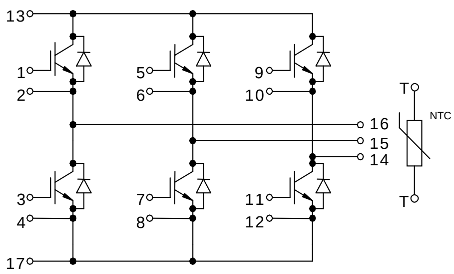
IGBT Modules
Sixpack

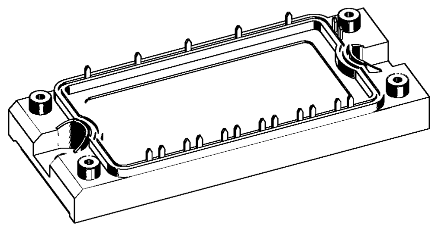
Short Circuit SOA Capability
Square RBSOA

I_{C25} = 90 A
V_{CES} = 600 V
$V_{CE(sat)\ typ.}$ = 2.1 V

Preliminary Data

Type	NTC - Option
MWI 75-06 A7	without NTC
MWI 75-06 A7T	with NTC





IGBTs

Symbol	Conditions	Maximum Ratings	
V_{CES}	T_{VJ} = 25°C to 150°C	600	V
V_{GES}		± 20	V
I_{C25} I_{C80}	T_C = 25°C T_C = 80°C	90 60	A A
RBSOA	V_{GE} = ±15 V; R_G = 18 Ω; T_{VJ} = 125°C Clamped inductive load; L = 100 µH	I_{CM} = 120 $V_{CEK} \le V_{CES}$	A
t_{SC} **(SCSOA)**	$V_{CE} = V_{CES}$; V_{GE} = ±15 V; R_G = 18 Ω; T_{VJ} = 125°C non-repetitive	10	µs
P_{tot}	T_C = 25°C	280	W

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
$V_{CE(sat)}$	I_C = 75 A; V_{GE} = 15 V; T_{VJ} = 25°C T_{VJ} = 125°C		2.1 2.5	2.6	V V
$V_{GE(th)}$	I_C = 1.5 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		 0.9	1.3	mA mA
I_{GES}	V_{CE} = 0 V; V_{GE} = ± 20 V			200	nA
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off}	Inductive load, T_{VJ} = 125°C V_{CE} = 300 V; I_C = 75 A V_{GE} = ±15 V; R_G = 18 Ω		50 50 270 40 3.5 2.5		ns ns ns ns mJ mJ
C_{ies} Q_{Gon}	V_{CE} = 25 V; V_{GE} = 0 V; f = 1 MHz V_{CE} = 300V; V_{GE} = 15 V; I_C = 75 A		3200 190		pF nC
R_{thJC}	(per IGBT)			0.44	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

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

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Diodes

Symbol	Conditions	Maximum Ratings	
I_{F25}	T_C = 25°C	140	A
I_{F80}	T_C = 80°C	85	A

Symbol	Conditions	Characteristic Values min.	typ.	max.	
V_F	I_F = 50 A; V_{GE} = 0 V; T_{VJ} = 25°C		1.8	2.1	V
	T_{VJ} = 125°C		1.3	1.5	V
I_{RM}	I_F = 60 A; di_F/dt = -500 A/µs; T_{VJ} = 125°C		28		A
t_{rr}	V_R = 300 V; V_{GE} = 0 V		100		ns
R_{thJC}	(per diode)			0.61	K/W

Temperature Sensor NTC (MWI ... A7T version only)

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

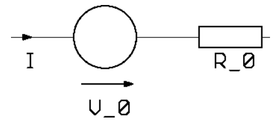
Module

Symbol	Conditions	Maximum Ratings	
T_{VJ}		-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

