⊔IXYS

IGBT Modules
Sixpack

I_{C80} **= 440 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 125°C	1200	V
V_{GES}		± 20	V
I_{C25}	T_C = 25°C	640	A
I_{C80}	T_C = 80°C	440	A
RBSOA	R_G = 2.7 Ω; T_{VJ} = 125°C Clamped inductive load; L = 100 µH	I_{CM} = 900 $V_{CEK} \leq V_{CES}$	A
t_{SC} (SCSOA)	V_{CE} = 900 V; V_{GE} = ±15 V; R_G = 2.7 Ω T_{VJ} = 125°C; non-repetitive; $V_{CEmax} \leq V_{CES}$	10	µs
P_{tot}	T_C = 25°C	2.2	kW

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified)			
		min.	typ.	max.	
$V_{CE(sat)}$	I_C = 450 A; V_{GE} = 15 V T_{VJ} = 25°C		2.2	2.4	V
	T_{VJ} = 125°C		2.5		V
$V_{GE(th)}$	I_C = 18 mA; V_{GE} = V_{CE}	4.5		6.5	V
I_{CES}	V_{CE} = V_{CES}; V_{GE} = 0 V T_{VJ} = 25°C			1	mA
	T_{VJ} = 125°C		6	21	mA
I_{GES}	V_{CE} = 0 V; V_{GE} = ± 20 V			600	nA
$t_{d(on)}$	Inductive load, T_{VJ} = 125°C V_{CE} = 600 V; I_C = 450 A V_{GE} = ±15 V; R_G = 2.7 Ω		190		ns
t_r			116		ns
$t_{d(off)}$			475		ns
t_f			100		ns
E_{on}			35		mJ
E_{off}			47		mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz		33		nF
Q_{Gon}	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 450 A		3.3		µC
R_{thJC}				0.057	K/W

Features

- NPT[3] IGBT technology
- low saturation voltage
- low switching losses
- square RBSOA, no latch up
- high short circuit capability
- positive temperature coefficient for easy parallelling
- 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_{F80}	$T_C = 80°C$	450	A
I_{FRM}	$t_p = 1$ ms	900	A
I^2t	$T_{VJ} = 125°C$; $t = 10$ ms; $V_R = 0$ V	35000	A^2s

Symbol	Conditions	Characteristic Values			
	($T_{VJ} = 25°C$, unless otherwise specified)	min.	typ.	max.	
V_F	$I_F = 450$ A; $V_{GE} = 0$ V; $T_{VJ} = 25°C$			2.2	V
I_{RM}	$I_F = 450$ A; $di_F/dt = 3500$ A/µs; $T_{VJ} = 125°C$; $V_R = 800$ V		200		A
R_{thJC}			0.075		K/W

Temperature Sensor NTC

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
R_{25}	$T = 25°C$	4.75	5.0	5.25	kΩ
$B_{25/50}$			3375		K

Module

Symbol	Conditions	Maximum Ratings	
T_{VJ}	operating	-40...+125	°C
T_{JM}		+150	°C
T_{stg}		-40...+125	°C
V_{ISO}	$I_{ISOL} \leq 1$ mA; 50/60 Hz	3400	V~
M_d	Mounting torque (M5)	3 - 6	Nm
	Terminal connection torque (M6)	3 - 6	Nm

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
$R_{therm-chip}$ *)	Resistance terminal to chip		0.55		mΩ
d_S	Creepage distance on surface	12.7			mm
d_A	Strike distance in air	10			mm
R_{thCH}	with heatsink compound		0.01		K/W
Weight			900		g

*) $V = V_{CEsat} + 2x\ R_{therm-chip} \cdot I_C$ resp. $V = V_F + 2x\ R \cdot I_F$

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Dimensions in mm (1 mm = 0.0394")

