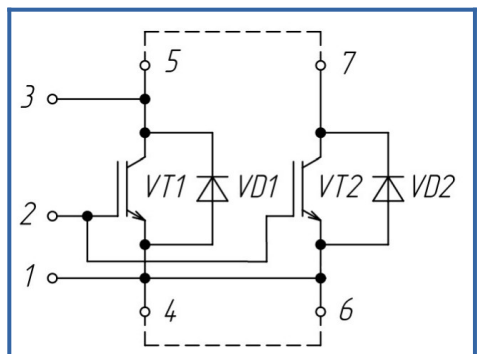


IGBT module high-power & increased rated insulation voltage 10.5 kV

4500 V 800 A


Chip features

- IGBT chip
 - SPT+
 - low $V_{CE(sat)}$ value
 - low EMI
 - fast and soft reverse recovery

Design features

- AlSiC baseplate
- AlN DBC substrate
- ultrasonically welded power terminals
- high rated insulation voltage – 10.5 kV
- RoHS compliant

Typical application

- transport (auxiliary power systems for rail and public transport)
- industrial equipment

Maximum rated values

Definition	Symbol	Conditions	Value	Unit
IGBT				
Collector-Emitter voltage	V_{CES}	$V_{GE} = 0$.	4500	V
Maximum allowable collector current (continuous)	I_{C100}	$T_{vj(max)} = 150^{\circ}C$; $T_c = 100^{\circ}C$.	800	A
Repetitive peak collector current ^{*1}	I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$; $t_p = 1$ ms.	1600	A
Short-circuit duration	t_{psc}	$T_{vj} = 150^{\circ}C$; $V_{GE} = \pm 15$ V; $V_{CE} = 3400$ V	10	μs
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.	4500	V
Maximum allowable forward current (continuous)	I_{F100}	$T_{vj(max)} = 150^{\circ}C$; $T_c = 100^{\circ}C$.	764	A
Repetitive peak forward current ^{*1}	I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$; $t_p = 1$ ms.	1600	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.	10500	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 V; I _C = 800 A; t _u = 1 ms.	T _{vj} = 25°C	-	-	2.60	V
			T _{vj} = 150°C	-	-	3.45	V
Gate-Emitter threshold voltage	V _{GE(th)}	I _C = 32 mA; V _{CE} = V _{GE} ; T _{vj} = 25°C; t _u = 2 ms.	5.50	-	-	7.50	V
Collector-Emitter cut-off current	I _{CES}	V _{CE} = 4500 V; t _u = 10 ms; V _{GE} = 0.	T _{vj} = 25°C	-	-	5.00	mA
			T _{vj} = 150°C	-	-	40.00	
Gate-Emitter leakage current	I _{GES}	V _{CE} = 0; V _{GE} = ±20 V; T _{vj} = 25°C; t _u = const.	-	-	-	300	nA
Input capacitance	C _{ies}	V _{CE} = 25 V; V _{GE} = 0 V; f = 100 kHz; T _{vj} = 25°C.	-	-	-	-	nF
Output capacitance	C _{oes}		-	-	-	-	nF
