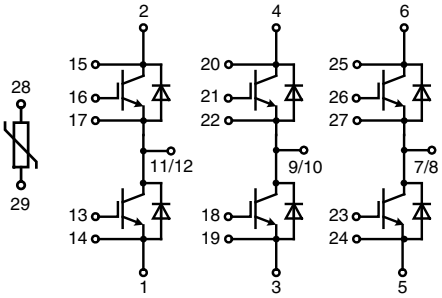
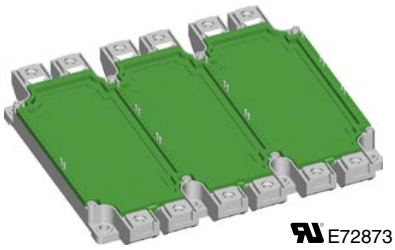
IGBT Modules
Sixpack

I_{C80} = 375 A
V_{CES} = 1200 V
$V_{CE(sat)\ typ.}$ = 2.0 V





See outline drawing for pin arrangement

Features

- NPT³ 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

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	530	A
I_{C80}	T_C = 80°C	375	A
RBSOA	R_G = 3.3 Ω; T_{VJ} = 125°C Clamped inductive load; L = 100 µH	I_{CM} = 750 $V_{CEK} \leq V_{CES}$	A
t_{SC} (SCSOA)	V_{CE} = 900 V; V_{GE} = ±15 V; R_G = 3.3 Ω T_{VJ} = 125°C; non-repetitive; $V_{CEmax} \leq V_{CES}$	10	µs
P_{tot}	T_C = 25°C	2.1	kW

Symbol	Conditions		Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{CE(sat)}$	I_C = 300 A; V_{GE} = 15 V	T_{VJ} = 25°C T_{VJ} = 125°C		2.0 2.2	2.4 2.7	V V
$V_{GE(th)}$	I_C = 12 mA; V_{GE} = V_{CE}		4.5		6.5	V
I_{CES}	V_{CE} = V_{CES}; V_{GE} = 0 V	T_{VJ} = 25°C T_{VJ} = 125°C		0.4 1	1 12	mA mA
I_{GES}	V_{CE} = 0 V; V_{GE} = ± 20 V				600	nA
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off}	Inductive load, T_{VJ} = 125°C V_{CE} = 600 V; I_C = 300 A V_{GE} = ±15 V; R_G = 3.3 Ω			180 100 650 120 19 32		ns ns ns ns mJ mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz			22		nF
Q_{Gon}	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 300 A			2.3		µC
R_{thJC}					0.06	K/W

Diodes

Symbol	Conditions	Maximum Ratings	
I_{F80}	T_C = 80°C	300	A
I_{FRM}	t_p = 1 ms	600	A
I^2t	T_{VJ} = 125°C; t = 10 ms; V_R = 0 V	21400	A^2s

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified)			
		min.	typ.	max.	
V_F	I_F = 300 A; V_{GE} = 0 V; T_{VJ} = 25°C			2	V
I_{RM}	I_F = 300 A; di_F/dt = 2700 A/µs; T_{VJ} = 125°C; V_R = 800 V		240		A
R_{thJC}			0.11		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

