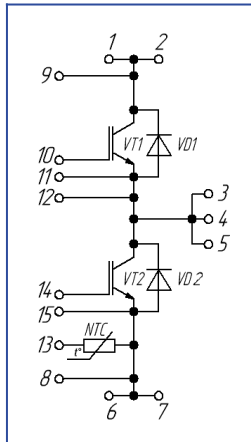
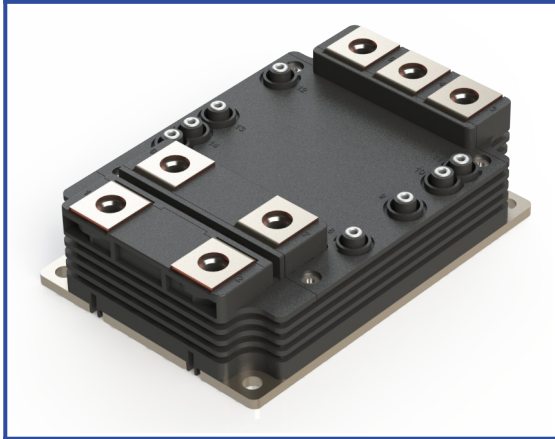




Low inductance IGBT module in a XM package (100mm*140mm)

1700 V 1400 A



Chip features

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

Design features

- copper baseplate
- Si3N4 substrate
- improved thermal cycling
- RoHS compliant
- low inductance value

Typical application

- AC motor drives
- solar inverter
- wind-powered generator inverters
- high power converters and UPS

Maximum rated values

Definition	Symbol	Conditions	Value	Unit
IGBT				
Collector-Emitter voltage	V_{CES}	$V_{GE} = 0$.	1700	V
Maximum allowable collector current (continuous)*2	$I_{C 25}$	$T_{vj(max)} = 175^{\circ}C$; $T_c = 25^{\circ}C$.	1743	A
	$I_{C 80}$	$T_{vj(max)} = 175^{\circ}C$; $T_c = 80^{\circ}C$.	1348	A
Repetitive peak collector current*1	I_{CRM}	$I_{CRM} = 3 \times I_{C nom}$; $t_p = 1 ms$.	4200	A
Short-circuit duration	t_{psc}	$T_{vj} = 25^{\circ}C$; $V_{GE} = \pm 15 V$; $V_{CE} = 920 V$; $R_{G on} = R_{G off} = 1.2 \Omega$	10	μs
		$T_{vj} = 150^{\circ}C$; $V_{GE} = \pm 15 V$; $V_{CE} = 920 V$; $R_{G on} = R_{G off} = 1.2 \Omega$	-	
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)*2	$I_{F 25}$	$T_{vj(max)} = 175^{\circ}C$; $T_c = 25^{\circ}C$.	1496	A
	$I_{F 80}$	$T_{vj(max)} = 175^{\circ}C$; $T_c = 80^{\circ}C$.	1129	A
Repetitive peak forward current*1	I_{FRM}	$I_{FRM} = 3 \times I_{F nom}$; $t_p = 1 ms$.	4200	A
Junction operating temperature	$T_{vj (op)}$		-40...+150	°C
Module				
Storage temperature	T_{stg}		-55...+50	°C
Isolation voltage	V_{isol}	AC sin 50 Hz; $t = 1 min$.	6000	V

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

*2 $I_{C 25}$ and $I_{C 80}$ ($I_{F 25}$ и $I_{F 80}$) values were calculated in accordance with typical U_{CE0} , r_{CE0} and $R_{\theta(j-c)}$ ($U_{(T0)}$, r_T and $R_{\theta(j-c)}$).