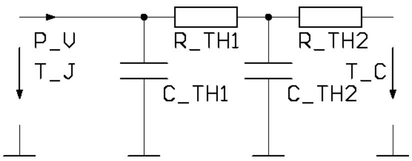
Conduction



IGBT (typ. at V_{GE} = 15 V; T_J = 125°C)
$V_0 = 0.95$ V; $R_0 = 20$ mΩ

Free Wheeling Diode (typ. at T_J = 125°C)
$V_0 = 1.014$ V; $R_0 = 4$ mΩ

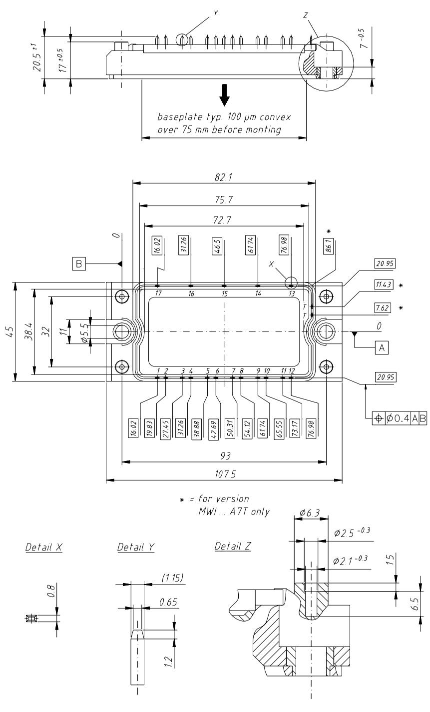
Thermal Response



IGBT (typ.)
$C_{th1} = 0.248$ J/K; $R_{th1} = 0.343$ K/W
$C_{th2} = 1.849$ J/K; $R_{th2} = 0.097$ K/W

Free Wheeling Diode (typ.)
$C_{th1} = 0.23$ J/K; $R_{th1} = 0.483$ K/W
$C_{th2} = 1.3$ J/K; $R_{th2} = 0.127$ K/W

Dimensions in mm (1 mm = 0.0394")