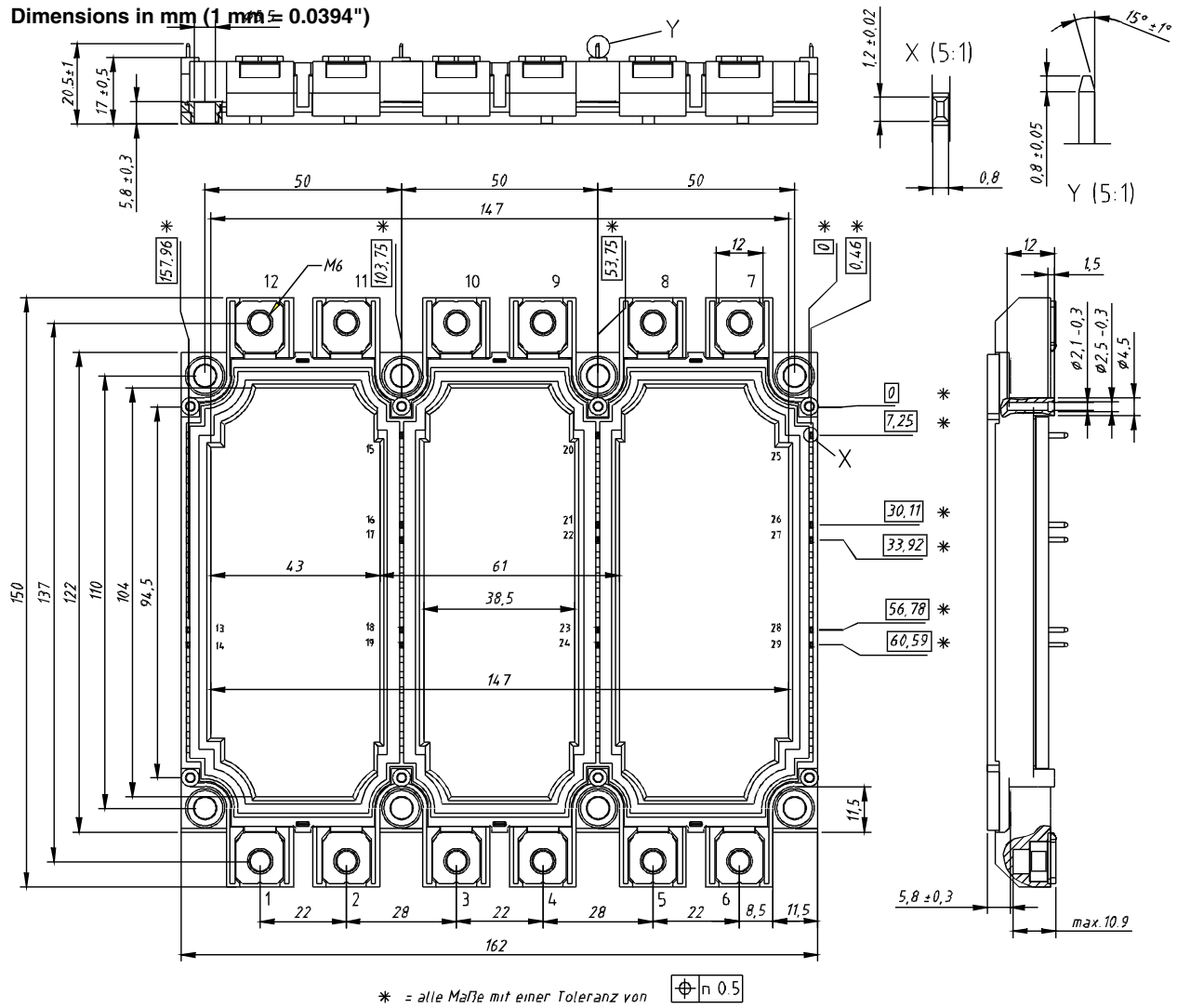
Symbol	Conditions	Maximum Ratings	
T_{VJ}	operating	-40...+125	°C
T_{JM}		+150	°C
T_{stg}		-40...+125	°C
V_{ISO}	$I_{ISOL} \leq$ 1 mA; 50/60 Hz	3400	V~
M_d	Mounting torque (M5)	3 - 6	Nm
	Terminal connection torque (M6)	3 - 6	Nm

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
$R_{therm\text{-}chip}$ *)	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

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

20070912a

Dimensions in mm (1 mm = 0.0394")



= tolerance for all dimensions:

