

1200V , 15A , PIM

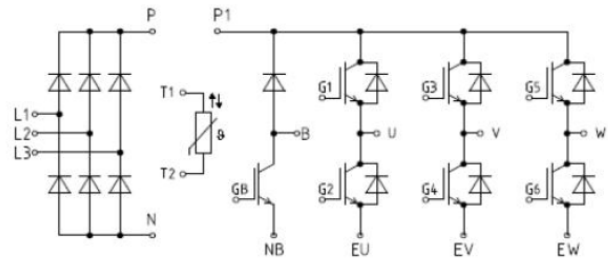
Features

- High frequency operation
- Low stray inductance
- High reliability and Power density
- Low switching loss



Applications

- High frequency drivers
- Industry Inverter
- Industry servo
- AC motor control



Key parameter show as below

- Part1: IGBT - Inverter
- Part2: Diode- Inverter
- Part3: Diode-Rectifier
- Part4: IGBT - Chopper
- Part5: Diode- Chopper
- Part6: NTC- Thermistor
- Part7: Module

Part1: IGBT - Inverter

Absolute Max Ratings						
Symbol	Parameter	condition	Units	Maximum		
V _{CES}	Collector-to-Emitter Voltage	T _{VJ} =25 °C	V	1200		
I _C	Continuous DC collector current	TC = 25°C,T _{VJ MAX} =175 °C	A	30		
		TC = 100°C,T _{VJ MAX} =175 °C	A	15		
I _{CRM}	Repetitive peak collector current	t _p =1ms	A	30		
P _{total}	Total power dissipation	TC = 25°C,T _{VJ MAX} =175 °C	°C/W	136		
V _{GES}	Gate-Emitter peak voltage		V	+/- 30		
IGBT characteristics						
Symbol	Parameter	Test conditions	Units	Min.	Typ.	Max.
V _{CE(sat)}	Collector-Emitter Saturation voltage	V _{GE} =15V, I _C =15A,T _{VJ} =25°C	V	—	2.1	2.5
		V _{GE} =15V, I _C =15A,T _{VJ} =125°C	V	—	2.35	—
V _{GE(th)}	Gate threshold voltage	V _{GE} = V _{CE} , I _D = 1mA	V	4.8	-	6.8
C _{iss}	Input capacitance	V _{GE} = 0V V _{CE} = 25V T _{VJ} =25°C f = 1MHz	pF	—	980	—
C _{oss}	Output capacitance		pF	—	70	—
C _{rss}	Reverse transfer capacitance		pF	—	45	—
Q _g	Total gate charge	V _{GE} = -15.....+15V	nC	—	132	—
I _{CES}	Collector-Emitter leakage current	V _{CE} =1200V, V _{GE} = 0V,T _{VJ} =25°C	mA	-	-	1
I _{GES}	Gate-Emitter leakage current	V _{CE} =0V, V _{GE} =20V,T _{VJ} =25°C	nA	-	-	200
T _{d(on)}	Turn-On DelayTime	T _{VJ} =25°C,V _{CE} =600V, I _c =15A,Rg _{ON} =27ohm, V _{GE} =+/-15V	ns	-	32	-
Tr	Rise Time		ns	-	28	-
T _{d(off)}	Turn-Off DelayTime		ns	-	260	-
T _f	Turn-Off Fall Time		ns	-	80	-
T _{d(on)}	Turn-On DelayTime	T _{VJ} =125°C,V _{CE} =600V, I _c =15A,Rg _{ON} =27ohm, V _{GE} =+/-15V	ns	-	35	-
Tr	Rise Time		ns	-	33	-
T _{d(off)}	Turn-Off DelayTime		ns	-	289	-
T _f	Turn-Off Fall Time		ns	-	98	-
E _{on}	Turn-on switch loss	T _{VJ} =25°C,V _{CE} =600V,	mJ	-	1.4	-

