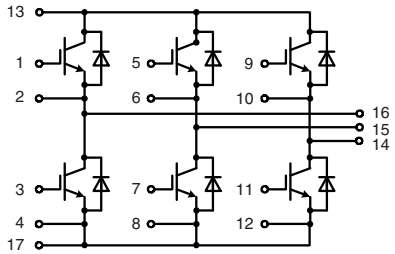
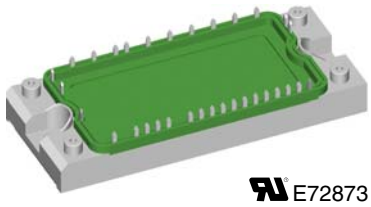
IGBT Module
Sixpack

Short Circuit SOA Capability
Square RBSOA

I_{C25} = 52 A
V_{CES} = 1200 V
$V_{CE(sat)\ typ.}$ = 1.9 V





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	52	A
I_{C80}	T_C = 80°C	36	A
I_{CM}	V_{GE} = ±15 V; R_G = 39 Ω; T_{VJ} = 125°C	70	A
V_{CEK}	RBSOA; clamped inductive load; L = 100 µH	V_{CES}	
t_{SC}	V_{CE} = 900 V; V_{GE} = ±15 V; R_G = 39 Ω; T_{VJ} = 125°C SCSOA; non-repetitive	10	µs
P_{tot}	T_C = 25°C	225	W

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{CE(sat)}$	I_C = 25 A; V_{GE} = 15 V; T_{VJ} = 25°C		1.9	2.4	V
	T_{VJ} = 125°C		2.1		V
$V_{GE(th)}$	I_C = 1 mA; V_{GE} = V_{CE}	4.5		6.5	V
I_{CES}	V_{CE} = V_{CES}; V_{GE} = 0 V; T_{VJ} = 25°C			0.4	mA
	T_{VJ} = 125°C		0.4		mA
I_{GES}	V_{CE} = 0 V; V_{GE} = ± 20 V			200	nA
$t_{d(on)}$	Inductive load, T_{VJ} = 125°C		80		ns
t_r	V_{CE} = 600 V; I_C = 25 A		50		ns
$t_{d(off)}$	V_{GE} = ±15 V; R_G = 39 Ω		440		ns
t_f			50		ns
E_{on}			3.8		mJ
E_{off}			2.0		mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz		2		nF
Q_{Gon}	V_{CE} = 600 V; V_{GE} = 15 V; I_C = 35 A		150		nC
R_{thJC}	(per IGBT)			0.55	K/W

Features

- NPT³ IGBTs
  - low saturation voltage
  - positive temperature coefficient for easy paralleling
  - fast switching
  - short tail current for optimized performance also in resonant circuits
- HiPerFRED™ diode:
  - fast reverse recovery
  - low operating forward voltage
  - low leakage current
- Industry Standard Package
  - solderable pins for PCB mounting
  - isolated copper base plate

Typical Applications

- AC drives
- power supplies with power factor correction

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

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Symbol	Conditions	Maximum Ratings	
I_{F25}	T_C = 25°C	50	A
I_{F80}	T_C = 80°C	33	A

Symbol	Conditions	Characteristic Values min.	typ.	max.	
V_F	I_F = 25 A; V_{GE} = 0 V; T_{VJ} = 25°C		2.3	2.7	V
	T_{VJ} = 125°C		1.7		V
I_{RM}	I_F = 30 A; di_F/dt = -1100 A/µs; T_{VJ} = 125°C		51		A
t_{rr}	V_R = 600 V; V_{GE} = 0 V		180		ns
$E_{rec(off)}$			1.8		mJ
R_{thJC}	(per diode)			1.19	K/W

