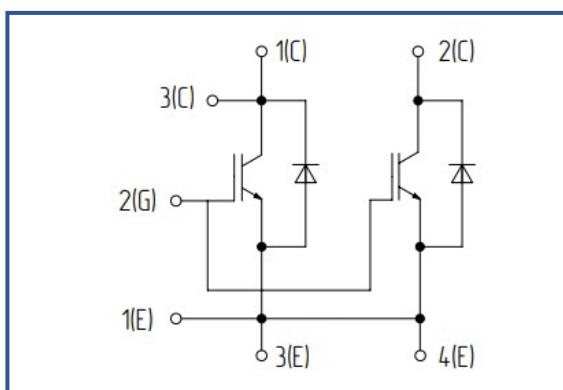
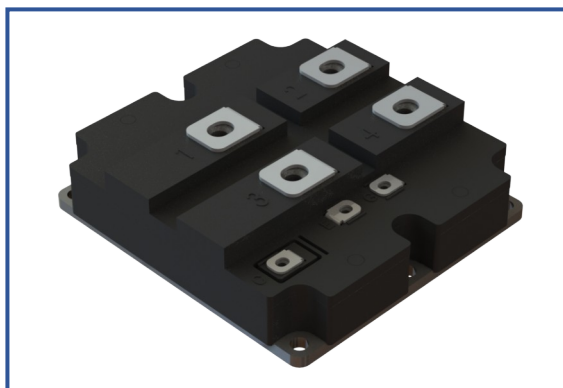


IGBT high-power module
3300 V 1400 A

Chip features

- IGBT chip
 - SPT+
 - low $V_{CE(sat)}$ value
 - 10 μ s short circuit of 150°C
 - square RBSOA of 2xIC
 - low EMI
- FRD chip
 - fast and soft reverse recovery
 - low voltage drop

Design features

- AlSiC baseplate
- AlN DBC substrate
- ultrasonically welded power terminals

Typical application

- AC and DC motor drives
- high-power converters
- wind-powered generator inverters
- industrial equipment

Maximum rated values

Definition	Symbol	Conditions	Value	Unit
IGBT				
Collector-Emitter voltage	V_{CES}	$V_{GE} = 0$.	3300	V
Maximum allowable collector current (continuous)*2	$I_{C 25}$	$T_{vj(max)} = 175^{\circ}C$; $T_c = 25^{\circ}C$.	2166	A
	$I_{C 100}$	$T_{vj(max)} = 175^{\circ}C$; $T_c = 100^{\circ}C$.	1400	A
Repetitive peak collector current*1	I_{CRM}	$I_{CRM} = 2 \times I_{C nom}$; $t_p = 1$ ms.	2800	A
Short-circuit duration	t_{psc}	$T_{vj} = 25^{\circ}C$; $V_{GE} = \pm 15$ V; $V_{CE} = 2500$ V; $I_{Cmax} < 5800$ A.	10	μ s
		$T_{vj} = 150^{\circ}C$; $V_{GE} = \pm 15$ V; $V_{CE} = 2500$ V; $I_{Cmax} < 5800$ A	10	
Gate-Emitter voltage	V_{GES}		± 20	V
Junction operating temperature	$T_{vj(op)}$		-40...+150	$^{\circ}C$
Inverse diode \ Freewheeling diode				
Repetitive peak reverse voltage	V_{RRM}	$V_{GE} = 0$ V.	3300	V
Maximum allowable forward current (continuous)*2	$I_{F 25}$	$T_{vj(max)} = 175^{\circ}C$; $T_c = 25^{\circ}C$.	1737	A
	$I_{F 100}$	$T_{vj(max)} = 175^{\circ}C$; $T_c = 100^{\circ}C$.	1113	A
Repetitive peak forward current*1	I_{FRM}	$I_{FRM} = 2 \times I_{F nom}$; $t_p = 1$ ms.	2226	A
Junction operating temperature	$T_{vj(op)}$		-40...+150	$^{\circ}C$
Module				
Storage temperature	T_{stg}		-50...+50	$^{\circ}C$
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 $I_{C 80}$ ($I_{F 25}$ and $I_{F 80}$) values were calculated in accordance with typical U_{CE0} , r_{CE0} and $R_{th(j-e)}$ ($U_{(TO)}$, r_T and $R_{th(jc-D)}$).