Diode		IGBT	
R_i	τ_i	**R_i**	τ_i
$2.884 \cdot 10^{-5}$	$1 \cdot 10^{-5}$	$2.344 \cdot 10^{-5}$	$1 \cdot 10^{-5}$
$1.523 \cdot 10^{-3}$	$5 \cdot 10^{-5}$	$5.97 \cdot 10^{-4}$	$5 \cdot 10^{-5}$
$7.617 \cdot 10^{-3}$	0.012	$5.97 \cdot 10^{-3}$	0.015
0.03	0.078	0.023	0.075
0.036	0.82	0.028	0.69

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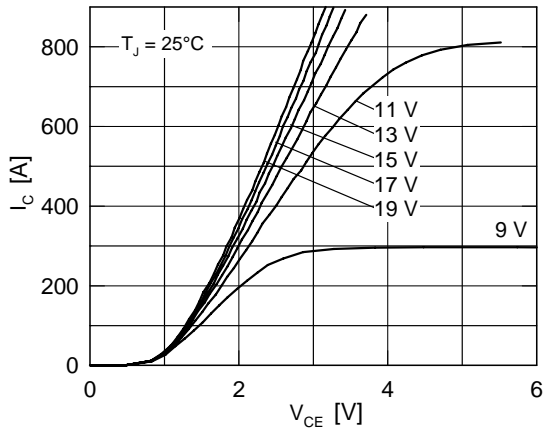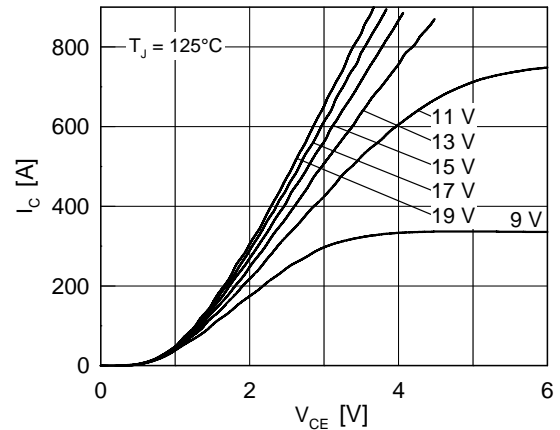
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Fig. 1 Typ. output characteristics

