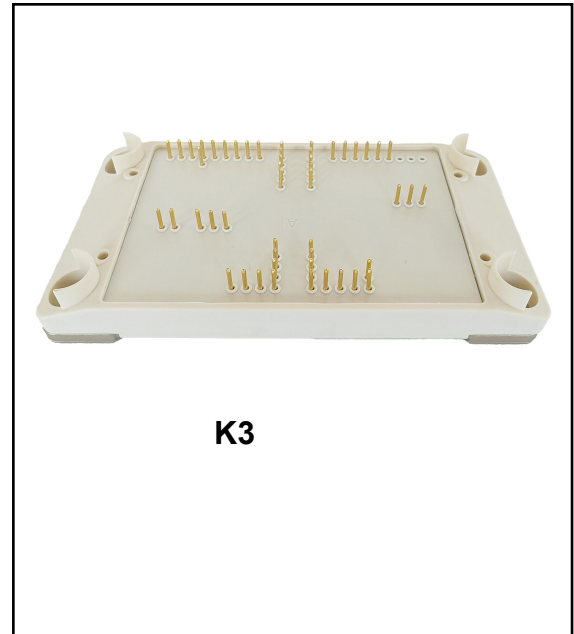


Features

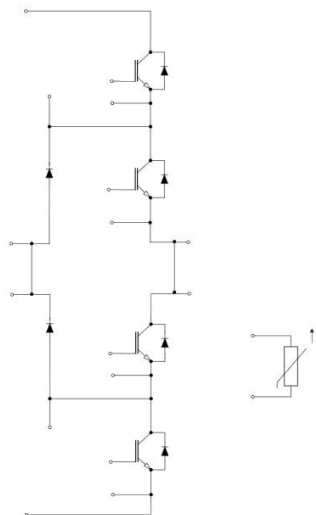
- Low Switching Losses
- Low Inductive Design
- Integrated NTC

Typical Applications

- Solar Applications
- 3-level-applications Converters
- UPS Systems



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	14.2	mm
Creepage distance	d_{creep}	terminal to terminal	6.8	mm
Clearance	d_{clear}	terminal to heatsink	12.4	mm
Clearance	d_{clear}	terminal to terminal	5.5	mm
Comparative tracking index (electrical)	CTI		≥ 600	

Package Characteristic values

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
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

MAXIMUM RATINGS (Note 1)

Symbol	Rating	Value	Unit
IGBT (Q1,Q4)			
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GE}	Gate- Emitter Voltage	± 30	V
I_C	Continuous Collector Current @ $T_c = 80^\circ\text{C}$, $T_J = 175^\circ\text{C}$	480	A
$I_{C(RM)}$	$T_p=1\text{ms}$	960	A
T_J	Junction Temperature	-40 to +175	$^\circ\text{C}$

IGBT (Q2, Q3)

V_{CES}	Collector-Emitter Voltage	1200	V
V_{GE}	Gate- Emitter Voltage	± 30	V
I_C	Continuous Collector Current @ $T_c = 80^\circ\text{C}$, $T_J = 175^\circ\text{C}$	480	A
$I_{C(RM)}$	$T_p=1\text{ms}$	960	A
T_J	Junction Temperature	-40 to +175	$^\circ\text{C}$

DIODE (D5, D6)

V_{RRM}	Peak Repetitive Reverse Voltage	1200	V
I_F	Continuous Forward Current @ $T_c = 80^\circ\text{C}$ ($T_J = 175^\circ\text{C}$)	640	A
I_{FRM}	$T_p=1\text{ms}$	1280	A
T_J	Junction Temperature	-40 to +175	$^\circ\text{C}$

INVERSE DIODES (D1, D2,D3, D4)

V_{RRM}	Peak Repetitive Reverse Voltage	1200	V
I_F	Continuous Forward Current @ $T_J = 150^\circ\text{C}$	480	A
I_{FRM}	Repetitive Peak Forward Current @ $T_J = 150^\circ\text{C}$	960	A
T_J	Junction Temperature	-40 to +175	$^\circ\text{C}$

THERMAL PROPERTIES

T_{stg}	Storage Temperature Range	-40 to 125	$^\circ\text{C}$
$T_{vj\text{ op}}$	Temperature under switching condition	-40 to 150	$^\circ\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Refer to ELECTRICAL CHARACTERISTICS, RECOMMENDED OPERATING RANGES and/or APPLICATION INFORMATION for Safe Operating parameters.

RECOMMENDED OPERATING RANGES

Symbol	Rating	Min	Max	Unit
T_J	Module Operating Junction Temperature	-40	175	$^\circ\text{C}$