E_{off}	Turn-off switch loss	$I_c=15A, R_{gON}=27\Omega, L_S=45nH, V_{GE}=+/-15V$	mJ	-	0.9	-
E_{on}	Turn-on switch loss	$T_{VJ}=125^{\circ}C, V_{CE}=600V, I_c=15A, R_{gON}=27\Omega, L_S=45nH, V_{GE}=+/-15V$	mJ	-	1.8	-
E_{off}	Turn-off switch loss	$I_c=15A, R_{gON}=27\Omega, L_S=45nH, V_{GE}=+/-15V$	mJ	-	1.25	-
I_{SC}	Short- circuit current	$T_{VJ}=125^{\circ}C, V_{GE}=15V, V_{CE}=720V, t_p<10\mu s$	A	-	65	-
R_{ThJC}	Junction-Case Thermal resistance		K/W		-	1.1
T_{VJOP}	Temperature under switching		$^{\circ}C$	-40		150

Part2: Diode- Inverter

Absolute Max Ratings						
Symbol	Parameter	condition	Units	Maximum		
V _{RRM}	Repetitive peak reversevoltage	T _{VJ} =25 °C	V	1200		
I _F	Continuous DC forward current		A	15		
I _{FRM}	Repetitive peak forward current	T _p =1ms	A	30		
I ² t	I ² t Data	V _R =0V,T _p =10ms,T _{VJ} =125 °C	A ² s	15		
Diode characteristics						
Symbol	Parameter	Test conditions	Units	Min.	Typ.	Max.
V _F	Forward voltage	I _F =15A,T _{VJ} =25 °C	V	-	2.2	2.6
I _{RM}	Peak reverse recovery current	I _F =15A,dif/dt=500A/us (T _{VJ} =25 °C),V _R =600V, V _{GE} =-15V,T _{VJ} =25 °C	A	-	14	-
Q _r	Recovery charge		uC	-	1.25	-
E _{rec}	Reverse recovery energy		mJ	-	0.385	-
I _{RM}	Peak reverse recovery current	I _F =15A,dif/dt=500A/us (T _{VJ} =125 °C),V _R =600V, V _{GE} =-15V,T _{VJ} =125 °C	A		13	
Q _r	Recovery charge		uC		2.3	
E _{rec}	Reverse recovery energy		mJ		0.75	
R _{ThJC}	Junction-Case Thermal resistance		K/W		-	1.8
T _{VJ OP}	Temperature under switching		°C	-40		150

Part3: Diode-Rectifier

Absolute Max Ratings						
Symbol	Parameter	condition	Units	Maximum		
V _{RRM}	Repetitive peak reversevoltage	T _{VJ} =25 °C	V	1600		
I _{FRMSM}	Maximum RMS forward current	T _C = 80 °C	A	30		
I _{RMSM}	Maximum RMS current at rectifier output	T _C = 80 °C	A	30		
I _{FSM}	Surge forward current	T _p =10ms,T _{VJ} =25 °C	A	300		
I _{FSM}	Surge forward current	T _p =10ms,T _{VJ} =150 °C	A	240		
I ² t	I ² t Data	V _R =0V,T _p =10ms,T _{VJ} =25 °C	A ² s	450		
I ² t	I ² t Data	V _R =0V,T _p =10ms,T _{VJ} =150 °C	A ² s	300		
Diode characteristics						
Symbol	Parameter	Test conditions	Units	Min.	Typ.	Max.
V _F	Forward voltage	I _F =15A,T _{VJ} =25 °C	V	-	1.3	-
I _R	Reverse Current	V _R =1600A,T _{VJ} =25 °C	mA	-	1.0	-
R _{ThJC}	Junction-Case Thermal resistance		K/W		-	1.35
T _{VJ OP}	Temperature under switching		°C	-40		150

