

# The Leader in High Temperature Semiconductor Solutions

## 1200V/300A IGBT Power Module

### CMT-PLA2218 - Preliminary Datasheet

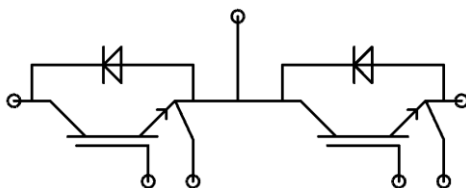
Version: 1.0  
(see note 1)

#### Applications

- Inverter for Motor Drive
- UPS (Uninterruptible Power Supplies)
- Soft Switching Welding Machine
- AC and DC Servo Drive Amplifier

#### Features

- Low  $V_{ce(sat)}$  with Field-Stop/Trench Technology: 1.85V @ 25°C/300A
- $V_{ce(sat)}$  with positive temperature coefficient
- Collector voltage up to 1200V
- Max Collector current: 300A DC @  $T_c=100^\circ\text{C}$
- Includes fast&soft recovery anti-parallel freewheeling diodes
- High short circuit capability (10 $\mu\text{s}$ )
- Low inductance module structure
- Operating junction temperature from  $-55^\circ\text{C}$  to  $+175^\circ\text{C}$
- 62 mm Power Package
- RoHS compliant



Note1: Please always refer to the latest datasheet version available at:  
<http://www.cissoid.com/files/files/products/planet/CMT-8963.pdf>

**Absolute Maximum Ratings** (Note 2)

Symbol	Parameter	Min.	Max.	Units
$V_{CES}$	Collector-Emitter Voltage		1200	V
$V_{GES}$	Gate-Emitter Voltage		$\pm 20$	V
$I_C$	DC Collector Current ( $T_C=100^\circ\text{C}$ )		300	A
$I_{Cpuls}$	Pulsed Collector Current ( $T_C=100^\circ\text{C}$ )		600	V
$P_{tot}$	Power Dissipation per IGBT ( $T_C=25^\circ\text{C}$ )		1970	W
$T_{JOP}$	Operating Junction Temperature	-40	150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature	-40	125	$^\circ\text{C}$
$V_{isol}$	Isolation Voltage (1min, 50Hz)	2500		V

Note 2 Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Frequent or extended exposure to absolute maximum rating conditions or above may affect device reliability.

## IGBT Electrical Characteristics

( $T_C=25^\circ\text{C}$ , unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ	Max.	Units
$V_{GE(th)}$	Gate-Emitter Threshold Voltage	$V_{GE}=V_{CE}$ , $I_C=3.3\text{mA}$ $T_J=25^\circ\text{C}$	5.5	6.0	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=200\text{A}$ , $V_{GE}=15\text{V}$ $T_J=25^\circ\text{C}$		1.9	2.25	V
		$I_C=200\text{A}$ , $V_{GE}=15\text{V}$ $T_J=125^\circ\text{C}$		2.25		V
$I_{CES}$	Collector Leakage Current	$V_{CE}=1200\text{V}$ , $V_{GE}=0\text{V}$ $T_J=25^\circ\text{C}$			0.8	mA
		$V_{CE}=1200\text{V}$ , $V_{GE}=0\text{V}$ $T_J=125^\circ\text{C}$			5	mA
$I_{GES}$	Gate Leakage Current	$V_{CE}=0\text{V}$ , $V_{GE}=20\text{V}$ $T_J=25^\circ\text{C}$			400	nA
$G_g$	Gate Charge			2.8		$\mu\text{C}$
$C_{ies}$	Input Capacitance			21.2		nF
$C_{oes}$	Output Capacitance	$V_{CE}=0\text{V}$ , $V_{GE}=0\text{V}$		1.42		nF
$C_{res}$	Reverse Transfer Capacitance	$F=1\text{MHz}$ , $T_J=25^\circ\text{C}$		0.94		nF
$R_{gint}$	Internal Gate Resistance			1		$\Omega$
$t_{d(on)}$	Turn-on Delay Time	$I_C=200\text{A}$ , $V_{CE}=600\text{V}$ , $V_{GE}=\pm 15\text{V}$ , $T_J=25^\circ\text{C}$ $R_G=4.7\Omega$		574		ns
$t_r$	Rise Time			133		ns
$t_{d(off)}$	Turn-Off Delay Time			563		ns
$t_f$	Fall Time			120		ns
$E_{on}$	Turn-on Energy				26.8	
$E_{off}$	Turn-off Energy			28.4		mJ
$t_{d(on)}$	Turn-on Delay Time	$I_C=200\text{A}$ , $V_{CE}=600\text{V}$ , $V_{GE}=\pm 15\text{V}$ , $T_J=25^\circ\text{C}$ $R_G=10\Omega$		604		ns
$t_r$	Rise Time			137		ns
$t_{d(off)}$	Turn-Off Delay Time			629		ns
$t_f$	Fall Time			167		ns
$E_{on}$	Turn-on Energy				35.1	
$E_{off}$	Turn-off Energy			35.9		mJ
$I_{sc}$	Short-Circuit Data	$T_P \leq 10\mu\text{s}$ , $V_{GE}=15\text{V}$ , $T_J=150^\circ\text{C}$ , $V_{CC}=1200\text{V}$		1500		A