Characteristics

Definition	Symbol	Conditions	Value			Unit	
			min.	typ.	max.		
IGBT							
Collector-Emitter saturation voltage (at terminals)	V _{CEsat}	V _{GE} = +15 V; I _C = 1200 A; t _u = 1000 μs.	T _{vj} = 25°C	-	1.84	-	V
			T _{vj} = 150°C	-	2.39	-	V
Gate-Emitter threshold voltage	V _{GE(th)}	I _C = 40 mA; V _{CE} = V _{GE} ; T _{vj} = 25°C; t _u = 2 ms.	-	5.60	-	-	V
Collector-Emitter cut-off current	I _{CES}	V _{CE} = 1700 V; t _u = 50ms; V _{GE} = 0;	T _{vj} = 25°C	-	68.60	-	μA
			T _{vj} = 150°C	-	7.00	-	mA
Gate-Emitter leakage current	I _{GES}	V _{CE} = 0; V _{GE} = ±20 V; T _{vj} = 25°C; t _u = 30 ms.	-	64.00	-	-	nA
Input capacitance	C _{ies}	V _{CE} = 10 V; V _{GE} = 0 V; f = 1 MHz; T _{vj} = 25°C.	-	-	-	-	nF
Output capacitance	C _{oes}		-	-	-	-	nF
Reverse transfer capacitance	C _{res}		-	-	-	-	nF
Total gate charge	Q _G	I _C = 1200 A; V _{CE} = 920 V; V _{GE} = - 8÷15 V.	-	-	-	-	nC
Internal gate resistance	R _{Gint}	T _{vj} = 25°C.	-	-	-	-	Ω
Turn-on delay time	t _{d(on)}	V _{CE} = 920 V; V _{GE} = ±15 V; I _{C max} = 1200 A; R _G = 0.5 Ω; L _s ≤ 80 nH.	T _{vj} = 25°C	-	211	-	ns
			T _{vj} = 150°C	-	252	-	
Rise time	t _{ri}		T _{vj} = 25°C	-	56	-	ns
			T _{vj} = 150°C	-	71	-	
Turn-on energy	E _{on}		T _{vj} = 25°C	-	263	-	mJ
			T _{vj} = 150°C	-	370	-	
Turn-off delay time	t _{d(off)}		T _{vj} = 25°C	-	394	-	ns
			T _{vj} = 150°C	-	486	-	
Fall time	t _{fi}		T _{vj} = 25°C	-	437	-	ns
			T _{vj} = 150°C	-	598	-	
Turn-off energy	E _{off}		T _{vj} = 25°C	-	272	-	mJ
			T _{vj} = 150°C	-	376	-	
Collector-emitter threshold voltage	V _{CE0}	V _{GE} = +15 V; T _{vj} = 150°C;	-	0.82	-	-	V
On-State slope resistance (IGBT)	r _{CE0}	I _{CE1} = 300 A; I _{CE2} = 1200 A; t _u = 1000 μs.	-	1.88	-	-	mΩ
Thermal resistance junction to case	R _{th(j-c)}	DC; I _{CE} = 300±50 A; I _{test} = 1.5 A; V _{GE} = +15 V.	-	0.021	-	-	K/W
Inverse diode							
Forward voltage drop (at terminals)	V _F	I _F = 1200 A; V _{GE} = 0; t _u = 1000 μs.	T _{vj} = 25°C	-	1.91	-	V
			T _{vj} = 150°C	-	2.26	-	V
Reverse recovery time	t _{rr}	V _{GE} = ±15 V; V _{CE} = 920 V; I _{C max} = 1200 A; L _s ≤ 80 nH; R _{G on} = 0.5 Ω.	T _{vj} = 25°C	-	402	-	ns
			T _{vj} = 150°C	-	606	-	ns
Peak reverse recovery current	I _{rr}		T _{vj} = 25°C	-	1280	-	A
			T _{vj} = 150°C	-	1082	-	A
Reverse recovered charge	Q _{rr}		T _{vj} = 25°C	-	312	-	μC
			T _{vj} = 150°C	-	386	-	μC
Reverse recovery energy	E _{rec}		T _{vj} = 25°C	-	212	-	mJ
			T _{vj} = 150°C	-	277	-	mJ
Threshold voltage	V _(T0)	T _{vj} = 150°C; V _{GE} = 0; I _{CE1} = 300 A;	-	0.96	-	-	V
Forward slope resistance	r _T	I _{CE2} = 1200 A; t _u = 1000 μs.	-	1.22	-	-	mΩ
Thermal resistance junction to case	R _{th(JC-D)}	DC; I _{CE} = 300±50 A; I _{test} = 1.5 A; V _{GE} = +15 V.	-	0.036	-	-	K/W



Module							
Pin resistance	R_{Pxy}	$T_{vj} = 25^{\circ}\text{C}$	$R_{P1/2-3/4/5}$	-	0.269	-	mΩ
			$R_{P6/7-3/4/5}$	-	0.366	-	
			$R_{P1/2-6/7}$	-	0.516	-	
Parasitic inductance between terminals	L_{Pce}		$L_{P1/2-3/4/5}$	-	16.3	-	nH
			$L_{P6/7-3/4/5}$	-	18.9	-	
			$L_{P1/2-6/7}$	-	8.8	-	
Thermistor resistance	R_{t25}	$T_{vj} = 30^{\circ}\text{C}$		-	4.06	-	kΩ
		$T_{vj} = 100^{\circ}\text{C}$		-	0.54	-	
Coefficient of temperature sensitivity	$B_{25/50}$	$R_2 = R_{25} \exp [B_{25/50} (1/T_2 - 1/T_1)],$ $T_1 = 298,15 \text{ K}$		-	-	-	K
Thermal resistance case to heatsink	R_{thCH}	per module		-	0.02	-	K/W
Mounting torque for screws to heatsink	M_s	to heatsink M6		4.00	-	6.00	N*m
Mounting torque for terminal screws	M_t	to terminals M8		8.00	-	10.00	N*m
Mounting torque for gate terminal	M_a	to gate terminal M3		0.90	-	1.10	
Weight	W			-	1100	-	g