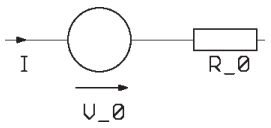
Module

Symbol	Conditions	Maximum Ratings	
T_{VJ}		-40...+150	°C
T_{stg}		-40...+125	°C
V_{ISOL}	I_{ISOL} ≤ 1 mA; 50/60 Hz	2500	V~
M_d	Mounting torque (M5)	2.7 - 3.3	Nm

Symbol	Conditions	Characteristic Values min.	typ.	max.	
$R_{pin-chip}$			5		mΩ
d_S	Creepage distance on surface	6			mm
d_A	Strike distance in air	6			mm
R_{thCH}	with heatsink compound		0.02		K/W
Weight			180		g

Equivalent Circuits for Simulation

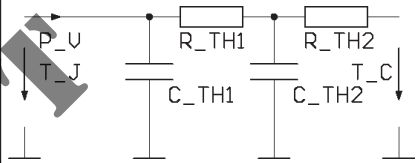
Conduction



IGBT (typ. at V_{GE} = 15 V; T_J = 125°C)
V_0 = 0.95 V; R_0 = 48 mΩ

Free Wheeling Diode (typ. at T_J = 125°C)
V_0 = 1.3 V; R_0 = 16.0 mΩ

Thermal Response



IGBT (typ.)
C_{th1} = 0.129 J/K; R_{th1} = 0.415 K/W
C_{th2} = 1.279 J/K; R_{th2} = 0.135 K/W

Free Wheeling Diode (typ.)
C_{th1} = 0.069 J/K; R_{th1} = 0.956 K/W
C_{th2} = 0.847 J/K; R_{th2} = 0.234 K/W

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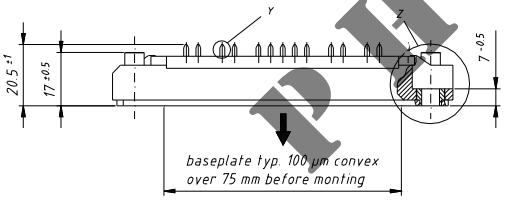
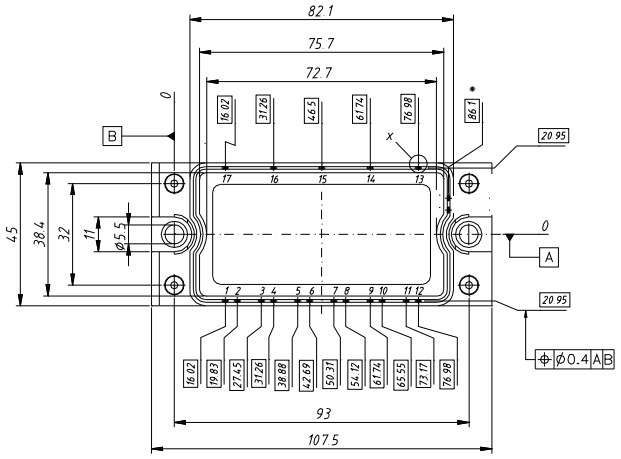
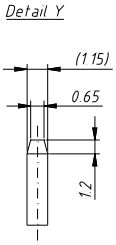
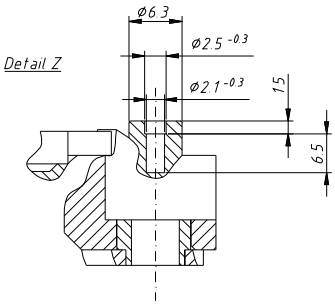
Dimensions in mm (1 mm = 0.0394")











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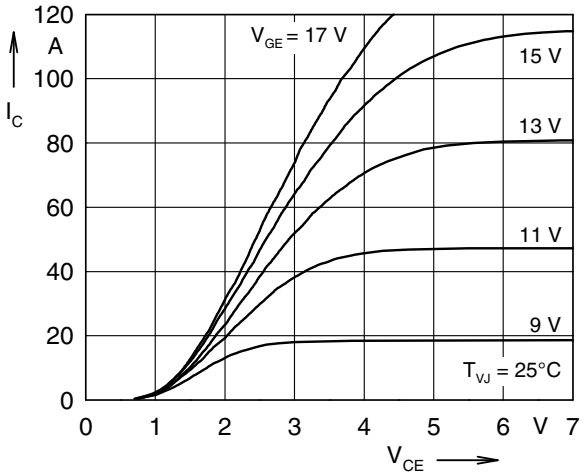

