

### Electrical Features

- Trench/Fieldstop IGBT
- $V_{CEsat}$  with positive Temperature Coefficient
- Low  $V_{CEsat}$

### Typical Applications

- Auxiliary inverters
- Motor drives
- Servo drives

### Mechanical Features

- High power density
- Integrated NTC temperature sensor
- Copper base plate
- Solder contact technology
- Standard housing



### IGBT, Inverter

Maximum Rated Values							
Symbol	Item	Conditions		Rating			Unit
IGBT							
$V_{CES}$	Collector-emitter voltage	$T_{vj}=25^{\circ}\text{C}$		1200			V
$V_{GES}$	Gate-emitter voltage	-		$\pm 20$			V
$I_C$	Collector current,DC	$T_C=100^{\circ}\text{C}, T_{vj}=175^{\circ}\text{C}$		100			A
$I_{CRM}$	Repetitive peak collector current	$t_p=1\text{ms}$		200			A
$P_{tot}$	Total power dissipation	$T_C=25^{\circ}\text{C}, T_{vj}=175^{\circ}\text{C}$		517			W
Characteristics Values							
Symbol	Item	Conditions		Values			Unit
IGBT				Min.	Typ.	Max.	
$I_{CES}$	Collector-emitter cut-off current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_{vj}=25^{\circ}\text{C}$		-	-	1	mA
$I_{GES}$	Gate leakage current	$V_{CE}=0\text{V}, V_{GE}=20\text{V}, T_{vj}=25^{\circ}\text{C}$		-	-	100	nA
$V_{GE(th)}$	Gate-emitter threshold voltage	$I_C=3.8\text{mA}, V_{CE}=V_{GE}, T_{vj}=25^{\circ}\text{C}$		5.2	5.86	6.2	V
$V_{CEsat}$	Collector-emitter saturation voltage	$I_C=100\text{A}$ $V_{GE}=15\text{V}$	$T_{vj}=25^{\circ}\text{C}$	-	1.81	-	V
			$T_{vj}=125^{\circ}\text{C}$	-	-	-	
			$T_{vj}=150^{\circ}\text{C}$	-	-	-	
$C_{ies}$	Input capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}$ $f=1\text{MHz}, T_{vj}=25^{\circ}\text{C}$		-	7.07	-	nF
$C_{oes}$	Output capacitance			-	0.46	-	
$C_{res}$	Reverse transfer capacitance			-	0.24	-	
$Q_G$	Gate charge	$V_{GE}=-15\dots+15\text{V}, T_{vj}=25^{\circ}\text{C}$		-	-	-	uC
$R_g$	Internal gate resistance	$T_{vj}=25^{\circ}\text{C}$		-	1.8	-	$\Omega$

$t_{d(on)}$	Turn-on delay time	$V_{CC}=600V$ $I_C=100A$ $V_{GE}=\pm 15V$ $R_{G(on)}=1.6\Omega$ $R_{G(off)}=1.6\Omega$	$T_{vj}=25^\circ C$	-	200	-	ns
			$T_{vj}=125^\circ C$	-	-	-	
			$T_{vj}=150^\circ C$	-	-	-	
$t_r$	Rise time		$T_{vj}=25^\circ C$	-	246	-	
			$T_{vj}=125^\circ C$	-	-	-	
			$T_{vj}=150^\circ C$	-	-	-	
$t_{d(off)}$	Turn-off delay time		$T_{vj}=25^\circ C$	-	262	-	
			$T_{vj}=125^\circ C$	-	-	-	
			$T_{vj}=150^\circ C$	-	-	-	
$t_f$	Fall time		$T_{vj}=25^\circ C$	-	234	-	
			$T_{vj}=125^\circ C$	-	-	-	
			$T_{vj}=150^\circ C$	-	-	-	
$E_{on}$	Turn-on energy (per pulse)	$T_{vj}=25^\circ C$	-	2.23	-	mJ	
		$T_{vj}=125^\circ C$	-	-	-		
		$T_{vj}=150^\circ C$	-	-	-		
$E_{off}$	Turn-off energy (per pulse)	$T_{vj}=25^\circ C$	-	6.9	-		
		$T_{vj}=125^\circ C$	-	-	-		
		$T_{vj}=150^\circ C$	-	-	-		
SC data	Short-circuit current	$V_{CC}=600V, V_{GE}\leq 15V, T_{vj}=150^\circ C$ $V_{CES}\leq 1200V, t_p\leq 10\mu s$	-	1037	-	A	
$R_{thJC}$	Thermal resistance, junction to case	Per IGBT	-	-	0.29	K/W	
$R_{thCH}$	Thermal resistance, case to heatsink	Per IGBT $\lambda_{grease}=1W/(m\cdot K)$	-	0.085	-	K/W	
$T_{vjop}$	Temperature under switching conditions		-40		150	$^\circ C$	