Part4: IGBT - Break /Chopper

Absolute Max Ratings						
Symbol	Parameter	condition	Units	Maximum		
V _{CES}	Collector-to-Emitter Voltage	T _{VJ} =25 °C	V	1200		
I _C	Continuous DC collector current	TC = 25°C,T _{VJ MAX} =175 °C	A	30		
		TC = 100°C,T _{VJ MAX} =175 °C	A	15		
I _{CRM}	Repetitive peak collector current	t _p =1ms	A	30		
P _{total}	Total power dissipation	TC = 25°C,T _{VJ MAX} =150 °C	°C/W	136		
V _{GES}	Gate-Emitter peak voltage		V	+/- 30		
IGBT characteristics						
Symbol	Parameter	Test conditions	Units	Min.	Typ.	Max.
V _{CE(sat)}	Collector-Emitter Saturation voltage	V _{GE} =15V, I _C =15A,T _{VJ} =25°C	V	—	2.1	2.5
		V _{GE} =15V, I _C =15A,T _{VJ} =125°C	V	—	2.35	—
V _{GE(th)}	Gate threshold voltage	V _{GE} = V _{CE} , I _D = 1mA	V	4.8	-	6.8
C _{iss}	Input capacitance	V _{GE} = 0V V _{CE} = 25V T _{VJ} =25°C f = 1MHz	pF	—	980	—
C _{oss}	Output capacitance		pF	—	70	—
C _{rss}	Reverse transfer capacitance		pF	—	45	—
Q _g	Total gate charge	V _{GE} = -15.....+15V	nC	—	192	—
I _{CES}	Collector-Emitter leakage current	V _{CE} =1200V, V _{GE} = 0V,T _{VJ} =25°C	mA	-	-	1
I _{GES}	Gate-Emitter leakage current	V _{CE} =0V, V _{GE} =20V,T _{VJ} =25°C	nA	-	-	200
T _{d(on)}	Turn-On DelayTime	T _{VJ} =25°C,V _{CE} =600V, I _c =15A,R _{gON} =27ohm, V _{GE} =+/-15V	ns	-	32	-
Tr	Rise Time		ns	-	28	-
T _{d(off)}	Turn-Off DelayTime		ns	-	260	-
T _f	Turn-Off Fall Time		ns	-	80	-
T _{d(on)}	Turn-On DelayTime	T _{VJ} =125°C,V _{CE} =600V, I _c =15A,R _{gON} =27ohm, V _{GE} =+/-15V	ns	-	35	-
Tr	Rise Time		ns	-	33	-
T _{d(off)}	Turn-Off DelayTime		ns	-	289	-
T _f	Turn-Off Fall Time		ns	-	98	-

E_{on}	Turn-on switch loss	$T_{VJ}=25^{\circ}\text{C}, V_{CE}=600\text{V},$ $I_C=15\text{A}, R_{gON}=27\text{ohm},$ $L_S=45\text{nH}, V_{GE}=+/-15\text{V}$	mJ	-	1.4	-
E_{off}	Turn-off switch loss		mJ	-	0.9	-
E_{on}	Turn-on switch loss	$T_{VJ}=125^{\circ}\text{C}, V_{CE}=600\text{V},$ $I_C=15\text{A}, R_{gON}=27\text{ohm},$ $L_S=45\text{nH}, V_{GE}=+/-15\text{V}$	mJ	-	1.8	-
E_{off}	Turn-off switch loss		mJ	-	1.25	-
I_{SC}	Short- circuit current	$T_{VJ}=125^{\circ}\text{C}, V_{GE}=15\text{V},$ $V_{CE}=720\text{V}, t_P<10\text{us}$	A	-	65	-
R_{ThJC}	Junction-Case Thermal resistance		K/W		-	1.1
$T_{VJ OP}$	Temperature under switching		$^{\circ}\text{C}$	-40		150

