

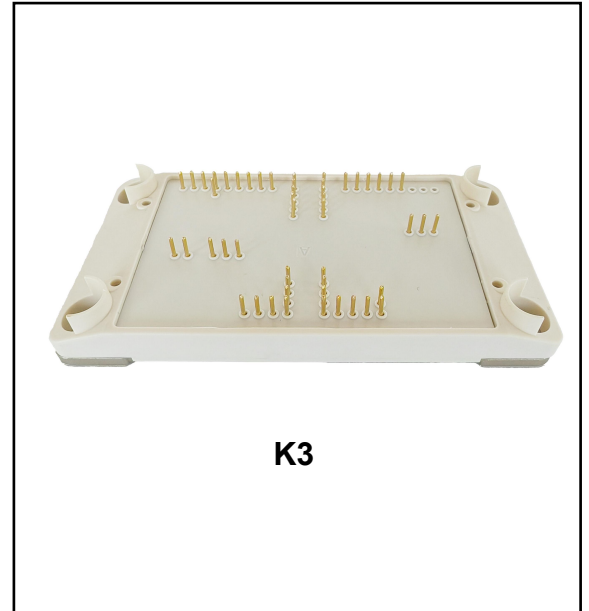
I-NPC Inverter Module with 1200V NCE Gen7 Trench Stop IGBTs

Features

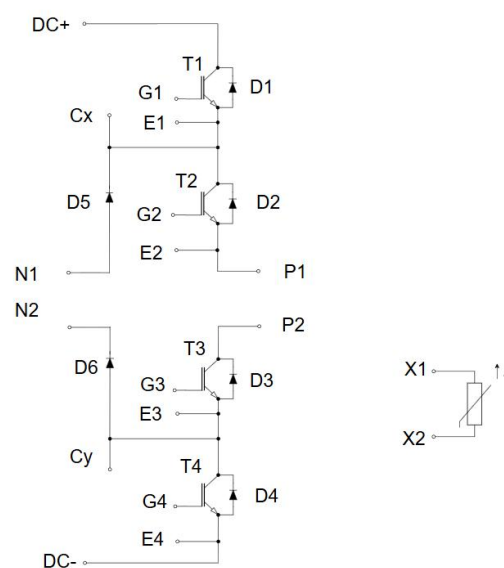
- 1050V Trench Stop IGBTs
- Vcesat with positive Temperature Coefficient
- Low Switching Losses
- Low Inductive Design
- Integrated NTC

Typical Applications

- Solar Applications
- 3-level-applications - Converters
- UPS Systems
- Energy Storage System



Description



Package Insulation coordination

Parameter	Symbol	Note or test condition	Values	Unit
Isolation test voltage	V_{ISOL}	RMS, f=50Hz, t=60s	4	kV
Creepage distance	d_{creep}	terminal to heatsink	11.5	mm
Creepage distance	d_{creep}	terminal to terminal	6.8	mm
Clearance	d_{clear}	terminal to heatsink	9.4	mm
Clearance	d_{clear}	terminal to terminal	5.5	mm
Comparative tracking index (electrical)	CTI		≥ 500	

Package Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Storage Temperature Range	T_{STG}			-40	--	125	°C
Mounting torque for module mounting	M	-Mounting according to valid application note	M5, Screw	3	--	5	Nm
Flatness of base plate						0.3	mm
Weight	G				250		g

IGBT (T1,T2,T3,T4)

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

Symbol	Description	Value	Unit
V _{CES}	Collector-Emitter Voltage	1200	V
V _{GES}	Gate-Emitter Voltage	±20	V
I _{CDC}	Continuous Collector Current @ T _c = 80°C (T _{JMAX} = 175°C)	400	A
I _{CM}	Pulsed Collector Current, t _p limited by T _{vj max}	800	A
P _D	Power Dissipation @ T _c = 25°C (T _{JMAX} = 175°C)	1100	W
	Power Dissipation @ T _c = 100°C (T _{JMAX} = 175°C)	550	W

Characteristics (T_c=25°C unless otherwise noted)

