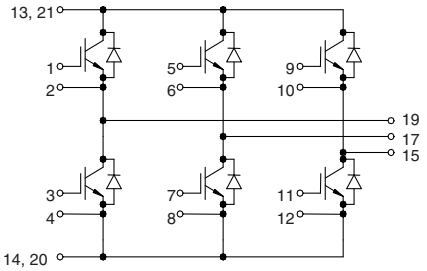
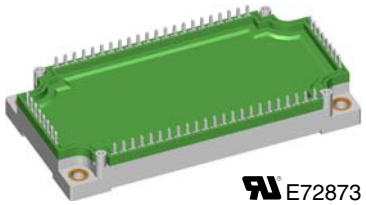
IGBT Modules
Sixpack

Short Circuit SOA Capability
Square RBSOA

Preliminary data

I_{C25} = 170 A
V_{CES} = 600 V
$V_{CE(sat)\ typ.}$ = 2.0 V





See outline drawing for pin arrangement

IGBTs

Symbol	Conditions	Maximum Ratings	
V_{CES}	T_{VJ} = 25°C to 150°C	600	V
V_{GES}		± 20	V
I_{C25}	T_C = 25°C	170	A
I_{C80}	T_C = 80°C	115	A
RBSOA	V_{GE} = ±15 V; R_G = 1.5 Ω; T_{VJ} = 125°C Clamped inductive load; L = 100 µH	I_{CM} = 300 $V_{CEK} \le V_{CES}$	A
t_{SC} (SCSOA)	$V_{CE} = V_{CES}$; V_{GE} = ±15 V; R_G = 1.5 Ω; T_{VJ} = 125°C non-repetitive	10	µs
P_{tot}	T_C = 25°C	515	W

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{CE(sat)}$	I_C = 150 A; V_{GE} = 15 V; T_{VJ} = 25°C		2.0	2.5	V
	T_{VJ} = 125°C		2.3		V
$V_{GE(th)}$	I_C = 3 mA; $V_{GE} = V_{CE}$	4.5		6.5	V
I_{CES}	$V_{CE} = V_{CES}$; V_{GE} = 0 V; T_{VJ} = 25°C			1.5	mA
	T_{VJ} = 125°C		1.1		mA
I_{GES}	V_{CE} = 0 V; V_{GE} = ± 20 V			400	nA
$t_{d(on)}$	Inductive load, T_{VJ} = 125°C V_{CE} = 300 V; I_C = 150 A V_{GE} = ±15 V; R_G = 1.5 Ω		125		ns
t_r			30		ns
$t_{d(off)}$			225		ns
t_f			35		ns
E_{on}			2.3		mJ
E_{off}			4.6		mJ
C_{ies}	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz		6.5		nF
Q_{Gon}	V_{CE} = 300V; V_{GE} = 15 V; I_C = 150 A		520		nC
R_{thJC}	(per IGBT)			0.24	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 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

Diodes

Symbol	Conditions	Maximum Ratings	
I_{F25}	T_C = 25°C	210	A
I_{F80}	T_C = 80°C	130	A

Symbol	Conditions	Characteristic Values min.	typ.	max.	
V_F	I_F = 150 A; V_{GE} = 0 V; T_{VJ} = 25°C		1.9	2.0	V
	T_{VJ} = 125°C		1.4		V
I_{RM}	I_F = 150 A; di_F/dt = -750 A/µs; T_{VJ} = 125°C		37		A
t_{rr}	V_R = 300 V; V_{GE} = 0 V		100		ns
R_{thJC}	(per diode)			0.41	K/W

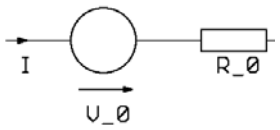
Module

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

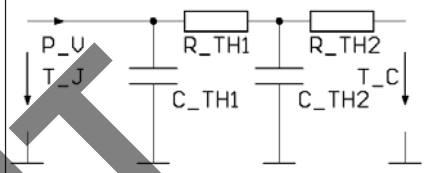
Conduction



IGBT (typ. at V_{GE} = 15 V; T_J = 125°C)
V_0 = 1.1 V; R_0 = 8 mΩ

Free Wheeling Diode (typ. at T_J = 125°C)
V_0 = 1.1 V; R_0 = 2.25 mΩ

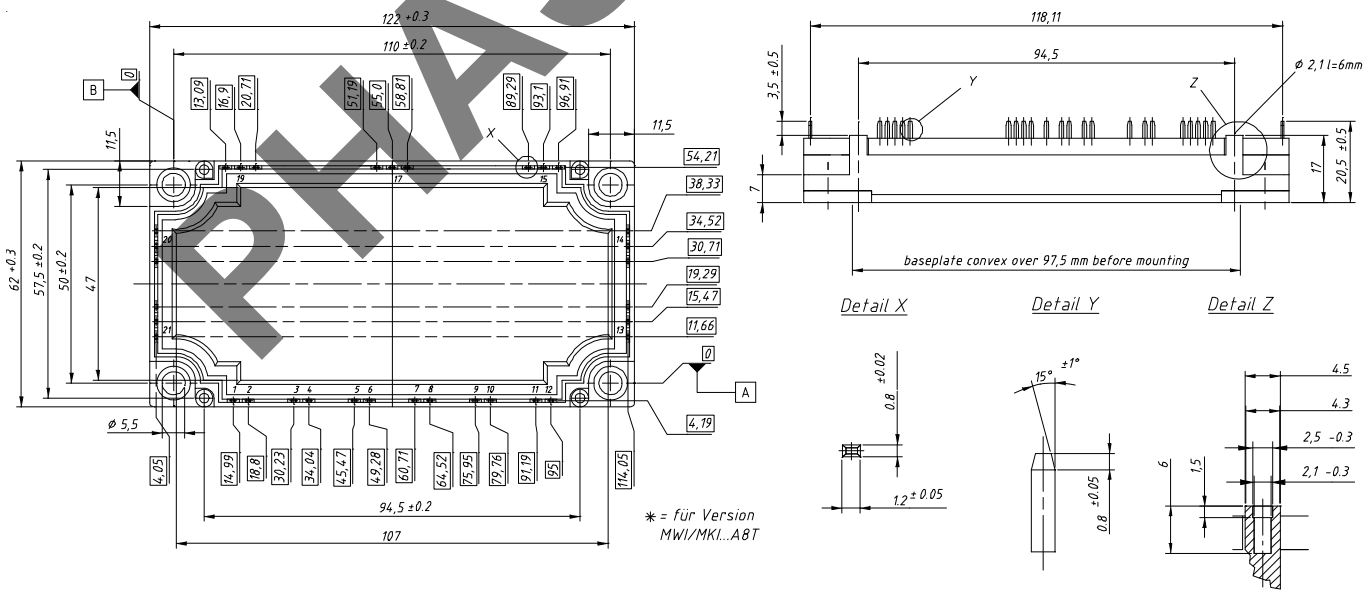
Thermal Response



IGBT (typ.)
C_{th1} = 0.295 J/K; R_{th1} = 0.176 K/W
C_{th2} = 1.750 J/K; R_{th2} = 0.064 K/W

Free Wheeling Diode (typ.)
C_{th1} = 0.21 J/K; R_{th1} = 0.317 K/W
C_{th2} = 1.28 J/K; R_{th2} = 0.093 K/W

Dimensions in mm (1 mm = 0.0394")



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