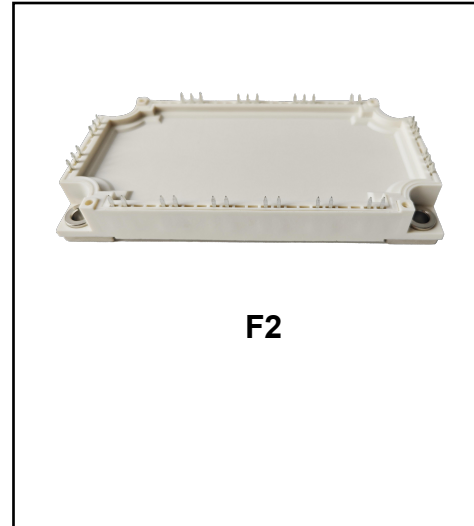


F2 PACK module with Gen.7 Trench/Fieldstop IGBT and Emitter Controlled diode and NTC

Features

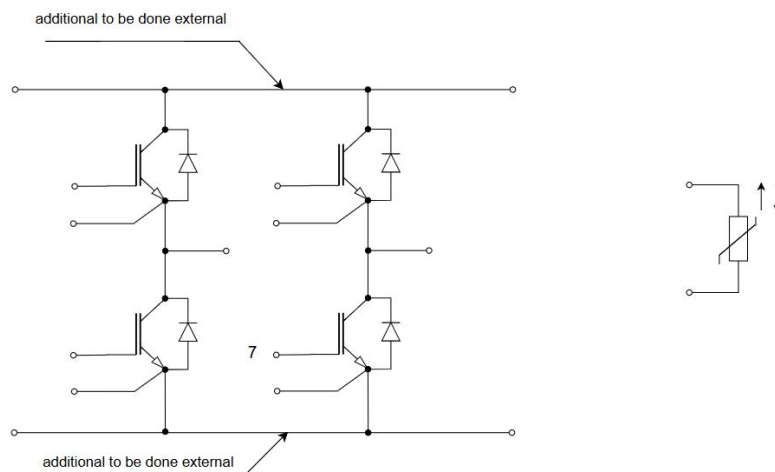
- Electrical features
 - $V_{CES} = 1200\text{ V}$
 - $I_C \text{ nom} = 150\text{ A} / I_{CRM} = 300\text{ A}$
 - Low V_{CEsat}
 - Overload operation up to 175°C
- Mechanical features
 - High power and thermal cycling capability
 - Integrated NTC temperature sensor
 - Copper base plate
 - Al_2O_3 substrate with low thermal resistance



Typical Applications

- Industrial welding
- Induction heating
- Air conditioning system
- Motor Control

Description



Package Insulation coordination

Parameter	Symbol	Note or test condition	Values	Unit
Isolation test voltage	V_{ISOL}	RMS, f=50Hz, t=60s	2.5	kV
Internal isolation		basic insulation(class 1, IEC 61140)	Al_2O_3	
Creepage distance	d_{creep}	terminal to heatsink	10.0	mm
Clearance	d_{clear}	terminal to heatsink	7.5	mm
Comparative tracking index (electrical)	CTI		>200	
RTI Elec.	RTI	housing	140	°C

Package Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Stray Inductance	L_{CE}		--	21	--	nH
Module Lead Resistance, Terminal to Chip	R_{CC+EE}	$T_C=25^{\circ}C$, per switch	--	2.6	--	mΩ
Storage Temperature Range	T_{STG}		-40		125	°C
Mounting Torque, Screw M5	M	M5, Screw	3		6	N.m
Weight	G		--	300	--	g

IGBT

Absolute Maximum Ratings (T_C = 25°C unless otherwise noted)

Symbol	Description	Note or test condition	Value	Unit
V _{CES}	Collector-Emitter Voltage	T _{vj} = 25 °C	1200	V
I _{CDC}	Continuous Collector Current @ T _C = 80°C (T _{JMAX} = 175°C)		150	A
I _{CRM}	Repetitive peak collector current	Peak Collector Current@ tp=1ms	300	A
P _{tot}	Total power dissipation	T _C = 25°C, T _{vj max} = 175°C	652	W
V _{GES}	Gate-emitter peak voltage		±30	V

Characteristics (T_C = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Rating			Unit
			Min	Typ	Max	
V _{CE(sat)}	Collector-Emitter Saturation Voltage	I _C =150A V _{GE} =15V		T _J =25°C	--	V
				T _J =125°C	--	
				T _J =150°C	--	
V _{GE(TH)}	Gate-Emitter Threshold Voltage	I _C = 3 mA, V _{CE} = V _{GE}	4.50	5.25	6.00	V
I _{CES}	Collector-Emitter Cutoff Current	V _{GE} = 0V, V _{CE} = 1200V, T _{vj} = 25°C	--	--	400	uA
I _{GES}	Gate-Emitter Leakage Current	V _{GE} = ±20V, V _{CE} = 0 V, T _{vj} = 25°C	--	--	200	nA
R _{Gint}	Internal Gate Resistance	T _{vj} = 25 °C	--	0.8	--	Ω
C _{ies}	Input Capacitance	V _{CE} =30V, V _{GE} =0V, f=1MHz, T _{vj} = 25°C	--	18.5	--	nF
C _{oes}	Output Capacitance		--	0.395	--	
C _{res}	Reverse Transfer Capacitance		--	0.075	--	
Q _g	Total Gate Charge	V _{CC} =960V, I _C =150A, V _{GE} =15V, T _{vj} = 25°C	--	0.595	--	uC
Q _{ge}	Gate to Emitter Charge		--	0.102	--	
Q _{gc}	Gate to Collector Charge		--	0.265	--	
t _{d(ON)}	Turn-on Delay Time	V _{CE} =600V, I _C =150A, V _{GE} =15/-5V, R _g =8Ω Inductive Load	--	148	--	ns
t _r	Rise Time		--	48	--	
t _{d(OFF)}	Turn-Off Delay Time		--	439	--	
t _f	Fall Time		--	30	--	
E _{on}	Turn-On Switching Loss		--	16.51	--	mJ
E _{off}	Turn-Off Switching Loss		--	6.63	--	
E _{is}	Total Switching Loss		--	23.14	--	
R _{thJC}	Thermal resistance, junction to case	per IGBT	--	0.23	--	K/W
T _{vj op}	Temperature under switching conditions		-40	--	175 ¹⁾	°C

