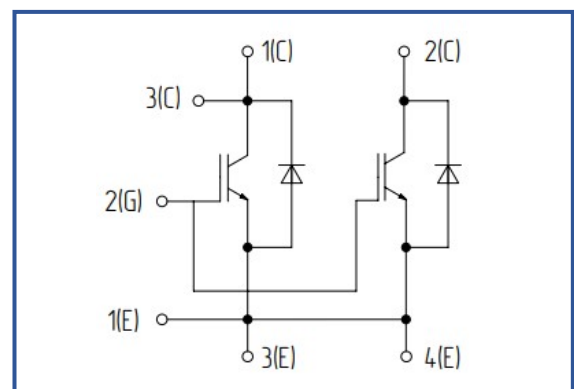
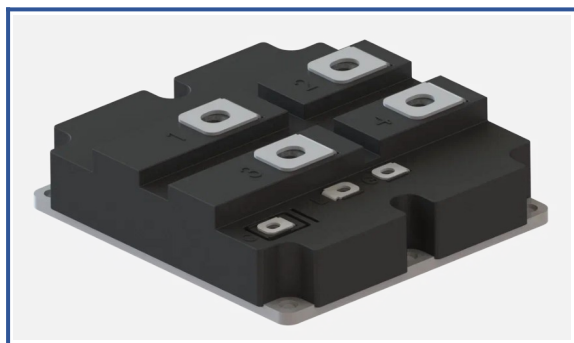


IGBT high-power module
1700 V 2400 A

Chip features

- IGBT chip
 - SPT+
 - low $V_{CE(sat)}$ value
 - 10 μs 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}	$V_{GE} = 0$.	1700	V
Maximum allowable collector current (continuous)* ²	$I_{C\ 25}$	$T_{vj\ (max)} = 175^{\circ}C$; $T_c = 25^{\circ}C$.	3774	A
	$I_{C\ 80}$	$T_{vj\ (max)} = 175^{\circ}C$; $T_c = 80^{\circ}C$.	2400	A
Repetitive peak collector current* ¹	I_{CRM}	$I_{CRM} = 2 \times I_{C\ nom}$; $t_p = 1\ ms$.	4800	A
Short-circuit duration	t_{psc}	$T_{vj} = 25^{\circ}C$; $V_{GE} = \pm 15\ V$; $V_{CE} = 1000\ V$; $R_{G\ on} = R_{G\ off} = 1\ \Omega$.	10	μs
		$T_{vj} = 150^{\circ}C$; $V_{GE} = \pm 15\ V$; $V_{CE} = 1000\ V$; $R_{G\ on} = R_{G\ off} = 1\ \Omega$;	10	
Gate-Emitter voltage	V_{GES}		± 20	V
Junction operating temperature	$T_{vj\ (op)}$		-40...+150	°C
Inverse diode \ Freewheeling diode				
Repetitive peak reverse voltage	V_{RRM}	$V_{GE} = 0\ V$.	1700	V
Maximum allowable forward current (continuous)* ²	$I_{F\ 25}$	$T_{vj\ (max)} = 175^{\circ}C$; $T_c = 25^{\circ}C$.	2912	A
	$I_{F\ 80}$	$T_{vj\ (max)} = 175^{\circ}C$; $T_c = 80^{\circ}C$.	2172	A
Repetitive peak forward current* ¹	I_{FRM}	$I_{FRM} = 2 \times I_{F\ nom}$; $t_p = 1\ ms$.	4800	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; $t = 1\ min$.	4000	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 $R_{th(j-e)}$ ($U_{(TO)}$, r_T and $R_{th(jc-D)}$).