Fig. 1 Typ. output characteristics

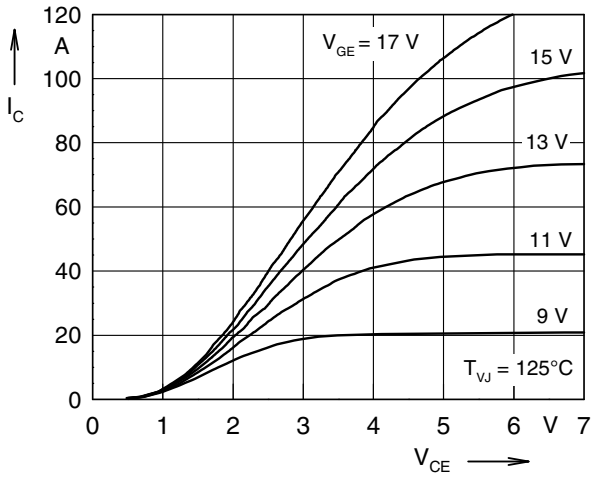

Fig. 2 Typ. output characteristics

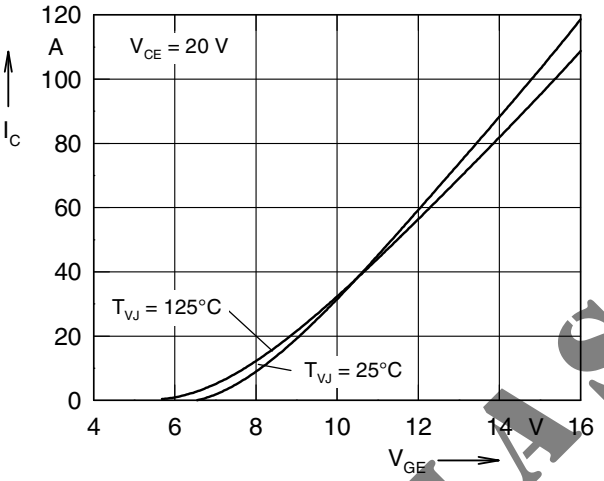

Fig. 3 Typ. transfer characteristics

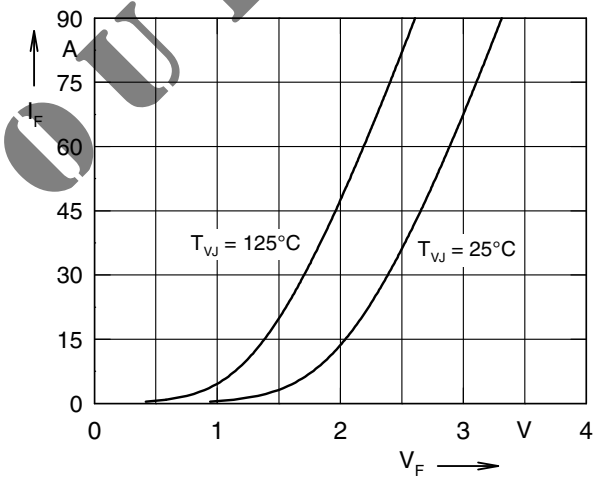

Fig. 4 Typ. forward characteristics of free wheeling diode