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted)(AC test is three-level test mode)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
IGBT (Q1,Q2,Q3,Q4)						
I_{CES}	Collector-Emitter Cutoff Current	$V_{GE} = 0\text{ V}, V_{CE} = 1200\text{ V}, T_{vj} = 25^\circ\text{C}$	--	--	800	μA
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE} = 15\text{ V}, I_C = 400\text{ A}$	$T_J = 25^\circ\text{C}$	--	1.2	V
			$T_J = 150^\circ\text{C}$	--	1.4	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE} = 15\text{ V}, I_C = 480\text{ A}$	$T_J = 25^\circ\text{C}$	--	1.6	V
			$T_J = 150^\circ\text{C}$	--	1.8	
$V_{GE(TH)}$	Gate-Emitter Threshold Voltage	$V_{GE} = V_{CE}, I_C = 15\text{ mA}$	4.0	5.0	6.0	V
R_{Gint}	Internal Gate Resistance	$T_{vj} = 25^\circ\text{C}$	--	0.5	--	Ω
I_{GES}	Gate Leakage Current	$V_{GE} = \pm 20\text{ V}, V_{CE} = 0\text{ V}$	--	--	400	nA
$t_{d(on)}$	Turn-On Delay Time	$T_J = 25^\circ\text{C}$ $V_{CE} = 600\text{ V}, I_C = 240\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_{Gon} = 4.7\Omega,$ $R_{Goff} = 4.7\Omega$	--	TBD	--	ns
t_r	Rise Time		--	TBD	--	
$t_{d(off)}$	Turn-off Delay Time		--	TBD	--	
t_f	Fall Time		--	TBD	--	
E_{on}	Turn-On Switching Loss per Pulse		--	TBD	--	mJ
E_{off}	Turn Off Switching Loss per Pulse		--	TBD	--	
$t_{d(on)}$	Turn-On Delay Time	$T_J = 150^\circ\text{C}$ $V_{CE} = 600\text{ V}, I_C = 240\text{ A}$ $V_{GE} = \pm 15\text{ V}, R_{Gon} = 4.7\Omega,$ $R_{Goff} = 4.7\Omega$	--	TBD	--	ns
t_r	Rise Time		--	TBD	--	
$t_{d(off)}$	Turn-off Delay Time		--	TBD	--	
t_f	Fall Time		--	TBD	--	
E_{on}	Turn-on Switching Loss per Pulse		--	TBD	--	mJ
E_{off}	Turn Off Switching Loss per Pulse		--	TBD	--	
C_{iss}	Input Capacitance	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 100\text{ kHz}$	--	46.1	--	nF
C_{oss}	Output Capacitance		--	1.09	--	
C_{rss}	Reverse Transfer Capacitance		--	0.26	--	
Q_g	Total Gate Charge	$V_{GE} = \pm 15\text{ V}$	--	1.423	--	μC
R_{thJC}	Thermal Resistance – Chip-to-Case		--	0.06	--	K/W

DIODE (D5, D6)

V _F	Diode Forward Voltage	I _F = 480 A, V _{GE} = 0 V	T _J = 25°C	--	TBD	--	V
			T _J = 150°C	--	TBD	--	
Q _{rr}	Reverse Recovery Charge	T _J = 25°C V _R =600 V, I _F =240A V _{GE} = ± 15 V, R _{Gon} = 4.7Ω, R _{Goff} = 4.7Ω		--	TBD	--	μC
I _{RRM}	Peak Reverse Recovery Current			--	TBD	--	A
E _{REC}	Reverse Recovery Energy			--	TBD	--	mJ
Q _{rr}	Reverse Recovery Charge	T _J = 150°C V _R =600 V, I _F =240A V _{GE} = ± 15 V, R _{Gon} = 4.7Ω, R _{Goff} = 4.7Ω		--	TBD	--	μC
I _{RRM}	Peak Reverse Recovery Current			--	TBD	--	A
E _{REC}	Reverse Recovery Energy			--	TBD	--	mJ
R _{thJC}	Thermal Resistance – Chip-to-Case			--	TBD	--	K/W

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted) (AC test is three-level test mode)

Symbol	Parameter	Test Condition		Min	Typ	Max	Unit
INVERSE DIODES (D1, D2,D3, D4)							
V _F	Diode Forward Voltage	I _F = 480 A, V _{GE} = 0 V	T _J = 25°C	--	1.7	2.6	V
			T _J = 150°C	--	1.6	--	
Q _{rr}	Reverse Recovery Charge	T _J = 25°C V _R =600 V, I _F =240A V _{GE} = ± 15 V, R _{Gon} = 4.7Ω, R _{Goff} = 4.7Ω		--	6.08	--	μC
I _{RRM}	Peak Reverse Recovery Current			--	54	--	A
E _{REC}	Reverse Recovery Energy			--	0.86	--	mJ
Q _{rr}	Reverse Recovery Charge	T _J = 150°C V _R =600 V, I _F =240A V _{GE} = ± 15 V, R _{Gon} = 4.7Ω, R _{Goff} = 4.7Ω		--	13.6	--	μC
I _{RRM}	Peak Reverse Recovery Current			--	82.8	--	A
E _{REC}	Reverse Recovery Energy			--	2.91	--	mJ
R _{thJC}	Thermal Resistance – Chip-to-Case				0.18		K/W

THERMISTOR PROPERTIES

R_{25}	Rated Resistance	$T_C = 25^\circ\text{C}$	--	5	--	k Ω
$\Delta R/R$	Deviation of R100	$T_C = 100^\circ\text{C}$, $R_{100} = 493\Omega$	-5	--	5	%
P_{25}	Power Dissipation	$T_{NTC} = 25^\circ\text{C}$	--	--	60	mW
$B_{25/50}$	B-value	B (25/50), tolerance $\pm 3\%$	--	3375	--	K
$B_{25/100}$	B-value	B (25/100), tolerance $\pm 3\%$	--	3433	--	K

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted.
Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

[illegible]

SIDE VIEW

