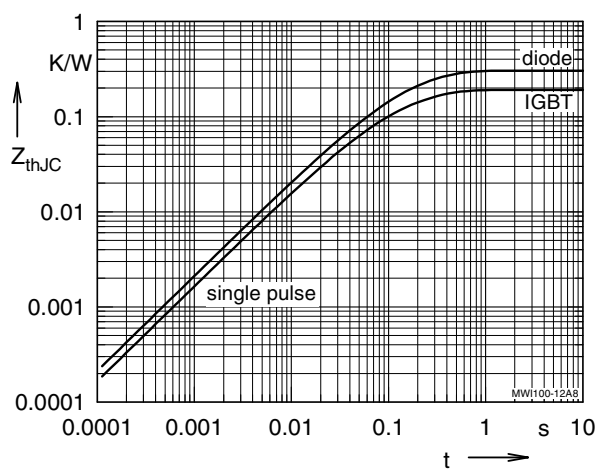

Fig. 11 Reverse biased safe operating area RBSOA

Fig. 12 Typ. transient thermal impedance

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