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

20070912a

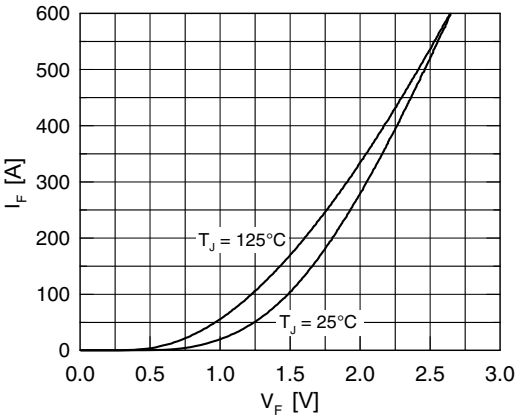


Fig. 1 Typ. forward characteristics of free wheeling diode

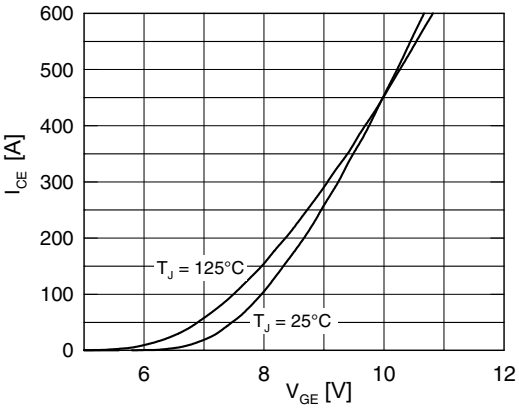


Fig. 2 Typ. transfer characteristics

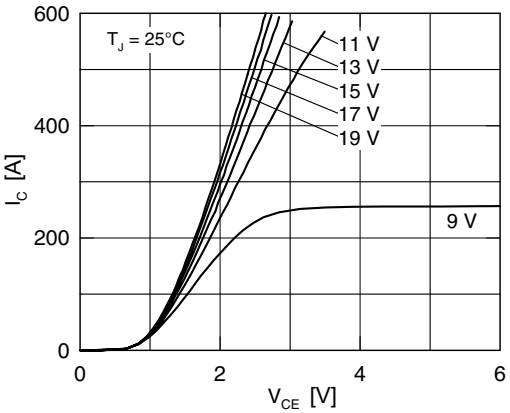


Fig. 3 Typ. output characteristics

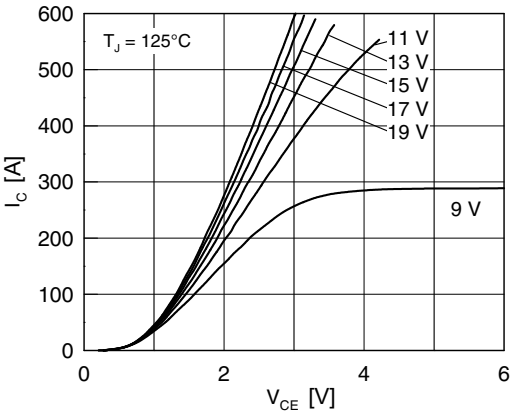


Fig. 4 Typ. output characteristics

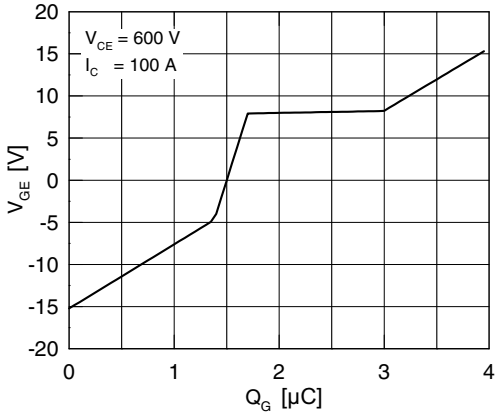


Fig. 5 Typ. turn on gate charge

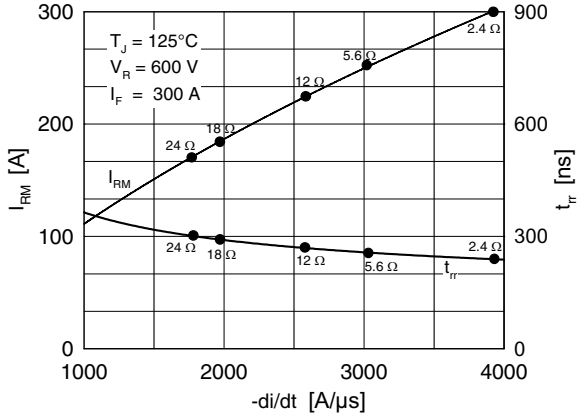


Fig. 6 Typ. turn off characteristics of free wheeling diode

20070912a

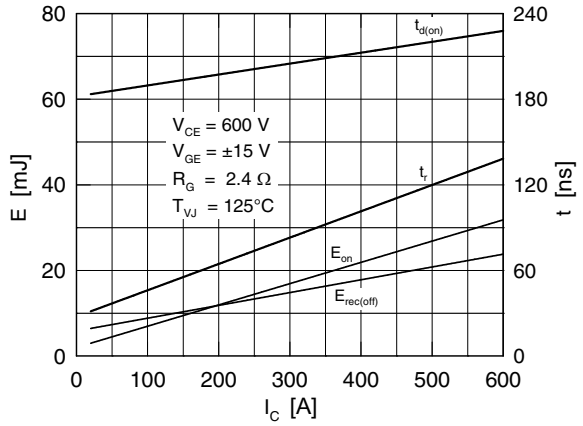