**Diode, Inverter**

**Maximum Rated Values**

Symbol	Item	Conditions	Rating	Unit
$V_{RRM}$	Repetitive peak reverse voltage	$T_{vj}=25^\circ C$	1200	V
$I_F$	Forward current, DC		100	A
$I_{FRM}$	Repetitive peak forward current	$t_p=1ms$	200	A
$I^2t$	$I^2t$ -value	$V_R=0V, t_p=10ms, T_{vj}=150^\circ C$	1500	$A^2s$

**Characteristic Values**

$V_F$	Continuous forward voltage	$I_F=100A$ $V_{GE}=0V$	$T_{vj}=25^\circ C$	-	1.83	-	V
			$T_{vj}=125^\circ C$	-	-	-	
			$T_{vj}=150^\circ C$	-	-	-	
$I_{RM}$	Peak reverse recovery current		$T_{vj}=25^\circ C$	-	145	-	A
			$T_{vj}=125^\circ C$	-	-	-	
			$T_{vj}=150^\circ C$	-	-	-	
$t_{rr}$	Reverse recovery time	$V_R=600V$ $I_F=100A$ $V_{GE}=-15V$	$T_{vj}=25^\circ C$	-	136	-	ns
			$T_{vj}=125^\circ C$	-	-	-	
			$T_{vj}=150^\circ C$	-	-	-	
$Q_r$	Repetitive peak forward current		$T_{vj}=25^\circ C$	-	8.9	-	$\mu C$
			$T_{vj}=125^\circ C$	-	-	-	
			$T_{vj}=150^\circ C$	-	-	-	

E <sub>rec</sub>	Recovered charge		T <sub>vj</sub> =25°C	-	6.07	-	mJ
			T <sub>vj</sub> =125°C	-	-	-	
			T <sub>vj</sub> =150°C	-	-	-	
R <sub>thJC</sub>	Thermal resistance, junction to case	per diode	-	-	0.5	K/W	
R <sub>thCH</sub>	Thermal resistance, case to heatsink	per diode, λ <sub>grease</sub> =1 W/(m • K)	-	0.145	-	K/W	
T <sub>vjop</sub>	Temperature under switching conditions		-40		150	°C	

Note:

IGBT electrical characteristics according to IEC 60747 – 9

Diode electrical characteristics according to IEC 60747 – 2

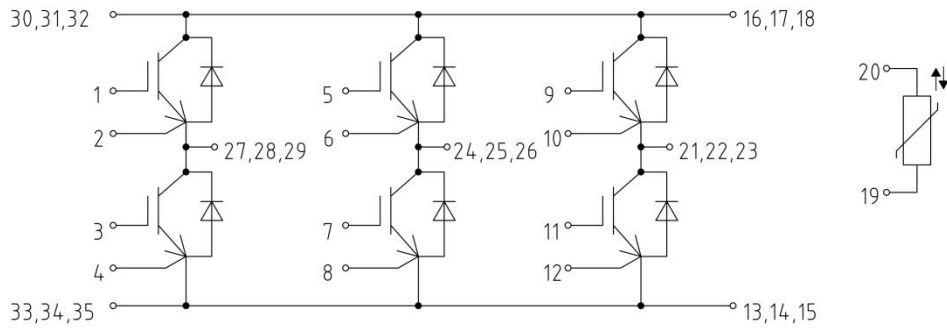
**NTC Thermistor Characteristics**

Symbol	Item	Conditions	Values			Unit
			Min.	Typ.	Max.	
R <sub>25</sub>	Rated resistance	T <sub>C</sub> =25°C	-	5	-	kΩ
ΔR/R	Deviation of resistance	T <sub>C</sub> =100°C,R <sub>100</sub> =493Ω	-5	-	5	%
P <sub>25</sub>	Power dissipation	T <sub>C</sub> =25°C	-	-	20	mW
B <sub>25/50</sub>	B-constant	R <sub>2</sub> =R <sub>25</sub> exp[B <sub>25/50</sub> (1/T <sub>2</sub> -1/(298.15K))]	-	3375	-	K
B <sub>25/80</sub>	B-constant	R <sub>2</sub> =R <sub>25</sub> exp[B <sub>25/85</sub> (1/T <sub>2</sub> -1/(298.15K))]	-	3411	-	
B <sub>25/100</sub>	B-constant	R <sub>2</sub> =R <sub>25</sub> exp[B <sub>25/100</sub> (1/T <sub>2</sub> -1/(298.15K))]	-	3433	-	