Part5: Diode- Chopper

Absolute Max Ratings						
Symbol	Parameter	condition	Units	Maximum		
V _{RRM}	Repetitive peak reversevoltage	T _{VJ} =25 °C	V	1200		
I _F	Continuous DC forward current		A	10		
I _{FRM}	Repetitive peak forward current	T _p =1ms	A	20		
I ² t	I ² t Data	V _R =0V,T _p =10ms,T _{VJ} =125 °C	A ² S	15		
Diode characteristics						
Symbol	Parameter	Test conditions	Units	Min.	Typ.	Max.
V _F	Forward voltage	I _F =10A,V _{GE} =0V,T _{VJ} =25 °C	V	-	2.0	2.3
V _F	Forward voltage	I _F =10A,V _{GE} =0V,T _{VJ} =125 °C	V	-	1.85	2.2
I _{RM}	Peak reverse recovery current	I _F =10A,diF/dt=400A/us (T _{VJ} =125 °C),V _R =600V, V _{GE} =-15V,T _{VJ} =25 °C	A	-	14	-
Q _r	Recovery charge		uC	-	1.0	-
E _{rec}	Reverse recovery energy		mJ	-	0.26	-
I _{RM}	Peak reverse recovery current	I _F =10A,diF/dt=400A/us (T _{VJ} =125 °C),V _R =600V, V _{GE} =-15V,T _{VJ} =125 °C	A	-	15	-
Q _r	Recovery charge		uC	-	1.8	-
E _{rec}	Reverse recovery energy		mJ	-	0.56	-
R _{ThJC}	Junction-Case Thermal resistance		K/W		-	2.1
T _{VJ OP}	Temperature under switching		°C	-40		150

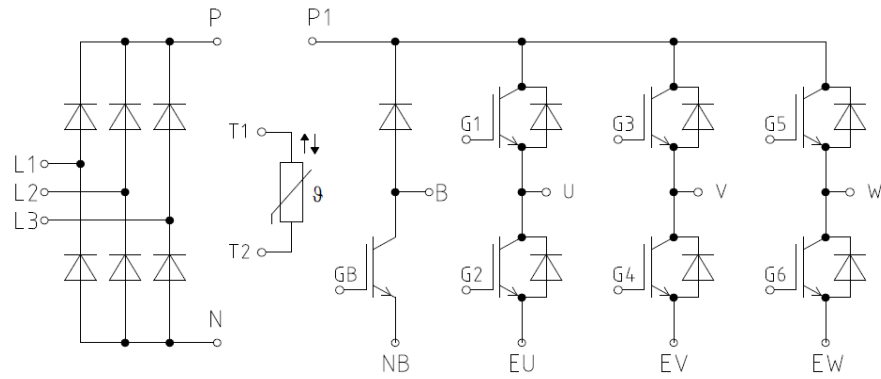
Part6: NTC- Thermistor

Diode characteristics						
Symbol	Parameter	Test conditions	Units	Min.	Typ.	Max.
R_{25}	Rated Resistance	$T_C = 25\text{ }^{\circ}\text{C}$	$\text{k}\Omega$	-	5.0	-
$\Delta R/R$	Deviation for R100	$T_C = 25\text{ }^{\circ}\text{C}, R_{100} = 493\Omega$	%	-5	-	5
P_{25}	Power dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	mW	-	-	20.0
$B_{25/50}$	B-value	$R_2 = R_{25} \exp[B_{25/50} (1/T_2 - 1/(298,15\text{K}))]$	K	-	3375	-

