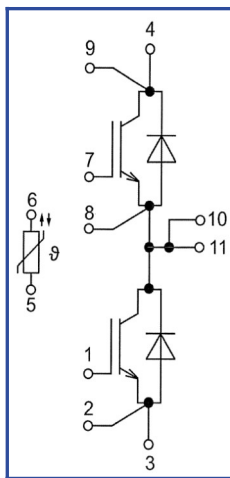
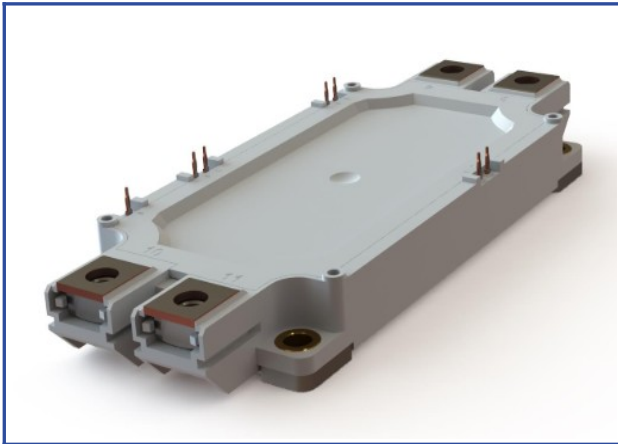


Low Inductance IGBT Module with 17 mm Height Housing
1700 V 450 A

Chip features

- IGBT chip
 - low $V_{CE(sat)}$ value
 - 10 μs short circuit duration at 150°C
 - square RBSOA of 2xI_c
- FRD chip
 - fast and soft reverse recovery
 - low voltage drop

Design features

- copper baseplate
- Al₂O₃ DBC substrate
- ultrasonic welded power terminals
- improved thermal cycling
- RoHS compliant
- low inductance value
- press-fit pins for driver connection

Typical application

- AC motor drives
- solar inverters
- air conditioning
- high power converters and UPS
- Inverters for wind energy converters

Maximum rated values

Definition	Symbol	Conditions	Value	Unit
IGBT				
Collector-Emitter voltage	V_{CES}	$V_{GE} = 0$.	1700	V
Maximum allowable collector current (continuous)	$I_{C 25}$	$T_{vj(max)} = 175^{\circ}C; T_c = 25^{\circ}C$.	-	A
	$I_{C 80}$	$T_{vj(max)} = 175^{\circ}C; T_c = 80^{\circ}C$.	450	A
Repetitive peak collector current* ¹	I_{CRM}	$I_{CRM} = 2 \times I_{C nom}; t_p = 1 ms$.	900	A
Short-circuit duration	t_{psc}	$T_{vj} = 25^{\circ}C; V_{GE} = \pm 15 V; V_{CE} = 700 V;$ $R_{G on} = R_{G off} = 3 \Omega$.	10	μs
		$T_{vj} = 150^{\circ}C; V_{GE} = \pm 15 V; V_{CE} = 700 V;$ $R_{G on} = R_{G off} = 3 \Omega$.	10	
Gate-Emitter voltage	V_{GES}		± 20	V
Junction operating temperature	$T_{vj(op)}$		-40...+150	°C
Inverse diode				
Repetitive peak reverse voltage	V_{RRM}	$V_{GE} = 0 V$.	1700	V
Maximum allowable forward current (continuous)	$I_{F 25}$	$T_{vj(max)} = 175^{\circ}C; T_c = 25^{\circ}C$.	-	A
	$I_{F 80}$	$T_{vj(max)} = 175^{\circ}C; T_c = 80^{\circ}C$.	450	A
Repetitive peak forward current* ¹	I_{FRM}	$I_{FRM} = 2 \times I_{F nom}; t_p = 1 ms$.	900	A
Junction operating temperature	$T_{vj(op)}$		-40...+150	°C
Module				
Storage temperature	T_{stg}		-40...+50	°C
Isolation voltage	V_{isol}	AC sin 50 Hz; t = 1 min.	4000	V

*¹ Pulse width and repetition rate should be such that device junction temperature does not exceed maximum T_{vj} rating



