

IGBT Module

phaseleg and chopper topologies

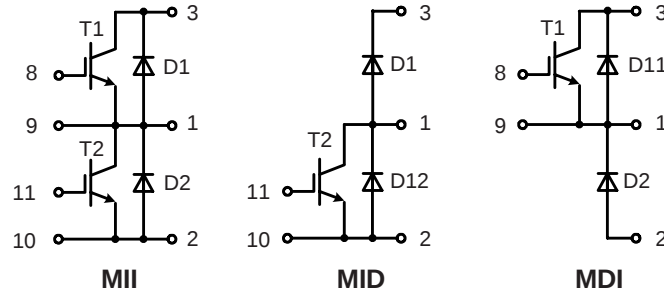
MII 400-12E4

MID 400-12E4

MDI 400-12E4

$I_{C25} = 420 \text{ A}$
 $V_{CES} = 1200 \text{ V}$
 $V_{CE(sat)} \text{ typ.} = 2.2 \text{ V}$

Preliminary



IGBTs T1-T2

Symbol	Conditions	Maximum Ratings	
V_{CES}	$T_{VJ} = 25^{\circ}\text{C to } 150^{\circ}\text{C}$	1200	V
V_{GES}		± 20	V
I_{C25}	$T_C = 25^{\circ}\text{C}$	420	A
I_{C80}	$T_C = 80^{\circ}\text{C}$	300	A
I_{CM}	$V_{GE} = \pm 15 \text{ V}; R_G = 4.7 \Omega; T_{VJ} = 125^{\circ}\text{C}$	450	A
V_{CEK}	RBSOA , Clamped inductive load; $L = 100 \mu\text{H}$	V_{CES}	
t_{SC} (SCSOA)	$V_{CE} = 900 \text{ V}; V_{GE} = \pm 15 \text{ V}; R_G = 4.7 \Omega; T_{VJ} = 125^{\circ}\text{C}$ non repetitive	10	μs
P_{tot}	$T_C = 25^{\circ}\text{C}$	1700	W

Symbol	Conditions	Characteristic Values ($T_{VJ} = 25^{\circ}\text{C}$, unless otherwise specified)		
		min.	typ.	max.
$V_{CE(sat)}$	$I_C = 300 \text{ A}; V_{GE} = 15 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		2.2 2.6	V V
$V_{GE(th)}$	$I_C = 10 \text{ mA}; V_{GE} = V_{CE}$	4.5		6.5 V
I_{CES}	$V_{CE} = V_{CES}; V_{GE} = 0 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$		0.8 3.5	mA mA
I_{GES}	$V_{CE} = 0 \text{ V}; V_{GE} = \pm 20 \text{ V}$			600 nA
$t_{d(on)}$ t_r $t_{d(off)}$ t_f E_{on} E_{off}	Inductive load, $T_{VJ} = 125^{\circ}\text{C}$ $V_{CE} = 600 \text{ V}; I_C = 300 \text{ A}$ $V_{GE} = \pm 15 \text{ V}; R_G = 4.7 \Omega$		150 60 680 50 36 30	ns ns ns ns mJ mJ
C_{ies}			17	nF
Q_{Gon}			2.25	μC
R_{thJC} R_{thJH}	(per IGBT) with heatsink compound		0.15	0.08 K/W K/W

Features

- IGBT
 - low saturation voltage
 - positive temperature coefficient
 - fast switching
 - short tail current for optimized performance in resonant circuits
- HiPerFRED™ diodes
 - fast and soft reverse recovery
 - low operating forward voltage
 - low leakage current
- Package
 - low inductive current path
 - screw connection to high current main terminals
 - use of non interchangeable connectors for auxiliary terminals possible
 - kelvin emitter terminal for easy drive
 - isolated ceramic base plate

Applications

- drives
 - AC
 - DC
- power supplies
 - rectifiers with power factor correction and recuperation capability
 - UPS

Free wheeling diodes D1-D2

Symbol	Conditions	Maximum Ratings	
I_{F25}	$T_C = 25^\circ\text{C}$	450	A
I_{F80}	$T_C = 80^\circ\text{C}$	290	A

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
V_F	$I_F = 300\text{ A}; V_{GE} = 0\text{ V}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	2.3	2.7	V
I_{RM}	$I_F = 225\text{ A}; di_F/dt = -2000\text{ A}/\mu\text{s}; T_{VJ} = 125^\circ\text{C}$ $V_R = 600\text{ V}; V_{GE} = 0\text{ V}$	240		A
t_{rr}		220		ns
R_{thJC}	(per diode)		0.15	K/W
R_{thJH}	with heatsink compound			K/W

Chopper anti parallel diodes D11-D12

Symbol	Conditions	Maximum Ratings	
I_{F25}	$T_C = 25^\circ\text{C}$	150	A
I_{F80}	$T_C = 80^\circ\text{C}$	95	A

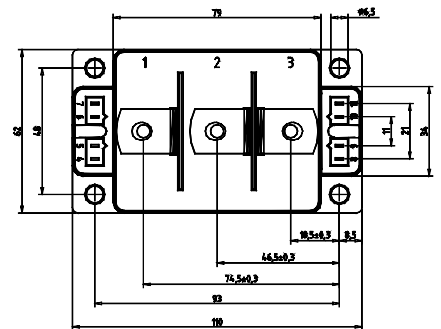
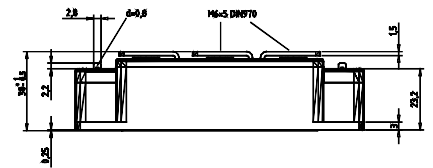
Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
V_F	$I_F = 100\text{ A}; V_{GE} = 0\text{ V}; T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$	2.3	2.7	V
I_{RM}	$I_F = 75\text{ A}; di_F/dt = -750\text{ A}/\mu\text{s}; T_{VJ} = 125^\circ\text{C}$ $V_R = 600\text{ V}; V_{GE} = 0\text{ V}$	80		A
t_{rr}		220		ns
R_{thJC}	(per diode)		0.45	K/W
R_{thJH}	with heatsink compound			K/W

Module

Symbol	Conditions	Maximum Ratings	
T_{VJ}		-40...+150	$^\circ\text{C}$
T_{stg}		-40...+125	$^\circ\text{C}$
V_{ISOL}	$I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}$	4000	V~
M_d	Mounting torque	(module, M6) (terminals, M6)	2.25 - 2.75 4.5 - 5.5
			Nm Nm

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
d_s	Creepage distance on surface	2		mm
d_A	Strike distance in air	2		mm
Weight		250		g

Dimensions in mm (1 mm = 0.0394")



Optional accessories for modules

keyed twin plugs
(UL758, style 1385, CSA class 5851, guide 460-1-1)

- Type ZY180L with wire length 350mm
 - for pins 4 (yellow wire) and 5 (red wire)
 - for pins 11 (yellow wire) and 10 (red wire)
- Type ZY180R with wire length 350mm
 - for pins 7 (yellow wire) and 6 (red wire)
 - for pins 8 (yellow wire) and 9 (red wire)