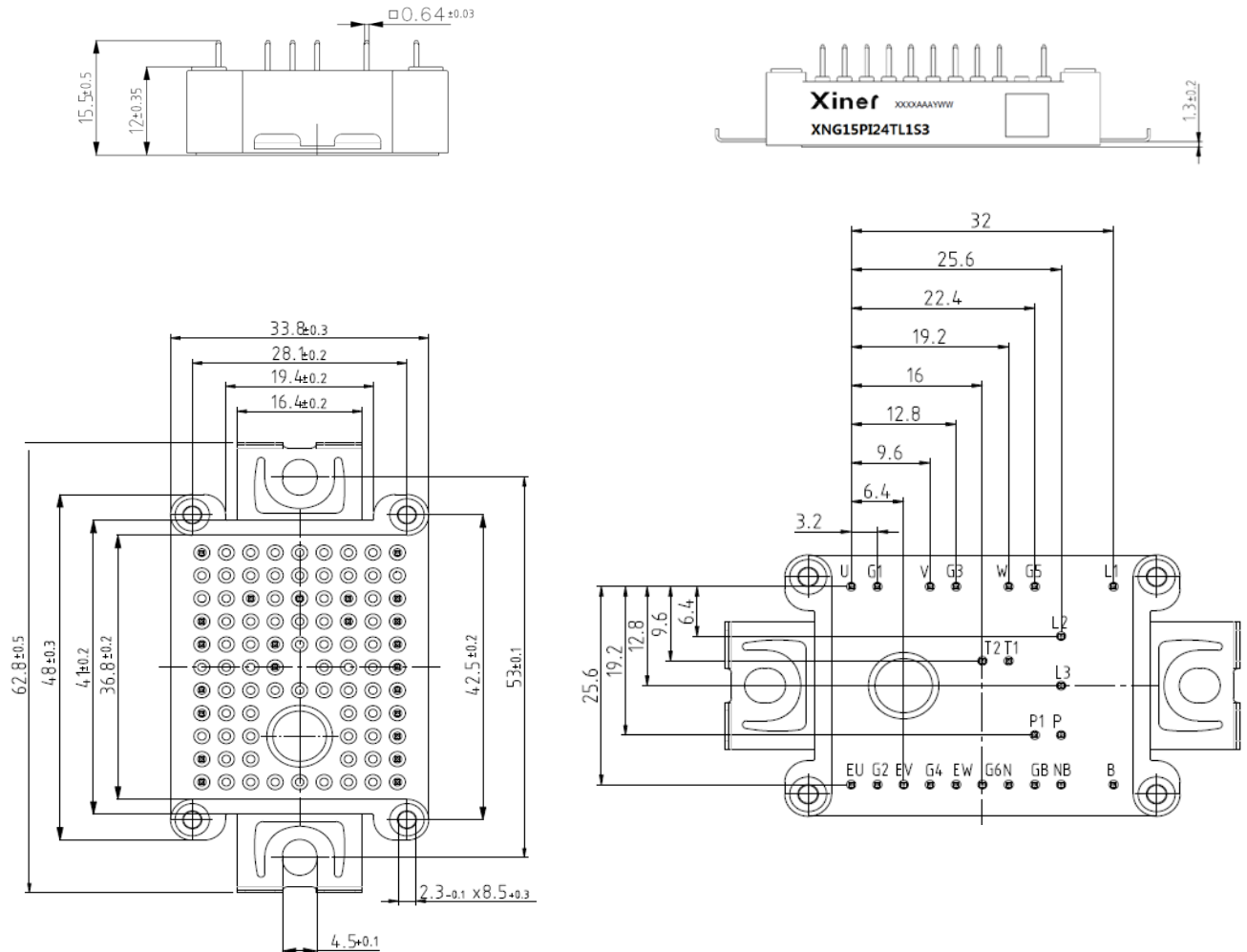
Part7: Module

Module parameter						
Symbol	Parameter	Test conditions	Units	Min.	Typ.	Max.
V_{ISOL}	Isolation voltage	RMS, $f=50\text{Hz}$, $t=1\text{min}$	kV	-	2.5	
	Internal Isolation	Basic insulation (class1, IEC61140)			Al_2O_3	
	Cree page distance	Terminal to Terminal	mm		5	
CTI	Comperative tracking index			225		
$L_{s\text{CE}}$	Stray induction module		nH		30	
$R_{CC'+EE'}$	Module lead resistance	$T_C = 25\text{ }^{\circ}\text{C}$	$\text{m}\Omega$		8.0	
$R_{AA'+CC'}$	Module lead resistance	$T_C = 25\text{ }^{\circ}\text{C}$	$\text{m}\Omega$		6.0	
T_{STG}	Storage Temperature		$^{\circ}\text{C}$	-40		125
M	Monuting torque		Nm	3.0		6.0
G	Weigh		g		24	

● Circuit diagram headline



● Package Dimensions (Unit:mm)



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