Higher magnification see outlines.pdf

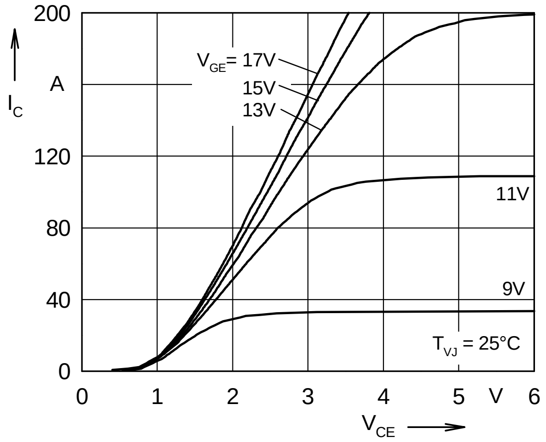


Fig. 1 Typ. output characteristics

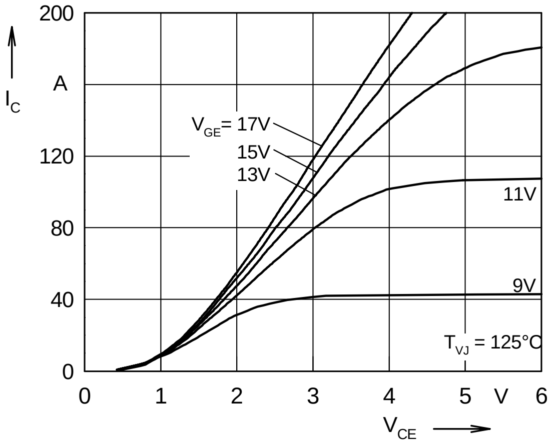


Fig. 2 Typ. output characteristics

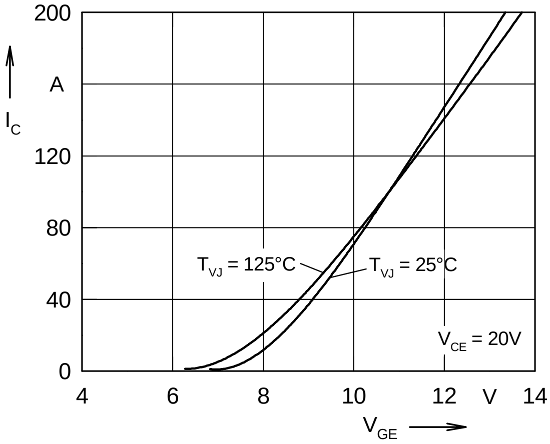


Fig. 3 Typ. transfer characteristics

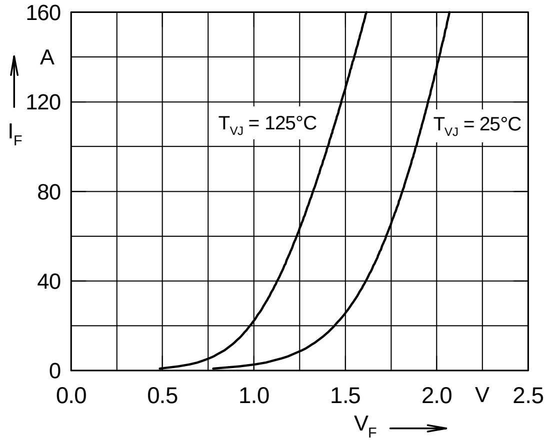


Fig. 4 Typ. forward characteristics of free wheeling diode

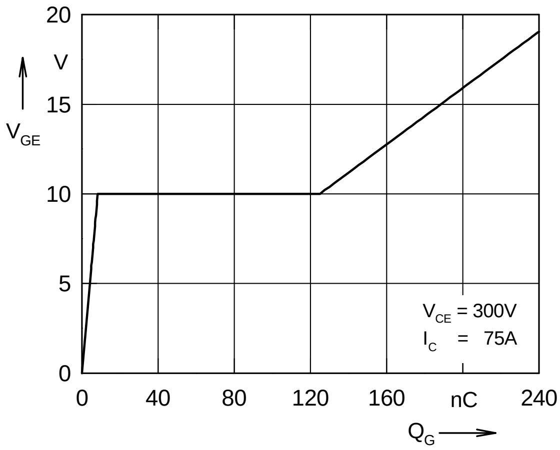


Fig. 5 Typ. turn on gate charge

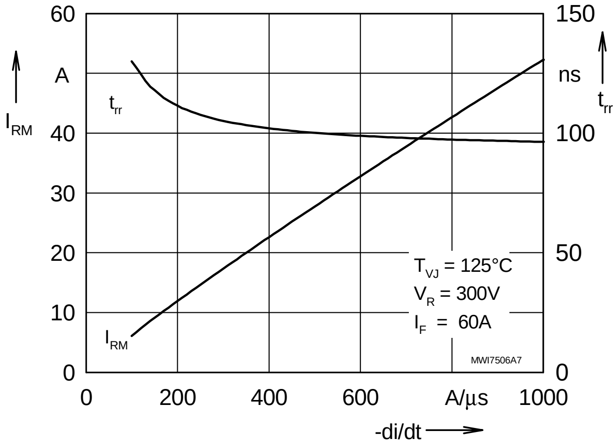


Fig. 6 Typ. turn off characteristics of free wheeling diode

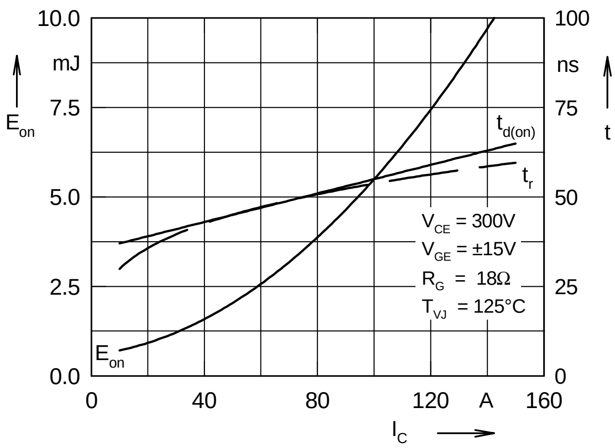