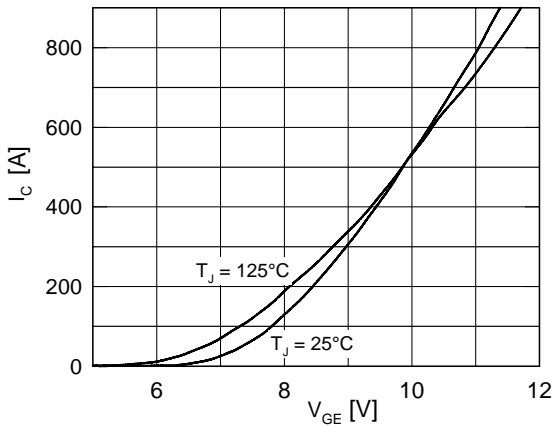Fig. 2 Typ. output characteristics

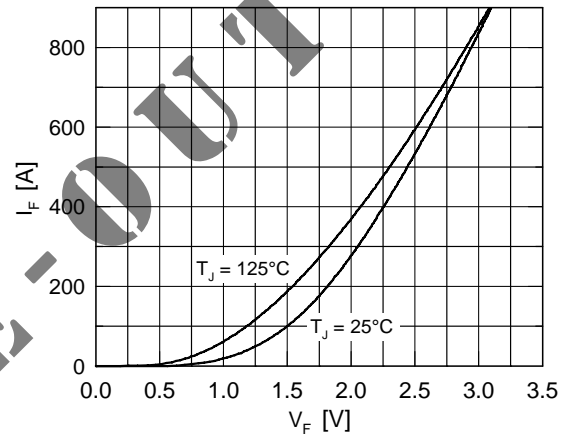Fig. 3 Typ. transfer characteristics

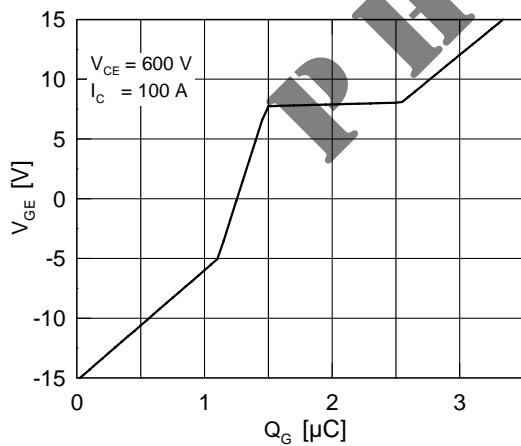
Fig. 4 Typ. forward characteristics
of free wheeling diode

Fig. 5 Typ. turn on gate charge

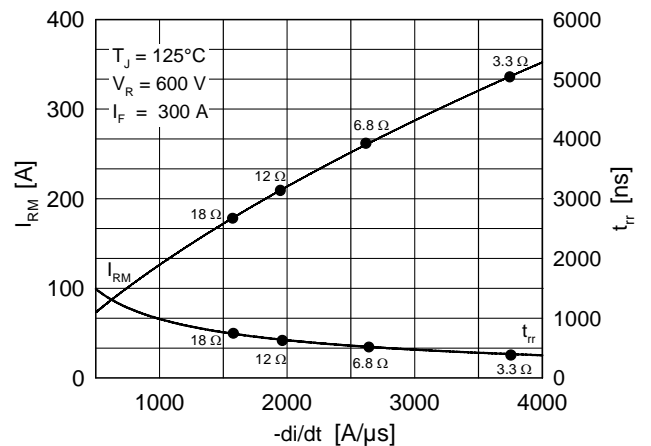Fig. 6 Typ. turn off characteristics
of free wheeling diode

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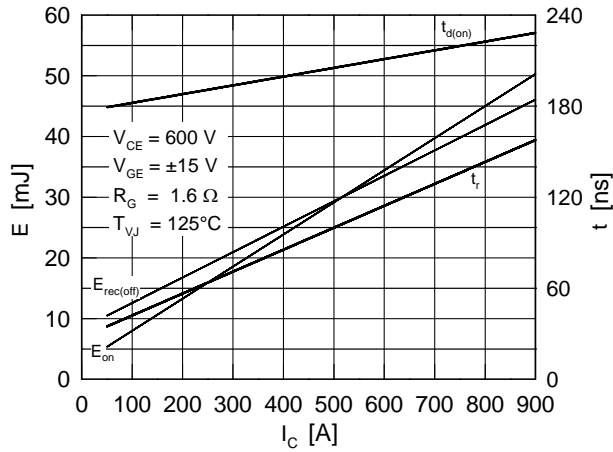
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Fig. 7 Typ. turn on energy and switching times versus collector current
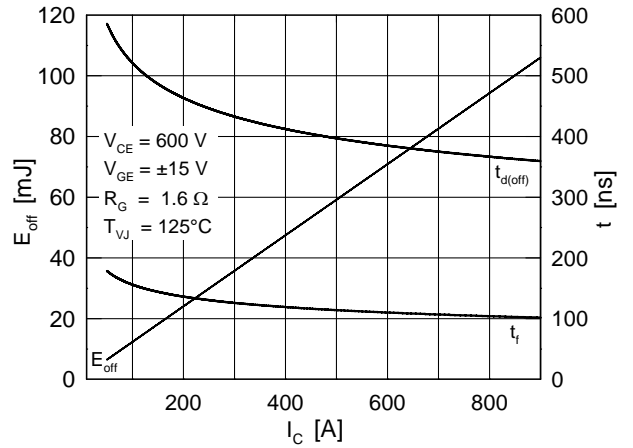

