

Dual Power HiPerFET™ Module

Phaseleg Configuration
High dv/dt, Low t_{rr} , HDMOS™ Family

Preliminary

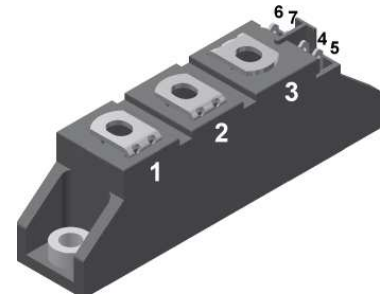
$$V_{DSS} = 200 \text{ V}$$

$$I_{D25} = 45 \text{ A}$$

$$R_{DS(on)} = 45 \text{ m}\Omega$$

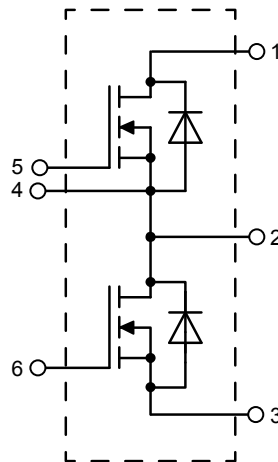
Part number

VMM45-02F



1 = Drain 1,
3 = Source 2,
5 = Gate 1

2 = Source 1, Drain 2
4 = Kelvin Source 1
6 = Gate 2



Features / Advantages:

- Two MOSFET's in phaseleg configuration
- Direct copper bonded Al_2O_3 ceramic base plate
- Low $R_{DS(on)}$ HDMOS™ process
- Easy to mount with two screws
- Space and weight savings
- High power density
- Low losses

Applications:

- Switched-mode and resonant-mode power supplies
- Uninterruptible power supplies (UPS)

Package: TO-240AA

- Isolation Voltage: 4800 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

Disclaimer Notice

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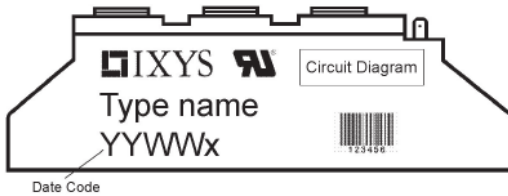
HiPerFET™s				Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.	Unit	
V_{DSS}	drain source breakdown voltage	$T_{VJ} = 25^{\circ}\text{C to } 125^{\circ}\text{C}$			200	V	
V_{DGR}	drain gate voltage	$R_{GS} = 10\text{ k}\Omega$ $T_{VJ} = 25^{\circ}\text{C to } 125^{\circ}\text{C}$			200	V	
V_{GS}	gate source voltage	Continuous			± 20	V	
V_{GSM}	max. transient gate source voltage	Transient			± 30	V	
I_{D25}	continuous drain current	$T_C = 25^{\circ}\text{C}$			45	A	
I_{D80}	drain current	$T_C = 80^{\circ}\text{C}$			34	A	
I_{DM}	maximum pulsed drain current	$t_p = 10\ \mu\text{s}$, pulse width limited by T_{JM} $T_C = 25^{\circ}\text{C}$			180	A	
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$			190	W	
V_{DSS}	drain source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 1\text{ mA}$	200			V	
$V_{GS(th)}$	gate threshold voltage	$V_{DS} = V_{GS}; I_D = 4\text{ mA}$	2		4	V	
I_{GSS}	gate source leakage current	$V_{GS} = \pm 20\text{ V DC}; V_{DS} = 0$			500	nA	
I_{DSS}	drain source leakage current	$V_{DS} = V_{DSS}; V_{GS} = 0\text{ V}$ $V_{DS} = 0.8 \cdot V_{DSS}; V_{GS} = 0\text{ V}$ $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$			15 1	μA mA	
$R_{DS(on)}$	static drain source on resistance	$V_{GS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$ $T_{VJ} = 25^{\circ}\text{C}$		39	45	m Ω	
g_{fs}	forward transconductance	$V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ pulsed	20	30		S	
C_{iss}	input capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 25\text{ V}; f = 1\text{ MHz}$		4800	7500	pF	
C_{oss}	output capacitance			900	2250	pF	
C_{rss}	reverse transfer (Miller) capacitance			310	750	pF	
$t_{d(on)}$	turn-on delay time	$V_{GS} = 10\text{ V}; V_{DS} = 0.5 \cdot V_{DSS}; I_D = 0.5 \cdot I_{D25}$ $R_G = 1\ \Omega$ (external), resistive load		40		ns	
t_r	current rise time			45		ns	
$t_{d(off)}$	turn-off delay time			300		ns	
t_f	current fall time			45		ns	
Q_g	total gate charge	$V_{GS} = 10\text{ V}; V_{DS} = 0.5 \cdot V_{DSS}; I_D = 0.5 \cdot I_{D25}$		190	225	nC	
Q_{gs}	gate source charge			35	55	nC	
Q_{gd}	gate drain (Miller) charge			45	115	nC	
R_{thJC}	thermal resistance junction to case	with heat transfer paste			0.63	K/W	
R_{thJH}	thermal resistance junction to heatsink			0.93		K/W	