Characteristics

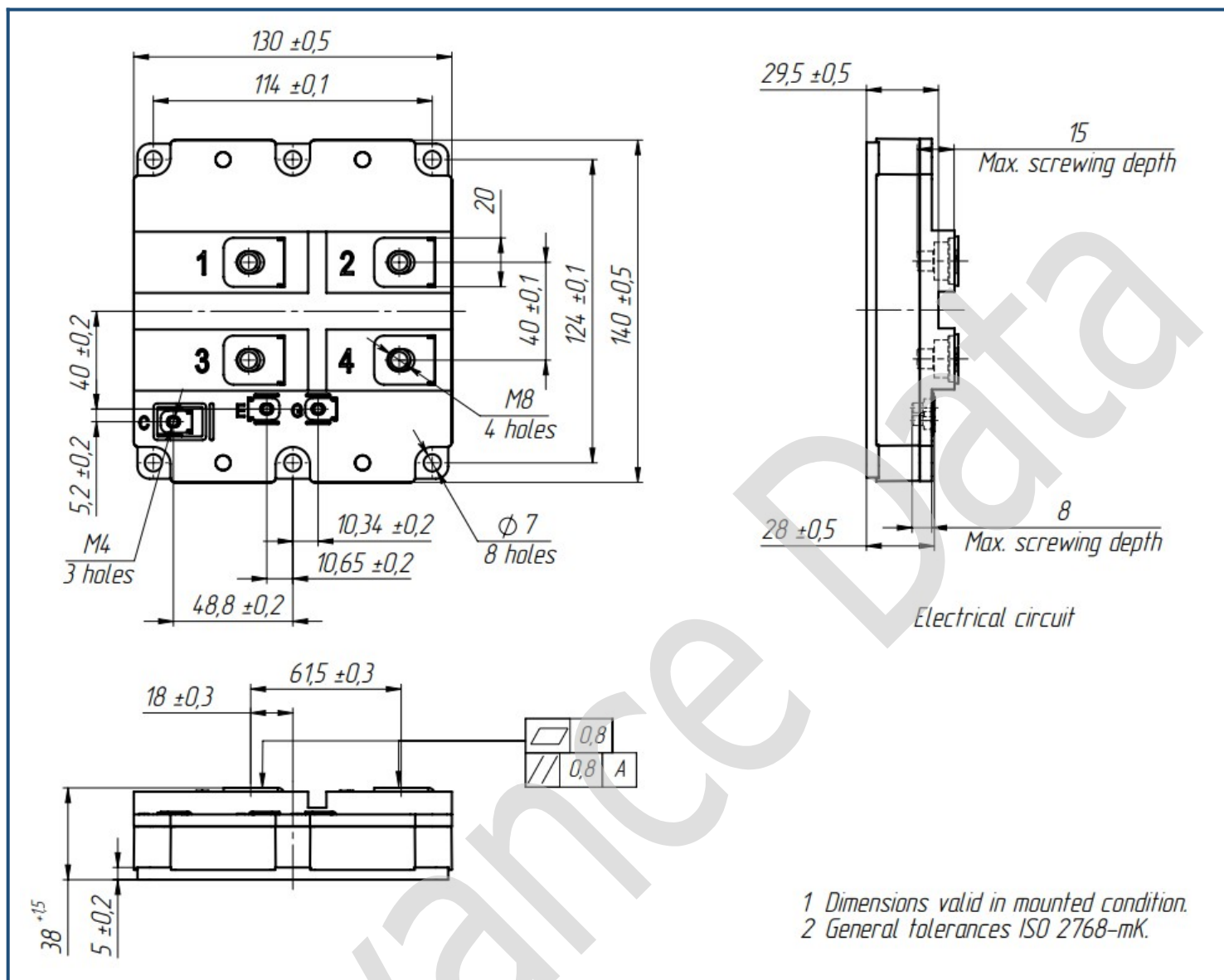
Definition	Symbol	Conditions	Value			Unit.		
			min.	typ.	max.			
IGBT								
Collector-Emitter saturation voltage	V _{CEsat}	V _{GE} = +15 V; I _C = 1400 A; t _u = 10 μs.	T _{vj} = 25°C	-	3.20	-	V	
			T _{vj} = 150°C	-	4.45	-	V	
Gate-Emitter threshold voltage	V _{GE(th)}	I _C = 160 mA; U _{CE} = U _{GE} ; T _{vj} = 25°C; t _u = 2 ms.	5.80	6.80	7.80		V	
Collector-Emitter cut-off current	I _{CES}	V _{CE} = 3300 V; t _u = 10 ms; V _{GE} = 0.	T _{vj} = 25°C	-	-	2.00	mA	
			T _{vj} = 150°C	-	-	32.00		
Gate-Emitter leakage current	I _{GES}	V _{CE} = 0; V _{GE} = ±20 V; T _{vj} = 25°C; t _u = const.	-	-	500		nA	
Input capacitance	C _{ies}	V _{CE} = 25 V; V _{GE} = 0 V; f = 1 MHz; T _{vj} = 25°C.	-	102.08	-		nF	
Output capacitance	C _{oes}		-	8.00	-		nF	
Reverse transfer capacitance	C _{res}		-	2.08	-		nF	
Total gate charge	Q _G	V _{GE} = -15÷15 V.	-	8.00	-		μC	
Internal gate resistance	R _{Gint}	T _{vj} = 25°C.	-	0.32	-		Ω	
Turn-on delay time	t _{d(on)}	V _{CE} = 1800 V; V _{GE} = ±15 V; I _{C max} = 1400 A.	T _{vj} = 25°C	-	-	-	ns	
			T _{vj} = 150°C	-	-	-		
Rise time	t _{ri}		T _{vj} = 25°C	-	-	-	ns	
			T _{vj} = 150°C	-	-	-		
Turn-on energy	E _{on}		T _{vj} = 25°C	-	2816	-	mJ	
			T _{vj} = 150°C	-	3840	-		
Turn-off delay time	t _{d(off)}		T _{vj} = 25°C	-	-	-	ns	
			T _{vj} = 150°C	-	-	-		
Fall time	t _{fi}		T _{vj} = 25°C	-	-	-	ns	
			T _{vj} = 150°C	-	-	-		
Turn-off energy	E _{off}		T _{vj} = 25°C	-	2304	-	mJ	
			T _{vj} = 150°C	-	2880	-		
Collector-emitter threshold voltage	V _{CE0}	V _{GE} = +15 V; T _{vj} = 150°C;	-	1.52	-		V	
On-State slope resistance (IGBT)	r _{CE0}	I _{CE1} = 375 A; I _{CE2} = 1500 A.	-	2.10	-		mΩ	
Thermal resistance junction to case	R _{th(j-c)}	DC; V _{GE} = +15 V.	-	0.0114	-		K/W	
Inverse diode \ Freewheeling diode								
