LIXYS

IGBT Module

Phase leg

Part number MITH200PF1700LP

tentative

V _{CES}	=	1700 V
C25	=	285 A
V _{CE(sat)}	=	1.90 V



Features / Advantages:

- Trench IGBT
- low V_{CE(sat)}
- easy paralleling due to the positive temperature coefficient of the on-state voltage
- Tvjm = 175°C
- square RBSOA @ 2x lc
- short circuit rated for 10 µsec.
- low gate charge
- low EMI
- Free wheeling diode
- fast and soft reverse recovery
- low operating forward voltage

Applications:

- AC motor drives
- Solar inverter
- Air-conditioning systems
- high power converters • UPS

Package: Y3-M6

- Isolation Voltage: 4000 V~
- Industry standard outline
- RoHS compliant
- Copper base plate
- internally DCB isolated
- ultrasonic welded power terminals
- advanced power cycling

Terms & Conditions of usage The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact the sales office, which is responsible for you. Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you. Should you intend to use the product in aviation, in health or live endangering or life support applications, please notify. For any such application we urgently recommend

to perform joint risk and quality assessments;
the conclusion of quality agreements;

- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

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IGBT T1,	T2				Rating	S	
Symbol	Definitions	Conditions		min.	typ.	max.	
V _{CES}	collector emitter voltage		$T_{VJ} = 25^{\circ}C$			1700	V
V_{ges}	max. DC gate voltage			-20		+20	V
I _{C25} I _{C80}	collector current		$T_{\rm C} = 25^{\circ}{\rm C}$ $T_{\rm C} = 80^{\circ}{\rm C}$			285 215	A A
I _{CRM}	repetitive peak collector current	Pulse width and repetition rate should such that device junction temperature not exceed the max. rating of 175°C	d not be e (T _J) does			450	A
P _{tot}	total power dissipation		$T_c = 25^{\circ}C$			1110	W
V _{CE(sat)}	collector emitter saturation voltage	$I_{\rm C}$ = 150 A; $V_{\rm GE}$ = 15 V on die level	$T_{VJ} = 25^{\circ}C$ $T_{VJ} = 150^{\circ}C$		1.90 2.25	2.20	V V
		$I_c = 150 \text{ A}; V_{GE} = 15 \text{ V}$ between power terminals	$T_{VJ} = 25^{\circ}C$ $T_{VJ} = 150^{\circ}C$		2.00 2.35	2.30	V V
V _{GE(th)}	gate emitter threshold voltage	$I_{\rm C} = 6 \text{ mA}; V_{\rm CE} = V_{\rm GE}$	$T_{vJ} = 25^{\circ}C$	5.2	5.8	6.4	V
I _{CES}	collector emitter leakage current	V _{CE} = 1200 V; V _{GE} = 0 V	T _{vJ} = 25°C T _{vJ} = 150°C		3.0	2.7	mA mA
I _{GES}	gate emitter leakage current	$V_{GE} = \pm 20 \text{ V}; V_{CE} = 0 \text{ V}$				600	nA
R _G	internal gate resistance				5.0		Ω
C _{iss} C _{oss} C _{rss}	input capacitance output capacitance reverse transfer (Miller) capacitance	- V _{CE} = 25 V; V _{GE} = 0 V; f = 1 MHz	T _{vj} = 25°C		12 500 380		nF pF pF
Q _g Q _{gs} Q _{gd}	total gate charge gate source charge gate drain (Miller) charge	$V_{CE} = 900 \text{ V}; V_{GE} = -8 \text{ V}/15 \text{ V};$ $I_{C} = 150 \text{ A}$			1200		nC nC nC
$\begin{array}{c} t_{d(on)} \\ t_r \\ t_{d(off)} \\ t_f \\ E_{on} \\ E_{off} \\ E_{rec(off)} \end{array}$	turn-on delay time current rise time turn-off delay time current fall time turn-on energy per pulse turn-off energy per pulse reverse recovery losses at turn-off	Inductive switching $V_{CE} = 1200 \text{ V}; \text{ I}_{\text{C}} = 150 \text{ A}$ $V_{GE} = \pm 15 \text{ V}; \text{ R}_{\text{G}} = 1.5 \Omega \text{ (external)}$	T _{vJ} = 150°C		235 41 670 145 67 59		ns ns ns mJ mJ mJ
SCSOA t _{sc} I _{sc}	short circuit safe operating area short circuit duration short circuit current	$V_{CEmax} = 1700 V$ - $V_{CE} = 720 V$; $V_{GE} = \pm 15 V$ non-repetitive	T _{vj} = 150°C			10	μs A
$f R_{thJC} \ f R_{thJH}$	thermal resistance junction to case thermal resistance junction to heatsink	per IGBT with heatsink compound; IXYS test s	etup		0.19	0.135	K/W K/W
	X						