Source-Drain Diodes				Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.	Unit	
I_S	continuous source current	$V_{GS} = 0\text{ V}$			45	A	
I_{SM}	maximum pulsed source current	Repetitive; pulse width limited by T_{JM}			180	A	
V_{SD}	forward voltage drop	$I_F = I_S; V_{GS} = 0\text{ V}$ Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$		0.9	1.2	V	
t_{rr}	reverse recovery time	$I_F = I_S; -di/dt = 100\text{ A}/\mu\text{s}$ $V_{DS} = 100\text{ V}; V_{GS} = 0\text{ V}$		200	400	ns	

 Data according to IEC 60747 and refer to a single thyristor/diode unless otherwise stated. $T_J = 25^{\circ}\text{C}$, unless otherwise specified

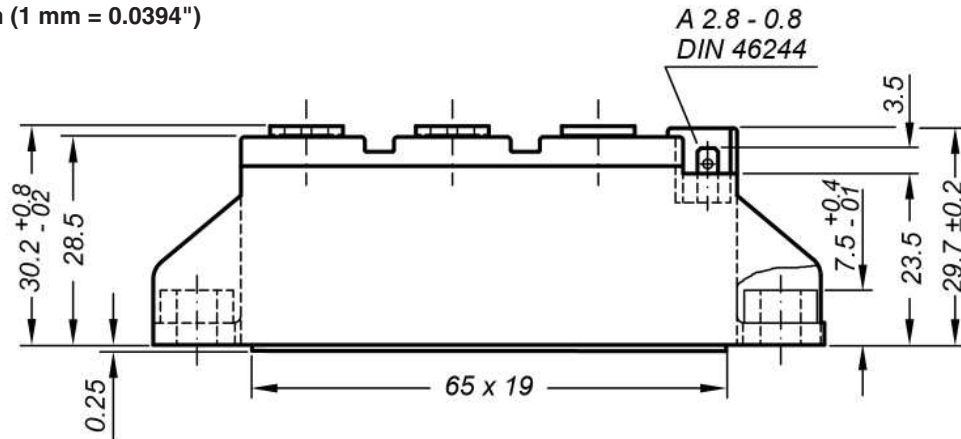
Preliminary

Package TO-240AA		Ratings				
Symbol	Definitions	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			200	A
T_{VJ}	virtual junction temperature		-40		150	°C
T_{VJM}	maximum virtual junction temperature				150	°C
T_{stg}	storage temperature		-40		125	°C
Weight				81		g
M_D	mounting torque		2.5		4	Nm
M_T	terminal torque		2.5		4	Nm
$d_{Spp/App}$	creepage distance on surface / striking distance through air	terminal to terminal	13.0	9.7		mm
$d_{Spb/Appb}$		terminal to backside	16.0	16.0		mm
V_{ISOL}	isolation voltage	t = 1 second t = 1 minute	50/60 Hz, RMS, $I_{ISOL} \leq 1$ mA		4800 4000	V V

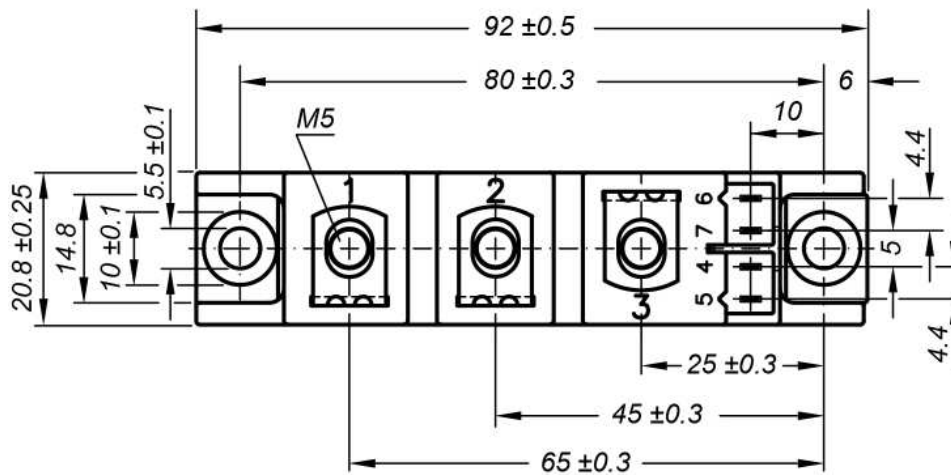


Outlines TO-240AA

Dimensions in mm (1 mm = 0.0394")



General tolerance: DIN ISO 2768 class „c“



Optional accessories for modules

Keyed gate/cathode twin plugs with wire length = 350 mm, gate = white, cathode = red

Type ZY 200L (L = Left for pin pair 4/5)

Type ZY 200R (R = Right for pin pair 6/7) } UL 758, style 3751