Forward voltage drop	V _F	I _F = 1500 A; V _{GE} = 0; t _u = 10 μs.	T _{vj} = 25°C	-	2.65	-	V	
			T _{vj} = 150°C	-	3.10	-	V	
Reverse recovery time	t _{rr}	V _{CE} = 1800 V; V _{GE} = ±15 V; I _{C max} = 1400 A.	T _{vj} = 25°C	-	-	-	ns	
			T _{vj} = 150°C	-	-	-	ns	
Peak reverse current	I _{RM}		T _{vj} = 25°C	-	-	-	A	
			T _{vj} = 150°C	-	-	-	A	
Recovered charge	Q _r		T _{vj} = 25°C	-	744	-	μC	
			T _{vj} = 150°C	-	1160	-	μC	
Reverse recovery energy	E _{rec}		T _{vj} = 25°C	-	880	-	mJ	
			T _{vj} = 150°C	-	1440	-	mJ	
Threshold voltage	V _(T0)	T _{vj} = 150°C; V _{GE} = 0; I _{CE1} = 375 A;	-	1.37	-		V	
Forward slope resistance	r _T	I _{CE2} = 1500 A; t _u = 10 μs	-	1.24	-		mΩ	
Thermal resistance junction to case	R _{th(JC-D)}	DC; U _{GE} = +15 V.	-	0.0245	-		K/W	

Module							
Pin resistance	R_{Pxy}	$T_{vj} = 25^{\circ}\text{C}$	$R_{P4-3/1-2}$	-	0.155	-	mΩ
Parasitic inductance between terminals	L_{Pxy}		$L_{P4-3/1-2}$	-	15.00	-	nH
Thermal resistance case to heatsink	R_{thCH}	per module		-	16.00	-	K/kW
Mounting torque for screws to heatsink	M_s	to heatsink M6		-	5.75	-	N*m
Mounting torque for screws to power terminal	M_t	to terminals M8		-	9.00	-	N*m
Creepage distance	d_s			32.00	-	-	mm
Clearance	d_a			19.50	-	-	mm
Comparative Tracking Index	CTI			600	-	-	
Weight	W			-	-	900	g

“ - ” Data will be refined as additional tests are conducted and statistics are collected.

Notes:

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

Overall dimensions: Package type – SM

Part numbering guide

MISM	-	SS	33	SG	-	1400	N	
MISM								IGBT module package type: SM
		SS						Single switch
			33					Voltage rating ($V_{CES}/100$)
				SG				IGBT+FRD chipset modification
						1400		Current Rating
							N	Climatic version: normal climate

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