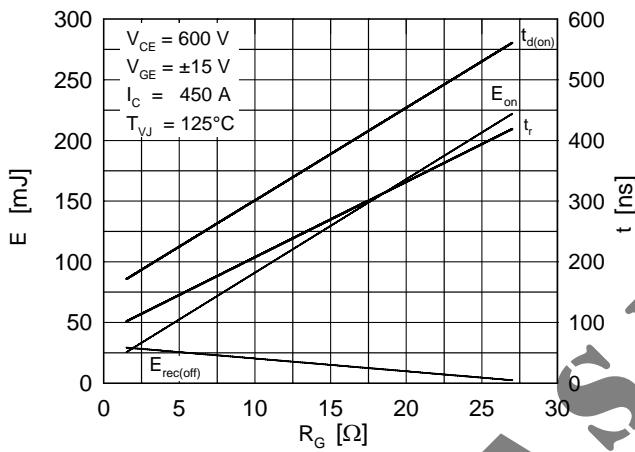Fig. 8 Typ. turn off energy and switching times versus collector current

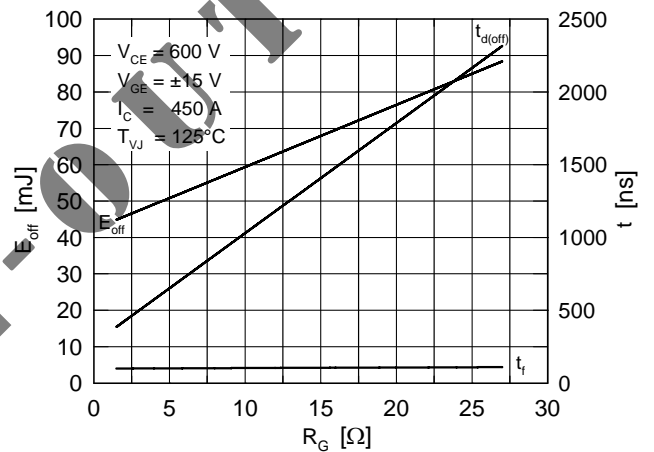Fig. 9 Typ. turn on energy and switching times versus gate resistor

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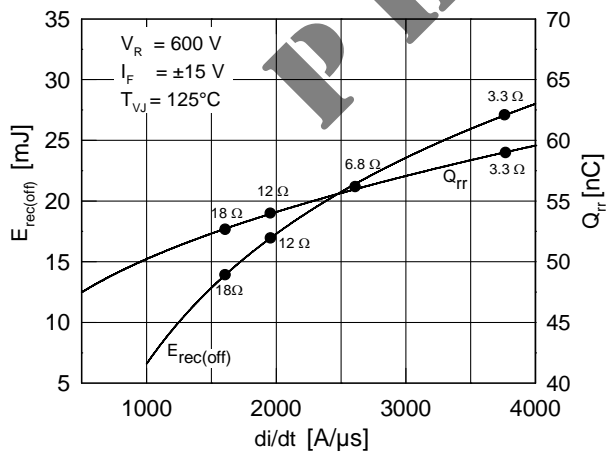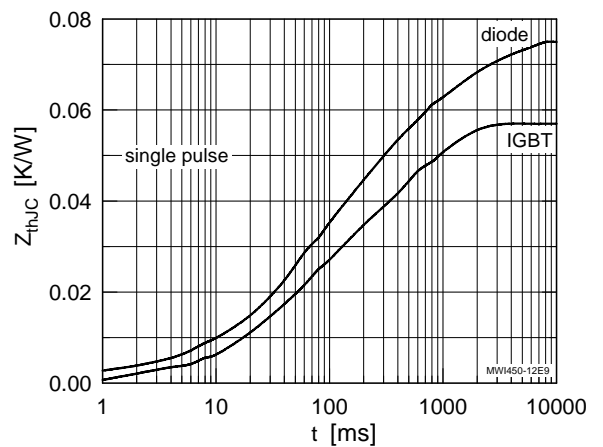

Fig. 11 Typ. turn off energy and recovered charge of free wheeling diode

Fig. 12 Typ. transient thermal impedance

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