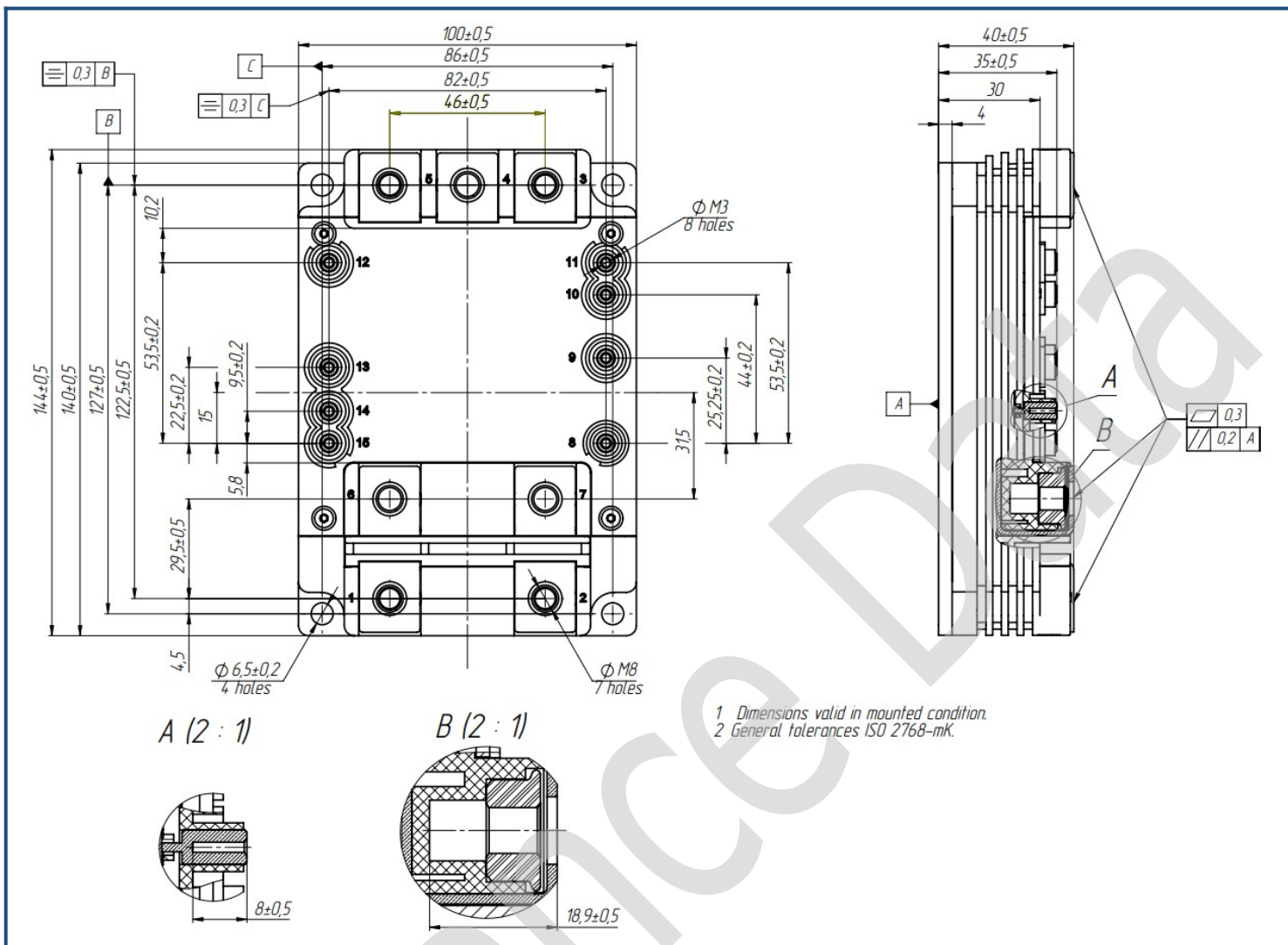
" - " — data will be refined as additional tests are conducted and statistics are collected.

Notes:

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



Overall dimensions: Package type – XM



Part numbering guide

MIXM	-	HB	17	SG	-	1400	N	-	C	
MIXM										IGBT module package type: XM
		HB								2 switches as Half-Bridge
			17							Voltage rating ($V_{CES}/100$)
				SG						IGBT+FRD chipset modification
						1400				Current Rating
							N			Climatic version: normal climate
									C	Copper baseplate

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