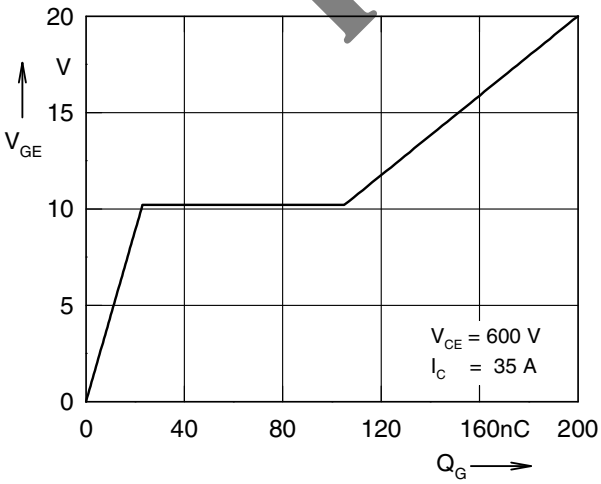

Fig. 5 Typ. turn on gate charge

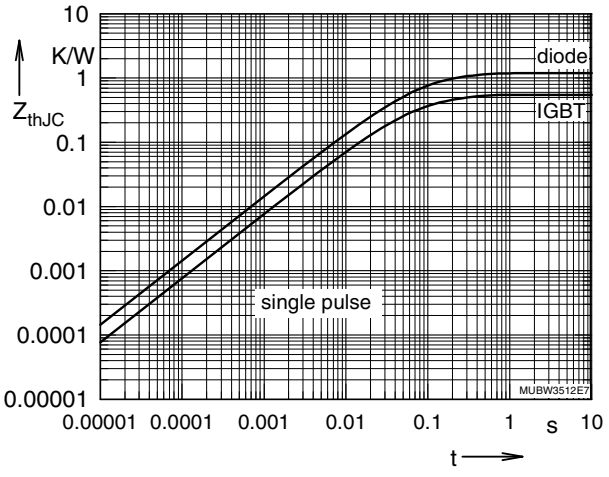

Fig. 6 Typ. transient thermal impedance

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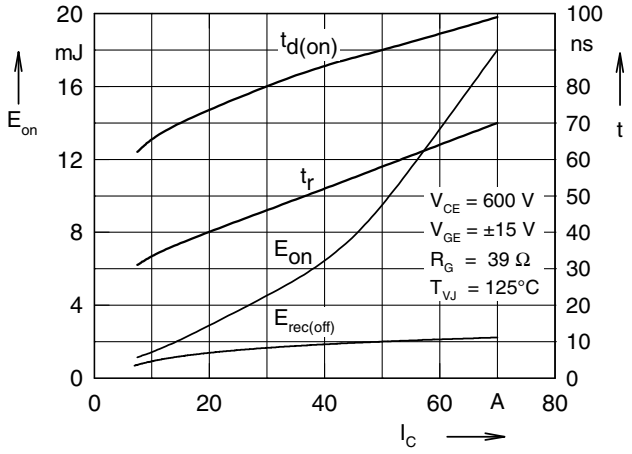