Characteristics

Definition	Symbol	Conditions	Value			Unit.	
			min.	typ.	max.		
IGBT							
Collector-Emitter saturation voltage	V_{CEsat}	$V_{GE} = +15\text{ V}; I_C = 450\text{ A}; t_u = 1000\ \mu\text{s}.$	$T_{vj} = 25^\circ\text{C}$	-	2.70	-	V
			$T_{vj} = 150^\circ\text{C}$	-	3.40	-	V
Gate-Emitter threshold voltage	$V_{GE(th)}$	$I_C = 18\text{ mA}; V_{CE} = V_{GE}; T_{vj} = 25^\circ\text{C}; t_u = 2\text{ ms}.$	-	4.50	-	6.50	V
Collector-Emitter cut-off current	I_{CES}	$V_{CE} = 1700\text{ V}; t_u = 50\text{ ms}; V_{GE} = 0.$	$T_{vj} = 25^\circ\text{C}$	-	-	300	μA
			$T_{vj} = 150^\circ\text{C}$	-	5.00	-	mA
Gate-Emitter leakage current	I_{GES}	$V_{CE} = 0; V_{GE} = \pm 20\text{ V}; T_{vj} = 25^\circ\text{C}; t_u = 30\text{ ms}.$	-	-	-	500	nA
Input capacitance	C_{ies}	$V_{CE} = 25\text{ V}; V_{GE} = 0\text{ V}; f = 1\text{ MHz}; T_{vj} = 25^\circ\text{C}.$	-	27.45	-	-	nF
Reverse transfer capacitance	C_{res}		-	1.08	-	-	nF
Total gate charge	Q_G	$I_C = 450\text{ A}; V_{CE} = 920\text{ V}; V_{GE} = -8 \div 15\text{ V}.$	-	3150	-	-	nC
Internal gate resistance	R_{Gint}	$T_{vj} = 25^\circ\text{C}.$	-	1.60	-	-	Ω
Turn-on delay time	$t_{d(on)}$		$T_{vj} = 25^\circ\text{C}$	-	290	-	-
			$T_{vj} = 150^\circ\text{C}$	-	320	-	-
Rise time	t_{ri}	$V_{CE} = 920\text{ V}; V_{GE} = \pm 15\text{ V}; I_{Cmax} = 450\text{ A}; R_G = 3.0\ \Omega; L_s = 53\text{ nH}.$	$T_{vj} = 25^\circ\text{C}$	-	100	-	-
			$T_{vj} = 150^\circ\text{C}$	-	130	-	-
Turn-on energy	E_{on}		$T_{vj} = 25^\circ\text{C}$	-	150.0	-	-
			$T_{vj} = 150^\circ\text{C}$	-	210.0	-	-
Turn-off delay time	$t_{d(off)}$		$T_{vj} = 25^\circ\text{C}$	-	480	-	-
			$T_{vj} = 150^\circ\text{C}$	-	610	-	-
Fall time	t_{fi}		$T_{vj} = 25^\circ\text{C}$	-	115	-	-
			$T_{vj} = 150^\circ\text{C}$	-	140	-	-
Turn-off energy	E_{off}		$T_{vj} = 25^\circ\text{C}$	-	105.0	-	-
			$T_{vj} = 150^\circ\text{C}$	-	150.0	-	-
Collector-emitter threshold voltage	V_{CE0}	$V_{GE} = +15\text{ V}; T_{vj} = 150^\circ\text{C}; I_{CE1} = 112\text{ A}; I_{CE2} = 450\text{ A}; t_u = 1000\ \mu\text{s}.$	-	-	-	-	V
On-State slope resistance (IGBT)	r_{CE0}		-	-	-	-	$\text{m}\Omega$
Thermal resistance junction to case	$R_{th(j-c)}$	$\text{DC}; I_{CE} = 300 \pm 50\text{ A}; I_{test} = 1.5\text{ A}; V_{GE} = +15\text{ V}.$	-	-	-	0.060	K/W
Inverse diode							
Forward voltage drop	V_F	$I_F = 450\text{ A}; V_{GE} = 0; t_u = 1000\ \mu\text{s}.$	$T_{vj} = 25^\circ\text{C}$	-	2.10	-	V
			$T_{vj} = 150^\circ\text{C}$	-	2.45	-	V
Reverse recovery time	t_{rr}		$T_{vj} = 25^\circ\text{C}$	-	650	-	ns
			$T_{vj} = 150^\circ\text{C}$	-	870	-	ns
Peak reverse current	I_{RM}	$V_{CE} = 920\text{ V}; V_{GE} = \pm 15\text{ V}; I_{Cmax} = 450\text{ A}; R_G = 3.0\ \Omega; L_s = 53\text{ nH}.$	$T_{vj} = 25^\circ\text{C}$	-	485	-	A
			$T_{vj} = 150^\circ\text{C}$	-	515	-	A
Recovered charge	Q_r		$T_{vj} = 25^\circ\text{C}$	-	129.0	-	μC
			$T_{vj} = 150^\circ\text{C}$	-	243.0	-	μC
Reverse recovery energy	E_{rec}		$T_{vj} = 25^\circ\text{C}$	-	87.0	-	mJ
			$T_{vj} = 150^\circ\text{C}$	-	156.0	-	mJ
Threshold voltage	$V_{(T0)}$	$T_{vj} = 150^\circ\text{C}; V_{GE} = 0; I_{CE1} = 112\text{ A}; I_{CE2} = 450\text{ A}; t_u = 1000\ \mu\text{s}$	-	-	-	-	V
Forward slope resistance	r_T		-	-	-	-	$\text{m}\Omega$
Thermal resistance junction to case	$R_{th(jc-D)}$	$\text{DC}; I_{CE} = 300 \pm 50\text{ A}; I_{test} = 1.5\text{ A}; V_{GE} = 0\text{ V}.$	-	-	-	0.100	K/W