Reverse transfer capacitance	C _{res}		-	-	-	-	nF
Total gate charge	Q _G	V _{GE} = -15...+15 V.	-	-	-	15.00	μC
Internal gate resistance	R _{Gint}	T _{vj} = 25°C.	-	-	-	-	Ω
Turn-on delay time	t _{d(on)}	V _{GE} = ±15 V; V _{CE} = 2800 V; I _C = 800 A; R _{Gon} = R _{Goff} = 2.4 Ω; L = 150 nH.	T _{vj} = 25°C	-	-	900	ns
			T _{vj} = 150°C	-	-	900	
Rise time	t _{ri}		T _{vj} = 25°C	-	-	350	ns
			T _{vj} = 150°C	-	-	560	
Turn-on energy	E _{on}		T _{vj} = 25°C	-	-	3200	mJ
			T _{vj} = 150°C	-	-	4300	
Turn-off delay time	t _{d(off)}		T _{vj} = 25°C	-	-	3000	ns
			T _{vj} = 150°C	-	-	3100	
Fall time	t _{fi}		T _{vj} = 25°C	-	-	600	ns
			T _{vj} = 150°C	-	-	360	
Turn-off energy	E _{off}		T _{vj} = 25°C	-	-	3000	mJ
			T _{vj} = 150°C	-	-	3100	
Collector-emitter threshold voltage	V _{CE0}	V _{GE} = +15 V; T _{vj} = 150°C;	-	-	-	1.50	V
On-State slope resistance (IGBT)	r _{CE0}	I _{CE1} = 200 A; I _{CE2} = 800 A; t _u = 1 ms	-	-	-	2.50	mΩ
Thermal resistance junction to case	R _{th(j-c)}	DC; I _{CE} = 1000 A; I _{test} = 1 A; V _{GE} = +15 V.	-	-	-	0.015	K/W
Inverse diode \ Freewheeling diode							
Forward voltage drop	V _F	I _F = 800 A; V _{GE} = 0; t _u = 1 ms.	T _{vj} = 25°C	-	-	2.75	V
			T _{vj} = 150°C	-	-	3.10	V
Reverse recovery time	t _{rr}	V _{GE} = ±15 V; V _{CE} = 2800 V; I _C = 800 A; R _{Gon} = R _{Goff} = 2.4 Ω; L = 150 nH.	T _{vj} = 25°C	-	-	700	ns
			T _{vj} = 150°C	-	-	720	ns
Peak reverse current	I _{RM}		T _{vj} = 25°C	-	-	680	A
			T _{vj} = 150°C	-	-	750	A
Recovered charge	Q _r		T _{vj} = 25°C	-	-	880	μC
			T _{vj} = 150°C	-	-	1450	μC
Reverse recovery energy	E _{rec}		T _{vj} = 25°C	-	-	1480	mJ
			T _{vj} = 150°C	-	-	2500	mJ
Threshold voltage	V _(T0)	T _{vj} = 150°C; V _{GE} = 0; I _{F1} = 200 A;	-	-	-	1.50	V
Forward slope resistance	r _T	I _{F2} = 800 A; t _u = 1 ms.	-	-	-	1.60	mΩ
Thermal resistance junction to case	R _{th(JC-D)}	DC; I _{CE} = 1000 A; I _{test} = 1 A; V _{GE} = +15 V.	-	-	-	0.024	K/W