Fig. 7 Typ. turn on energy and switching times versus collector current

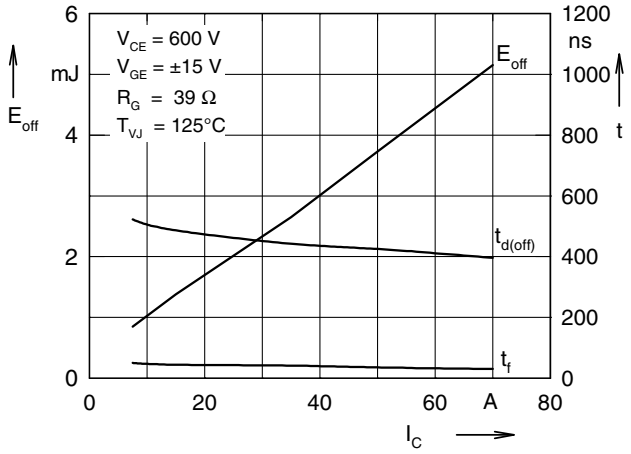

Fig. 8 Typ. turn off energy and switching times versus collector current

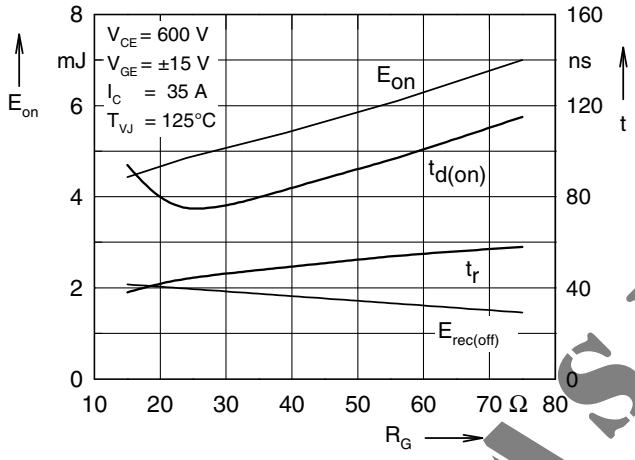

Fig. 9 Typ. turn on energy and switching times versus gate resistor

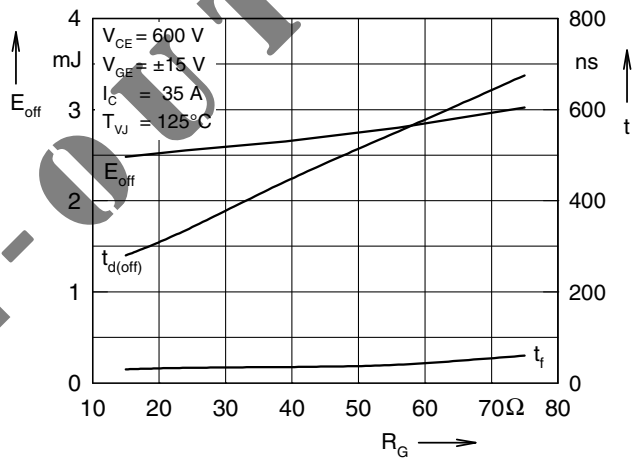

Fig.10 Typ. turn off energy and switching times versus gate resistor

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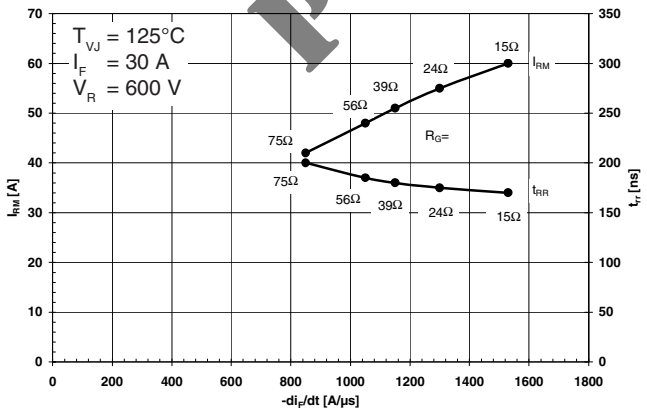

Fig. 11 Typ. turn off characteristics of free wheeling diode

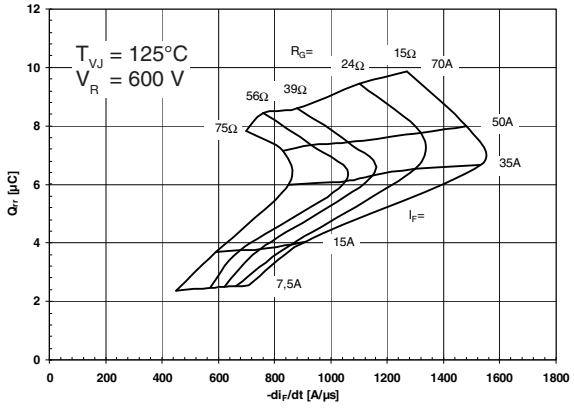

Fig. 12 Typ. turn off characteristics of free wheeling diode

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