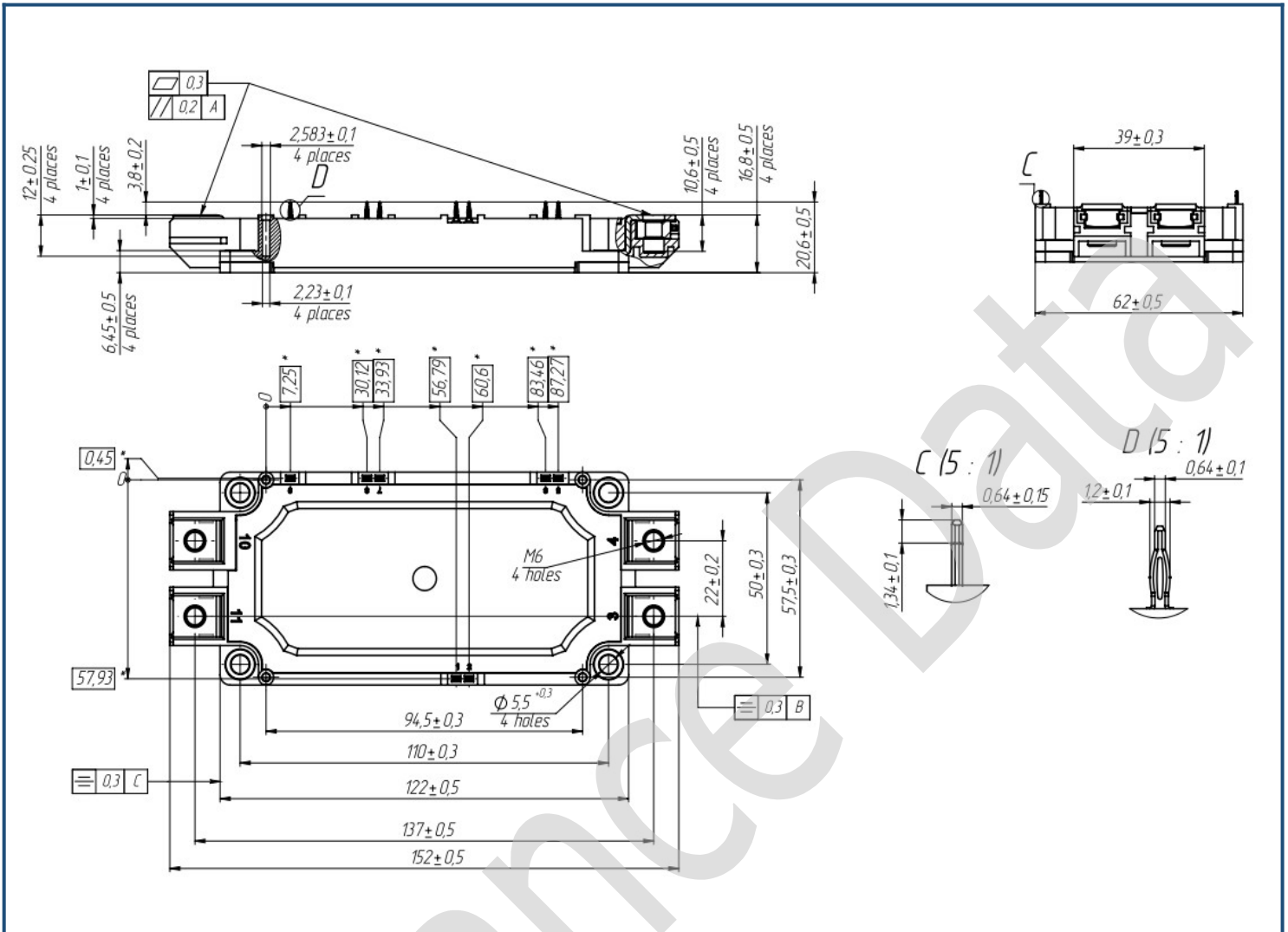
Module							
Pin resistance	R_{Pxy}	$T_{vj} = 25^{\circ}\text{C}$.	$R_{P10/11-3}$	-	0.92	1.00	m Ω
			$R_{P10/11-4}$	-	0.59	1.00	
Parasitic inductance between terminals	L_{Pce}			-	26	-	nH
Thermistor resistance	R_t	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$		4850	-	6225	Ω
				475	-	554	
Thermal resistance case to heatsink	R_{thCH}	per module		-	0.009	0.014	K/W
Mounting torque for screws to heatsink	M_s	to heatsink M5		3	-	6	N*m
Mounting torque for terminal screws	M_t	to terminals M6		3	-	6	N*m
Weight	W			-	360	-	g

" - " — data will be refined as additional tests are conducted and statistics are collected.

Notes:

- Insulating material operating temperature 125°C max;
- Case temperature 125°C max;
- The recommended operating junction temperature $T_{vj\ op} = -40\dots+150^{\circ}\text{C}$.

Overall dimensions: Package type – DA



Part numbering guide

MIDA	-	HB	17	AB	-	450	N	-	P	
MIDA										IGBT module package type: DA
		HB								Half-Bridge
			17							Voltage rating ($V_{CES}/100$)
				AB						IGBT+FRD chipset modification
						450				Current Rating
							N			Climatic version: normal climate
									P	Press-fit pins for driver connection

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