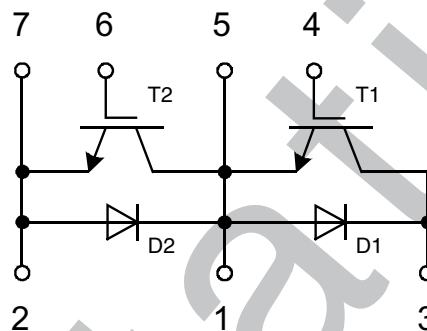
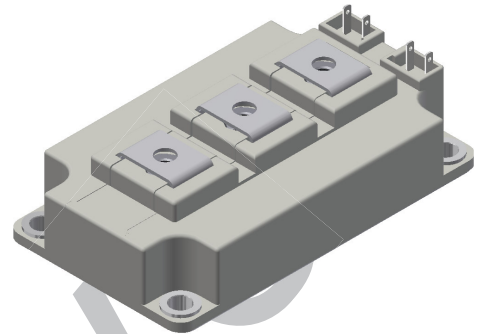


# IGBT Module

$$\begin{aligned} V_{CES} &= 1700 \text{ V} \\ I_{C25} &= 325 \text{ A} \\ V_{CE(sat)} &= 1.90 \text{ V} \end{aligned}$$

## Phase leg

**Part number**  
MITH250PF1700LP



### Features / Advantages:

- Trench IGBT
  - low  $V_{CE(sat)}$
  - easy paralleling due to the positive temperature coefficient of the on-state voltage
  - $T_{vj} = 175^{\circ}\text{C}$
  - square RBSOA @  $2 \times I_C$
  - short circuit rated for 10  $\mu\text{sec}$ .
  - 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

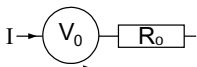
The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components 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 life 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.

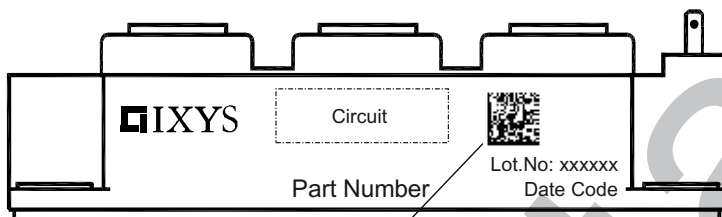
IGBT T1, T2				Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.		
$V_{CES}$	collector emitter voltage	$T_{VJ} = 25^{\circ}\text{C}$			1700	V	
$V_{GES}$	max. DC gate voltage		-20		+20	V	
$I_{C25}$	collector current	$T_C = 25^{\circ}\text{C}$			325	A	
$I_{C80}$		$T_C = 80^{\circ}\text{C}$			250	A	
$I_{CRM}$	repetitive peak collector current	Pulse width and repetition rate should not be such that device junction temperature ( $T_J$ ) does not exceed the max. rating of $175^{\circ}\text{C}$			600	A	
$P_{tot}$	total power dissipation	$T_C = 25^{\circ}\text{C}$			1215	W	
$V_{CE(sat)}$	collector emitter saturation voltage	$I_C = 200\text{ A}; V_{GE} = 15\text{ V}$ on die level	$T_{VJ} = 25^{\circ}\text{C}$	1.90	2.20	V	
			$T_{VJ} = 150^{\circ}\text{C}$	2.30		V	
		$I_C = 200\text{ A}; V_{GE} = 15\text{ V}$ between power terminals	$T_{VJ} = 25^{\circ}\text{C}$	2.00	2.30	V	
$V_{GE(th)}$	gate emitter threshold voltage	$I_C = 8\text{ mA}; V_{CE} = V_{GE}$	$T_{VJ} = 25^{\circ}\text{C}$	5.2	5.8	6.4	V
$I_{CES}$	collector emitter leakage current	$V_{CE} = 1700\text{ V}; V_{GE} = 0\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$		2.7	mA	
			$T_{VJ} = 150^{\circ}\text{C}$	3.5		mA	
$I_{GES}$	gate emitter leakage current	$V_{GE} = \pm 20\text{ V}; V_{CE} = 0\text{ V}$			1200	nA	
$R_G$	internal gate resistance			3.75		$\Omega$	
$C_{iss}$	input capacitance	$V_{CE} = 25\text{ V}; V_{GE} = 0\text{ V}; f = 1\text{ MHz}$ $T_{VJ} = 25^{\circ}\text{C}$		18		nF	
$C_{oss}$	output capacitance			680		pF	
$C_{rss}$	reverse transfer (Miller) capacitance			580		pF	
$Q_g$	total gate charge	$V_{CE} = 900\text{ V}; V_{GE} = -8\text{ V}/15\text{ V};$ $I_C = 200\text{ A}$		1600		nC	
$Q_{gs}$	gate source charge					nC	
$Q_{gd}$	gate drain (Miller) charge					nC	
$t_{d(on)}$	turn-on delay time	Inductive switching $V_{CE} = 1200\text{ V}; I_C = 200\text{ A}$ $V_{GE} = \pm 15\text{ V}; R_G = 2.0\text{ }\Omega$ (external) $T_{VJ} = 150^{\circ}\text{C}$		260		ns	
$t_r$	current rise time			35		ns	
$t_{d(off)}$	turn-off delay time			710		ns	
$t_f$	current fall time			150		ns	
$E_{on}$	turn-on energy per pulse			69		mJ	
$E_{off}$	turn-off energy per pulse			79		mJ	
$E_{rec(off)}$	reverse recovery losses at turn-off					mJ	
$SCSOA$	short circuit safe operating area	$V_{CEmax} = 1700\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$				
$t_{sc}$	short circuit duration	$V_{CE} = 720\text{ V}; V_{GE} = \pm 15\text{ V}$			10	$\mu\text{s}$	
$I_{sc}$	short circuit current	non-repetitive				A	
$R_{thJC}$	thermal resistance junction to case	per IGBT			0.123	K/W	
$R_{thJH}$	thermal resistance junction to heatsink	with heatsink compound; IXYS test setup		0.17		K/W	