Fig. 7 Typ. turn on energy and switching times versus collector current

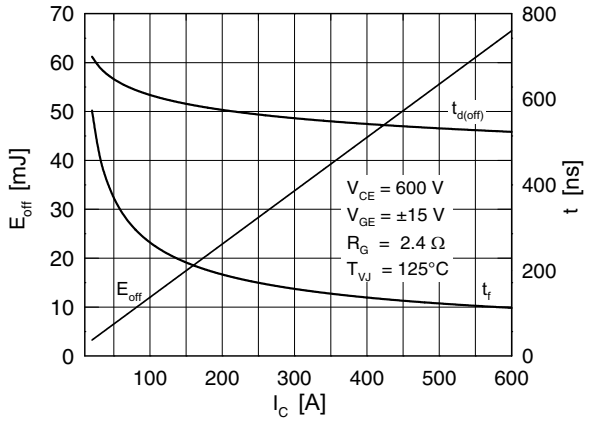


Fig. 8 Typ. turn off energy and switching times versus collector current

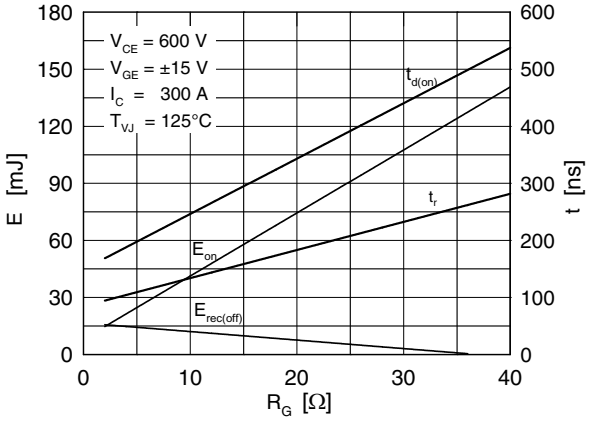


Fig. 9 Typ. turn on energy and switching times versus gate resistor

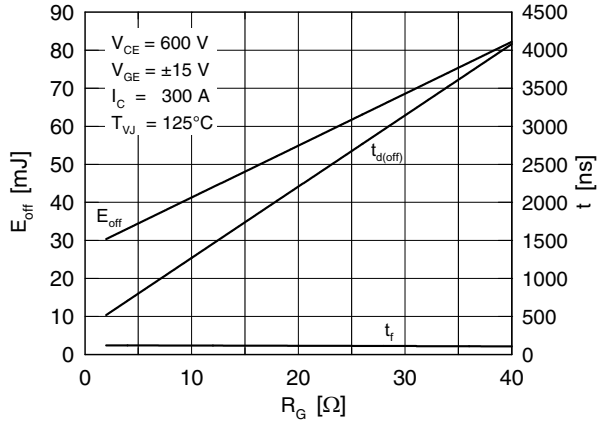


Fig. 10 Typ. turn off energy and switching times versus gate resistor

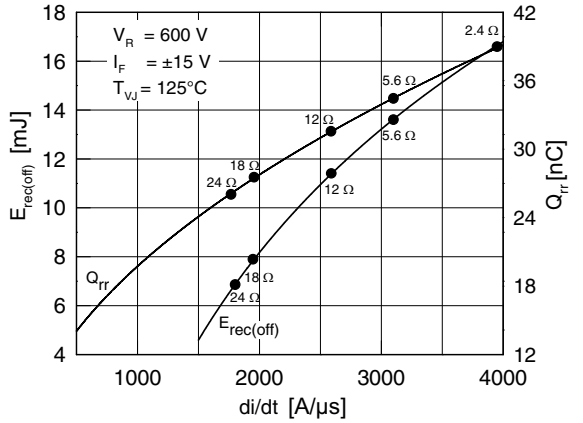


Fig. 11 Typ. turn off energy and recovered charge of free wheeling diode

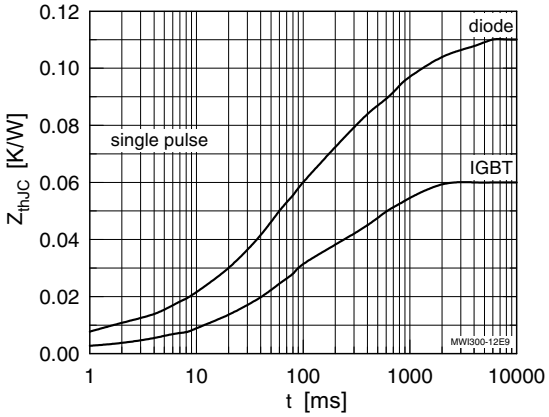


Fig. 12 Typ. transient thermal impedance

20070912a