Symbol	Parameter	Test Condition		Min	Typ	Max	Unit
V _{CE(sat)}	Collector-Emitter Saturation Voltage	V _{GE} = 15 V, I _C =400 A	T _J = 25°C	--	1.50	2.20	V
			T _J = 150°C	--	1.80	--	
I _{CES}	Collector-Emitter Cutoff Current	V _{GE} = 0 V, V _{CE} =1200V		--	--	800	μA
I _{GES}	Gate-Emitter Leakage Current	V _{GE} = ± 20 V, V _{CE} = 0 V		--	--	400	nA
V _{GE(TH)}	Gate-Emitter Threshold Voltage	V _{GE} = V _{CE} , I _C =15 mA		4.0	5.0	6.0	V
R _{Gint}	Internal Gate Resistance	T _{vj} = 25 °C		--	1.45	--	Ω
C _{iss}	Input Capacitance	V _{CE} = 25 V, V _{GE} = 0 V, f = 100 kHz		--	38.7	--	nF
C _{oss}	Output Capacitance			--	2.43	--	
C _{rss}	Reverse Transfer Capacitance			--	0.082	--	
Q _g	Total Gate Charge	V _{GE} = ± 15 V		--	1.10	--	μC
t _{d(on)}	Turn-On Delay Time	V _{CE} =600V, I _C =200A V _{GE} = ± 15 V, R _{Gon} = 25Ω, R _{Goff} = 25Ω T _{vj} = 25 °C		--	0.68	--	μs
t _r	Rise Time			--	0.113	--	
t _{d(off)}	Turn-off Delay Time			--	1.793	--	
t _f	Fall Time			--	0.146	--	
E _{on}	Turn-On Switching Loss per Pulse	V _{CE} =600V, I _C =200A V _{GE} = ± 15 V, R _{Gon} = 25Ω, R _{Goff} = 25Ω T _{vj} = 150 °C		--	44.15	--	mJ
E _{off}	Turn Off Switching Loss per Pulse			--	35.37	--	
t _{d(on)}	Turn-On Delay Time			--	0.64	--	μs
t _r	Rise Time			--	0.16	--	
t _{d(off)}	Turn-off Delay Time			--	1.933	--	
t _f	Fall Time			--	0.146	--	
E _{on}	Turn-on Switching Loss per Pulse	--	28.15	--	mJ		
E _{off}	Turn Off Switching Loss per Pulse	--	32.21	--			
R _{thJC}	Thermal Resistance – Chip-to-Case			--	0.135	--	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 (D1,D2,D3,D4,D5,D6)

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

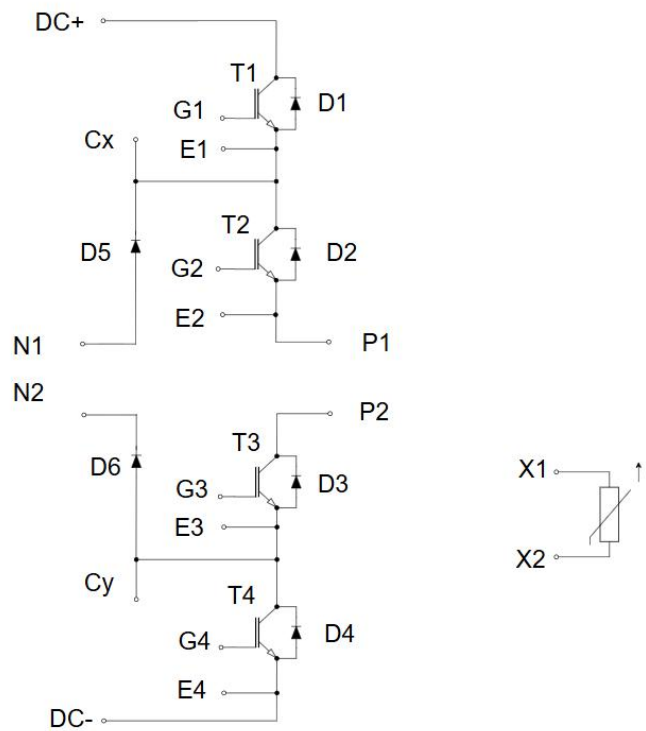
Symbol	Description	Value	Unit
V _{RRM}	Repetitive Peak Reverse Voltage	1200	V
I _F	Diode Continuous Forward Current	200	A
I _{FM}	Diode Maximum Forward Current t _p =1ms	400	A

Characteristics (T_c=25°C unless otherwise noted)

V _F	Diode Forward Voltage	I _F = 400 A, V _{GE} = 0 V	T _J = 25°C	--	1.5	2.3	V
			T _J = 150°C	--	1.3	--	
Q _{rr}	Reverse Recovery Charge	T _J = 25°C V _R = 600V, I _F = 400A V _{GE} = ±15V, R _{Gon} = 25Ω, R _{Goff} = 25Ω	--	--	8.1	--	μC
I _{RRM}	Peak Reverse Recovery Current		--	--	174	--	A
E _{REC}	Reverse Recovery Energy		--	--	2.17	--	mJ
Q _{rr}	Reverse Recovery Charge	T _J = 150°C V _R = 600V, I _F = 400A V _{GE} = ±15V, R _{Gon} = 25Ω, R _{Goff} = 25Ω	--	--	18.5	--	μC
I _{RRM}	Peak Reverse Recovery Current		--	--	226	--	A
E _{REC}	Reverse Recovery Energy		--	--	5.9	--	mJ
R _{thJC}	Thermal Resistance – Chip-to-Case		--	--	0.186	--	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.

CIRCUIT DIAGRAM



PACKAGE DIMENSIONS