Fig. 7 Typ. turn on energy and switching times versus collector current

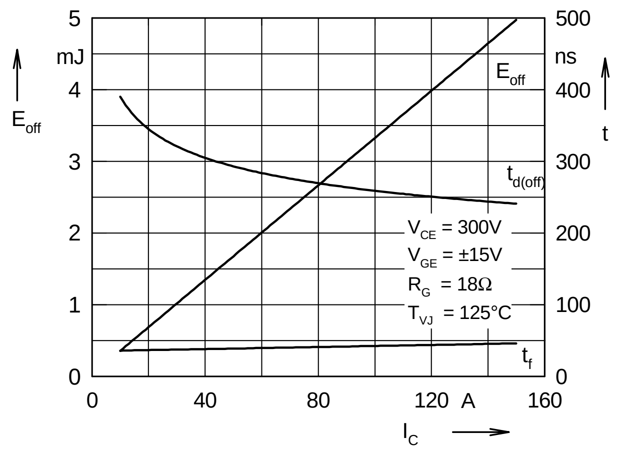


Fig. 8 Typ. turn off energy and switching times versus collector current

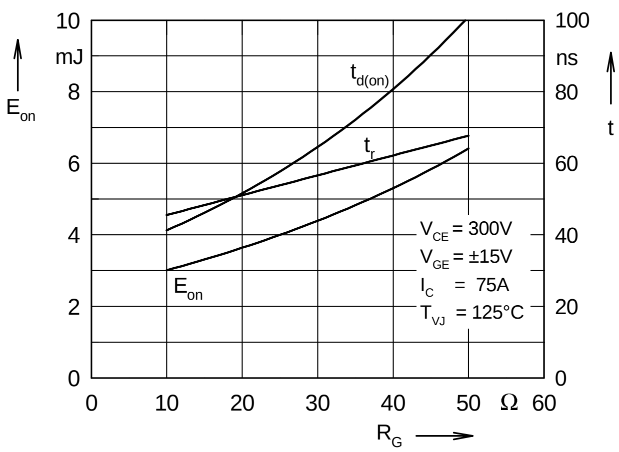


Fig. 9 Typ. turn on energy and switching times versus gate resistor

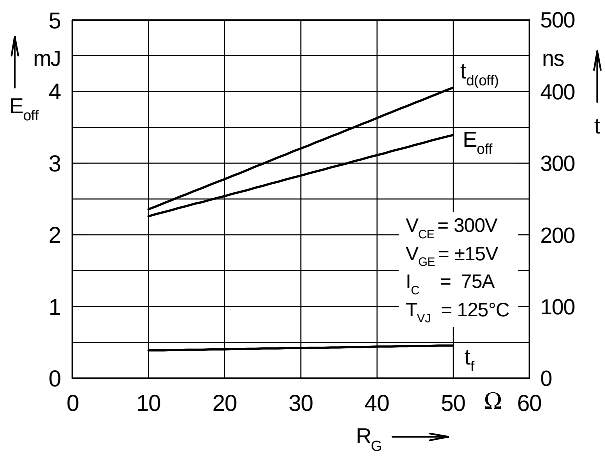


Fig.10 Typ. turn off energy and switching times versus gate resistor

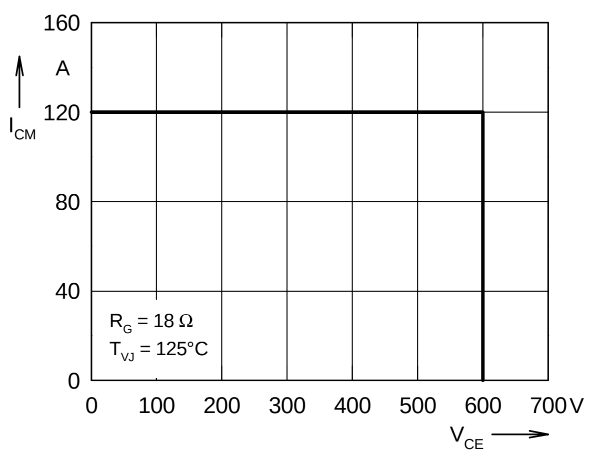


Fig. 11 Reverse biased safe operating area RBSOA

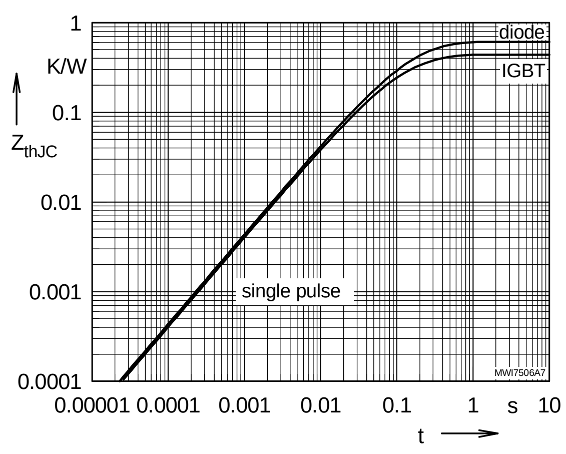


Fig. 12 Typ. transient thermal impedance