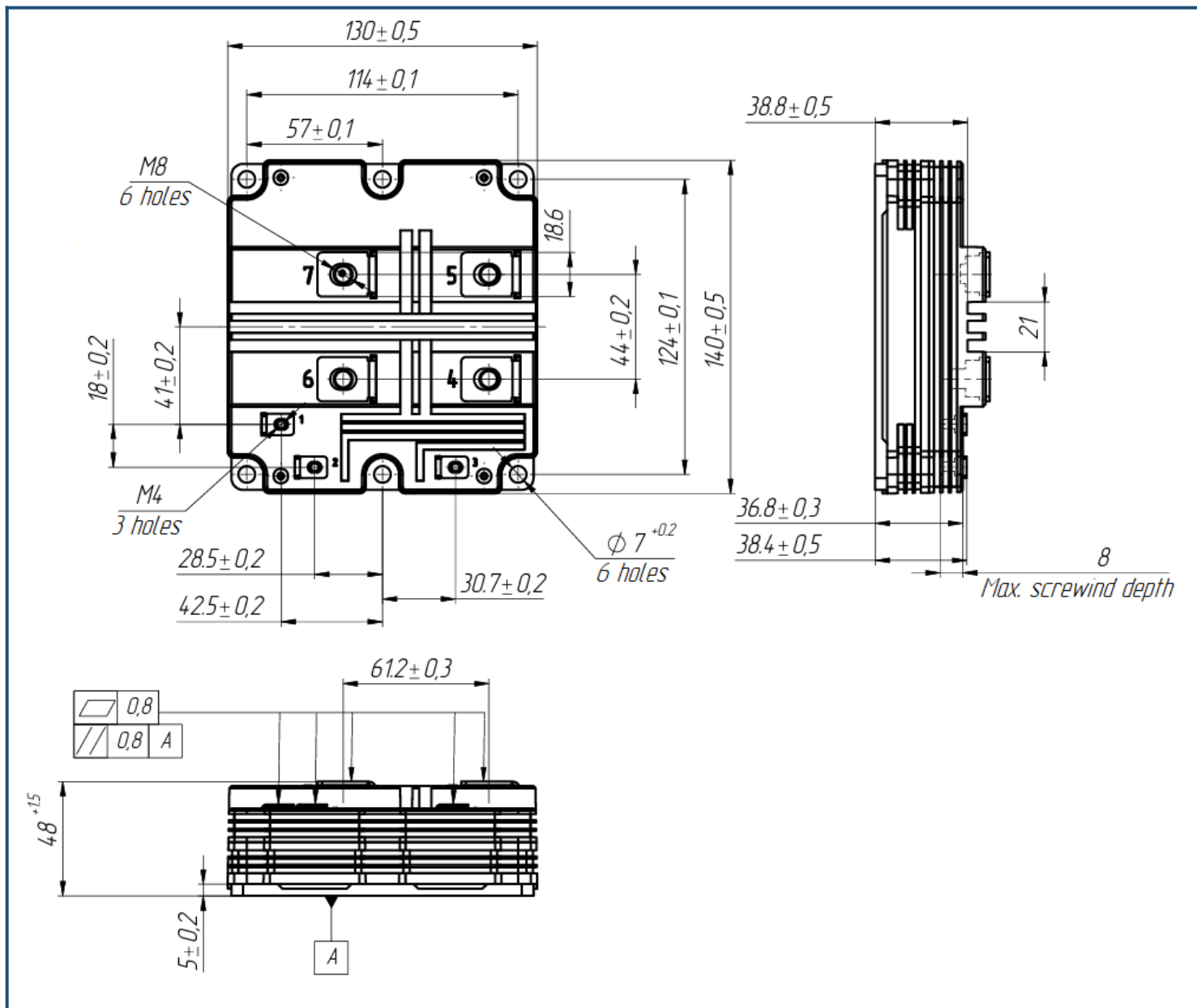
Module							
Pin resistance	R_{Pxy}	$T_{vj} = 25^{\circ}\text{C}.$	$R_{P5-7/4-6}$	-	0.33	-	mΩ
Parasitic inductance between terminals	L_{Pxy}		$L_{P5-7/4-6}$	-	18.00	-	nH
Thermal resistance case to heatsink	R_{thCH}	per module		-	21.00	-	K/kW
Mounting torque for screws to heatsink	M_s	to heatsink M6		4.25	-	5.75	N*m
Mounting torque for screws to power terminal	M_t	to terminals M8		8.00	-	10.00	N*m
Mounting torque for gate terminal	M_t	to terminals M4		1.80	-	2.20	N*m
Creepage distance	d_s			64.00	-	-	mm
Clearance	d_a			40.00	-	-	mm
Comparative Tracking Index	CTI			600	-	-	
Weight	W			-	-	1100	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 $T_{vj\text{ op}} = -40...+150^{\circ}\text{C}.$

Overall dimensions: package type – SV



Part numbering guide

MISV	-	SS	45	SG	-	800	N	
MISV								IGBT module package type: SV
		SS						Single switch
			45					Voltage rating ($V_{CES}/100$)
				SG				IGBT+FRD chipset modification
						800		Current Rating
							N	Climatic version: normal climate

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