Characteristics

Definition	Symbol	Conditions		Value			Unit.	
				min.	typ.	max.		
IGBT								
Collector-Emitter saturation voltage	V_{CEsat}	$V_{GE} = +15\text{ V}; I_C = 2400\text{ A};$ $t_u = 10\text{ }\mu\text{s}.$	$T_{vj} = 25^\circ\text{C}$	-	2.00	-	V	
			$T_{vj} = 150^\circ\text{C}$	-	2.50	-	V	
Gate-Emitter threshold voltage	$V_{GE(th)}$	$I_C = 16\text{ mA}; U_{CE} = U_{GE}; T_{vj} = 25^\circ\text{C};$ $t_u = 2\text{ ms}.$		5.00	5.60	6.20	V	
Collector-Emitter cut-off current	I_{CES}	$V_{CE} = 1700\text{ V};$ $t_u = 10\text{ ms}; V_{GE} = 0.$	$T_{vj} = 25^\circ\text{C}$	-	-	4.00	mA	
			$T_{vj} = 150^\circ\text{C}$	-	-	40.00		
Gate-Emitter leakage current	I_{GES}	$V_{CE} = 0; V_{GE} = \pm 20\text{ V}; T_{vj} = 25^\circ\text{C};$ $t_u = \text{const}.$		-	-	500	nA	
Input capacitance	C_{ies}	$V_{CE} = 25\text{ V}; V_{GE} = 0\text{ V};$ $f = 1\text{ MHz}; T_{vj} = 25^\circ\text{C}.$		-	-	-	nF	
Output capacitance	C_{oes}			-	-	-	nF	
Reverse transfer capacitance	C_{res}			-	-	-	nF	
Total gate charge	Q_G	$V_{GE} = -15...+15\text{ V}.$		-	16.00	-	μC	
Internal gate resistance	R_{Gint}	$T_{vj} = 25^\circ\text{C}.$		-	0.30	-	Ω	
Turn-on delay time	$t_{d(on)}$	$V_{CE} = 920\text{ V};$ $V_{GE} = \pm 15\text{ V};$ $I_{C\text{ max}} = 2400\text{ A}.$	$T_{vj} = 25^\circ\text{C}$	-	-	-	ns	
			$T_{vj} = 150^\circ\text{C}$	-	-	-		
Rise time	t_{ri}		$T_{vj} = 25^\circ\text{C}$	-	-	-	ns	
			$T_{vj} = 150^\circ\text{C}$	-	-	-		
Turn-on energy	E_{on}		$T_{vj} = 25^\circ\text{C}$	-	640	-	mJ	
			$T_{vj} = 150^\circ\text{C}$	-	800	-		
Turn-off delay time	$t_{d(off)}$		$T_{vj} = 25^\circ\text{C}$	-	-	-	ns	
			$T_{vj} = 150^\circ\text{C}$	-	-	-		
Fall time	t_{fi}		$T_{vj} = 25^\circ\text{C}$	-	-	-	ns	
			$T_{vj} = 150^\circ\text{C}$	-	-	-		
Turn-off energy	E_{off}		$T_{vj} = 25^\circ\text{C}$	-	640	-	mJ	
			$T_{vj} = 150^\circ\text{C}$	-	800	-		
Collector-emitter threshold voltage	V_{CE0}	$V_{GE} = +15\text{ V}; T_{vj} = 150^\circ\text{C};$		-	0.85	-	V	
On-State slope resistance (IGBT)	r_{CE0}	$I_{CE1} = 600\text{ A}; I_{CE2} = 2400\text{ A}.$		-	0.69	-	m Ω	
Thermal resistance junction to case	$R_{th(j-c)}$	DC; $V_{GE} = +15\text{ V}.$		-	0.0115	-	K/W	
Inverse diode \ Freewheeling diode								
Forward voltage drop	V_F	$I_F = 2400\text{ A};$ $V_{GE} = 0; t_u = 10\text{ }\mu\text{s}.$	$T_{vj} = 25^\circ\text{C}$	-	1.85	-	V	
			$T_{vj} = 150^\circ\text{C}$	-	2.05	-	V	
Reverse recovery time	t_{rr}	$V_{CE} = 920\text{ V};$ $V_{GE} = \pm 15\text{ V};$ $I_{C\text{ max}} = 2400\text{ A}.$	$T_{vj} = 25^\circ\text{C}$	-	-	-	ns	
			$T_{vj} = 150^\circ\text{C}$	-	-	-	ns	
Peak reverse current	I_{RM}		$T_{vj} = 25^\circ\text{C}$	-	-	-	A	
			$T_{vj} = 150^\circ\text{C}$	-	-	-	A	
Recovered charge	Q_r		$T_{vj} = 25^\circ\text{C}$	-	800	-	μC	
			$T_{vj} = 150^\circ\text{C}$	-	880	-	μC	
Reverse recovery energy	E_{rec}		$T_{vj} = 25^\circ\text{C}$	-	480	-	mJ	
			$T_{vj} = 150^\circ\text{C}$	-	640	-	mJ	
Threshold voltage	$V_{(T0)}$	$T_{vj} = 150^\circ\text{C}; V_{GE} = 0; I_{F1} = 600\text{ A};$		-	0.93	-	V	
Forward slope resistance	r_T	$I_{F2} = 2400\text{ A}; t_u = 10\text{ }\mu\text{s}$		-	0.47	-	m Ω	
Thermal resistance junction to case	$R_{th(JC-D)}$	DC; $U_{GE} = +15\text{ V}.$		-	0.0225	-	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			32.20	-	-	mm
Clearance	d_a			19.10	-	-	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 $T_{vj\text{ op}} = -40 \div +150^{\circ}\text{C.}$

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