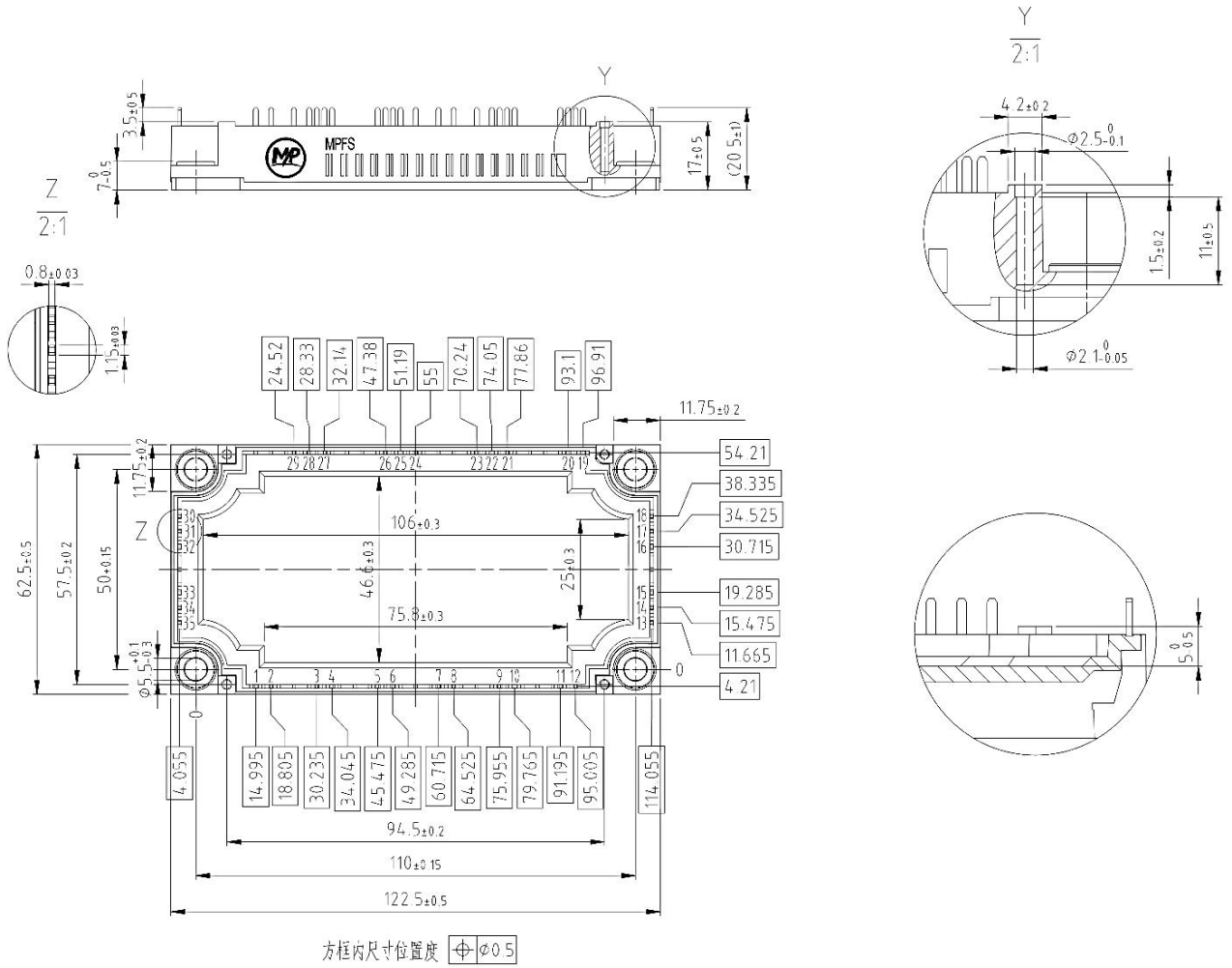
**Module**

Symbol	Item	Conditions	Rating			Unit
V <sub>ISOL</sub>	Isolation voltage	Terminals to baseplate, RMS,f=50Hz,t=1min	2500			V
T <sub>vj max</sub>	Maximum junction temperature	-	175			°C
T <sub>vj op</sub>	Operating junction temperature	Continuous operation(underswitching)	-40~150			°C
T <sub>stg</sub>	Storage temperature	-	-40~125			°C
Symbol	Item	Conditions	Values			Unit
			Min.	Typ.	Max.	
M	Mounting torque for module mounting	-	3	-	6	Nm
ds	Creepage distance	Terminal to terminal	-	-	-	mm
		Terminal to base plate	-	10	-	
da	Clearance	Terminal to terminal	-	-	-	mm
		Terminal to base plate	-	7.5	-	
m	Weight	-	-	290	-	g

Circuit Diagram



Package Outlines



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