Diode D1, D2				Ratings			
Symbol	Definitions	Conditions		min.	typ.	max.	
$V_{RRM}$	max. repetitive reverse voltage	$T_{VJ} = 25^{\circ}\text{C}$				1700	V
$I_{F25}$	forward current	$T_C = 25^{\circ}\text{C}$				205	A
$I_{F80}$		$T_C = 80^{\circ}\text{C}$				151	A
$V_F$	forward voltage	$I_F = 200\text{ A}; V_{GE} = 0\text{ V}$ on die level	$T_{VJ} = 25^{\circ}\text{C}$		2.00	2.40	V
			$T_{VJ} = 150^{\circ}\text{C}$		2.15		V
		$I_F = 200\text{ A}; V_{GE} = 0\text{ V}$ between power terminals	$T_{VJ} = 25^{\circ}\text{C}$		2.10	2.50	V
			$T_{VJ} = 150^{\circ}\text{C}$		2.25		V
$I_R$	reverse current * not applicable, see $I_{ces}$ at IGBT	$V_R = V_{RRM}$	$T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 150^{\circ}\text{C}$		*	*	mA mA
$Q_{RM}$	reverse recovery charge	$V_R = 1200\text{ V}, I_F = 200\text{ A},$ $-di_F/dt = 3200\text{ A}/\mu\text{s}$	$T_{VJ} = 25^{\circ}\text{C}$		50		$\mu\text{C}$
$I_{RM}$	max. reverse recovery current				200		A
$t_{rr}$	reverse recovery time						ns
$E_{rec}$	reverse recovery energy				23		mJ
$Q_{RM}$	reverse recovery charge	$V_R = 1200\text{ V}, I_F = 200\text{ A},$ $-di_F/dt = 3200\text{ A}/\mu\text{s}$	$T_{VJ} = 125^{\circ}\text{C}$		90		$\mu\text{C}$
$I_{RM}$	max. reverse recovery current				260		A
$t_{rr}$	reverse recovery time						ns
$E_{rec}$	reverse recovery energy				50		mJ
$R_{thJC}$	thermal resistance junction to case	with heatsink compound; IXYS test setup				0.28	K/W
$R_{thJH}$	thermal resistance junction to heatsink				0.39		K/W

## Equivalent Circuits for Simulation \*on die level

			IGBT T1, T2	Diode D1, D2	
$V_{0\text{ max}}$	threshold voltage	$T_{VJ} = 150^{\circ}\text{C}$	0.8	1.08	V
$R_{0\text{ max}}$	slope resistance *		9.0	5.4	m $\Omega$
$V_{0\text{ max}}$	threshold voltage	$T_{VJ} = 175^{\circ}\text{C}$			V
$R_{0\text{ max}}$	slope resistance *				m $\Omega$

Package Y3-M6			Ratings			
Symbol	Definitions	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			300	A
$T_{stg}$	storage temperature		-40		125	°C
$T_{op}$	operation temperature		-40		150	°C
$T_{vj}$	virtual junction temperature		-40		175	°C
<b>Weight</b>					340	g
$M_s$	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
$V_{ISOL}$	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

**Part number**

M = Module  
 I = IGBT  
 T = Trench IGBT  
 H = Gen 5  
 250 = Current Rating [A]  
 PF = phase leg  
 1700 = Reverse Voltage [V]  
 LP = Y3-M6

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	MITH250PF1700LP	MITH250PF1700LP			

**Outlines Y3-M6**