¹⁾T_{vj op} > 150°C is only allowed for operation at overload conditions.

Diode

Absolute Maximum Ratings (T_c = 25°C unless otherwise noted)

Symbol	Description	Note or test condition	Value	Unit
V _{RRM}	Repetitive peak reverse voltage	T _{vj} = 25 °C	1200	V
I _F	Continuous DC forward current		150	A
I _{FRM}	Repetitive peak forward current	t _p = 1 ms	300	A

Characteristics (T_c = 25°C unless otherwise noted)

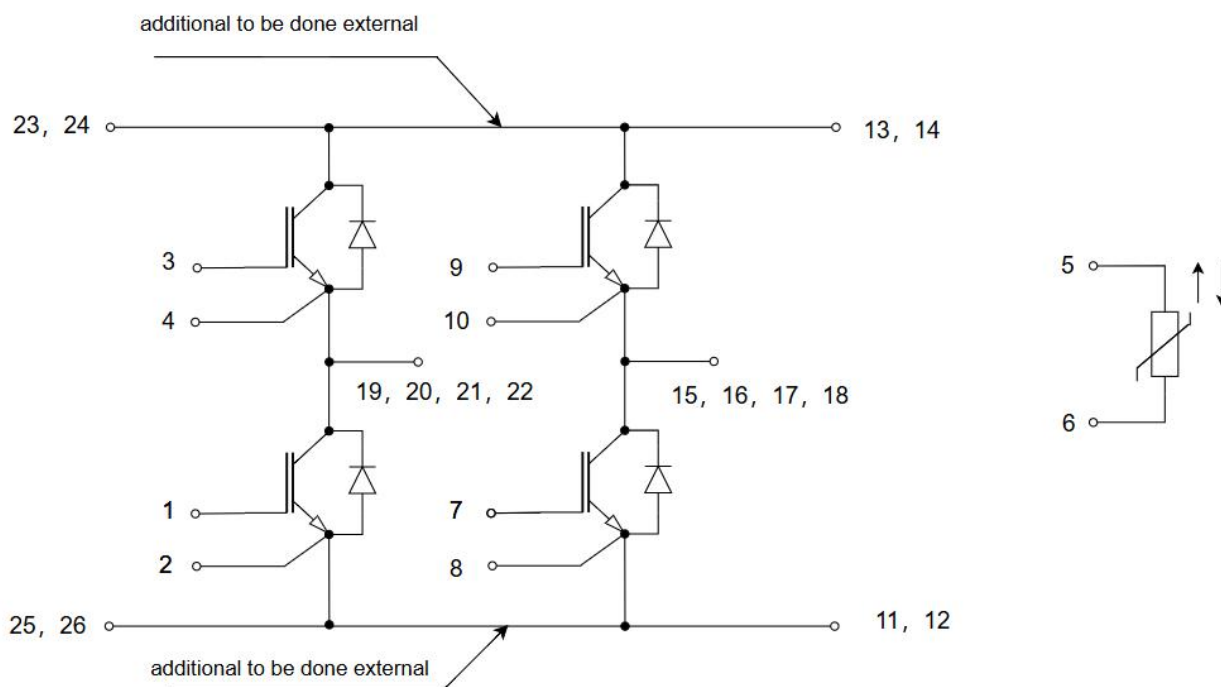
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V _F	Diode Forward Voltage	I _F =150A	--	2.8	3.8	V
T _{rr}	Reverse Recovery Time	V _{CE} =600V, I _F =150A, V _{GE} =15/-5V R _g =8Ω	--	268	--	ns
I _{RRM}	Diode Peak Reverse Recovery Current		--	33	--	A
Q _{rr}	Reverse Recovery Charge		--	4.13	--	uC
E _{rec}	Reverse Recovery Energy		--	0.64	--	mJ
R _{thJC}	Thermal resistance, junction to case	per Diode	--	0.38	--	K/W
T _{vj op}	Temperature under switching conditions		-40	--	175 ²⁾	°C

²⁾T_{vj op} > 150°C is only allowed for operation at overload conditions.

NTC Characteristics (T_c = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
R ₂₅	Rated Resistance		--	5.0	--	kΩ
ΔR/R	Deviation of R100	T _c =100 °C, R ₁₀₀ =493.3Ω	-5	--	5	%
P ₂₅	Power Dissipation		--	--	20.0	mW
B _{25/50}	B-value	R ₂ =R ₂₅ exp[B _{25/50} (1/T ₂ - 1/(298.15K))]	--	3375	--	K
B _{25/80}	B-value	R ₂ =R ₂₅ exp[B _{25/80} (1/T ₂ - 1/(298.15K))]	--	3411	--	K
B _{25/100}	B-value	R ₂ =R ₂₅ exp[B _{25/100} (1/T ₂ - 1/(298.15K))]	--	3433	--	K

CIRCUIT DIAGRAM



PACKAGE DIMENSIONS