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Diode D1, D2					Rating	s	
Symbol	Definitions	Conditions		min.	typ.	max.	
V _{RRM}	max. repetitive reverse voltage		$T_{VJ} = 25^{\circ}C$			1700	V
I _{F25} I _{F80}	forward current		$\begin{array}{rl} T_{\rm C} = & 25^{\circ}{\rm C} \\ T_{\rm C} = & 80^{\circ}{\rm C} \end{array}$			204 153	A A
V _F	forward voltage	$I_F = 150 \text{ A}; V_{GE} = 0 \text{ V}$ on die level	$T_{VJ} = 25^{\circ}C$ $T_{VJ} = 150^{\circ}C$		1.98 2.10	2.40	V V
		$I_F = 150 \text{ A}; V_{GE} = 0 \text{ V}$ between power terminals	$T_{VJ} = 25^{\circ}C$ $T_{VJ} = 150^{\circ}C$		2.10 2.20	2.50	V V
I _R	reverse current * not applicable, see Ices at IGBT	$V_{R} = V_{RRM}$	$T_{vJ} = 25^{\circ}C$ $T_{vJ} = 150^{\circ}C$		*	*	mA mA
Q _{RM} I _{RM}	reverse recovery charge max. reverse recovery current	$V_{\rm R} = 1200 \text{ V}, \text{ I}_{\rm F} = 150 \text{ A},$	T = 25°C		45 180		μC A
t _{rr} E _{rec}	reverse recovery time reverse recovery energy	$-di_{F}/dt = 2410 \text{ A/}\mu\text{s}$	1 VJ = 10 0		20		ns mJ
Q _{RM} I _{RM}	reverse recovery charge max. reverse recovery current	$V_{R} = 600 \text{ V}, I_{F} = 100 \text{ A},$	T 105%0		85 240		μC A
t _{rr} E _{rec}	reverse recovery time reverse recovery energy	-di _F /dt = 2500 A/µs	1 _{VJ} = 125°C		44		ns mJ
R _{thJC} R _{thJH}	thermal resistance junction to case thermal resistance junction to heatsink	with heatsink compound; IXYS test	setup		0.35	0.25	K/W K/W

Equivale	ent Circuits for Simulation	*on die level			
	- <u>R</u>		IGBT T1, T2	Diode D1, D2	
$V_{0 max}$	threshold voltage	T (15000	1.10	1.08	V
$\mathbf{R}_{0 \max}$	slope resistance *	$I_{VJ} = 150^{\circ}C$	9.0	6.9	mΩ
V _{0 max}	threshold voltage				V
R _{0 max}	slope resistance *	I _{vJ} = 175°C			mΩ
	X	5			

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Package	Y3-M6			Rati	ngs	
Symbol	Definitions	Conditions	min.	typ.	max.	Unit
I _{RMS}	RMS current	per terminal			300	A
T _{stg}	storage temperature		-40		125	°C
Top	operation temperature		-40		150	°C
T _{vJ}	virtual junction temperature		-40		175	°C
Weight					340	g
Ms	mounting torque for screws to heatsink	M6 to heatsink	3		5	Nm
M _T	mounting torque for terminal screws	M6 to terminals	2.5		5	Nm
VISOL	isolation voltage	t = 1 minute, 50 / 60 Hz, RMS	4000			V
R _{terminal-chip}	resistance terminal to chip			0.5		mΩ
C _P	coupling capacity per switch	between shorted pins of switch and back side metallization				pF



Data Matrix: *Typ* (1-19), DC+*Prod.Index* (20-25), *FKT*# (26-31) *leer* (33), *lfd*.# (33-36)

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MITH200PF1700LP	MITH200PF1700LP			

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