## Diode Electrical Characteristics

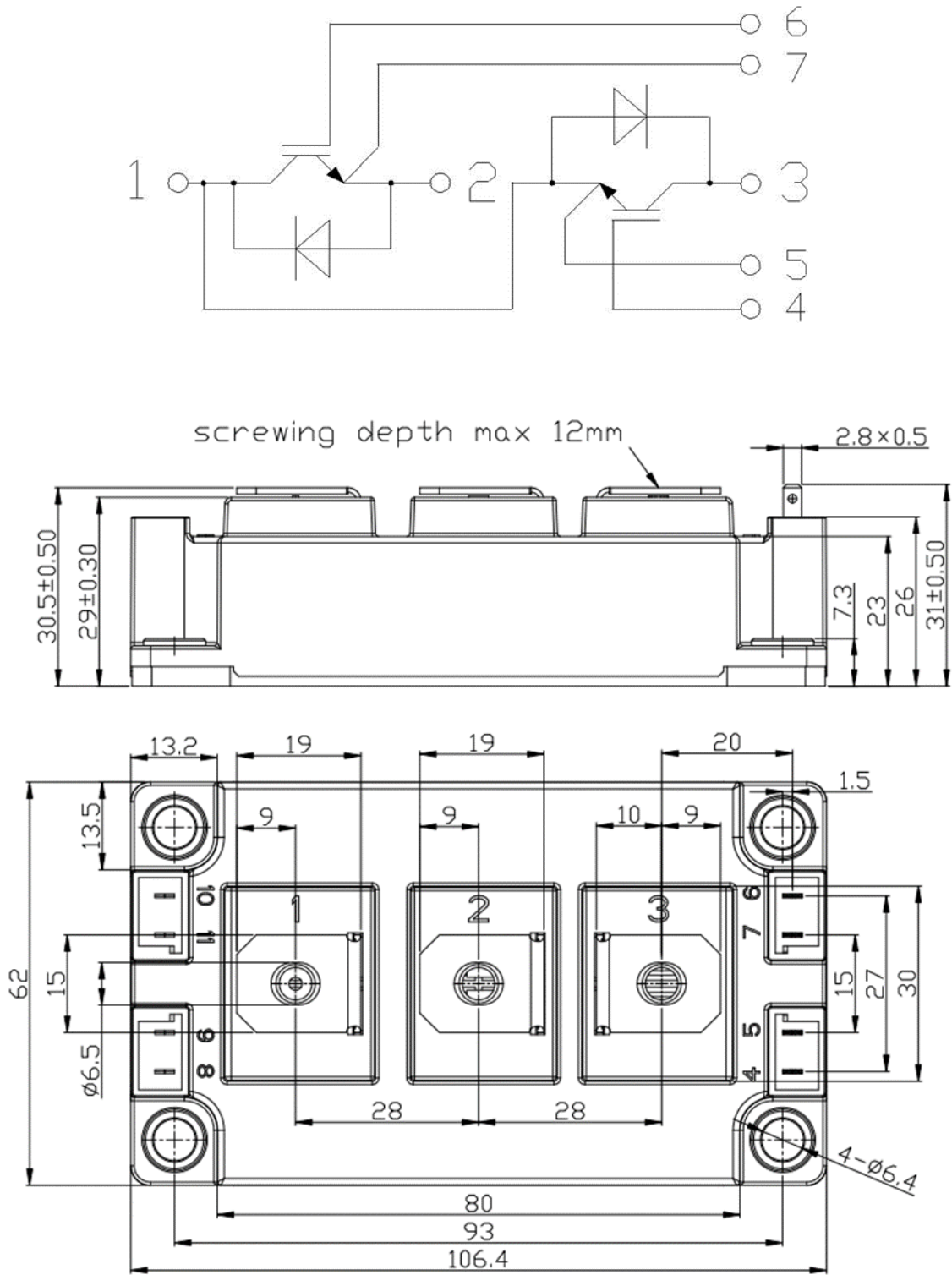
( $T_C=25^{\circ}\text{C}$ , unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ	Max.	Units
$I_F$	Diode DC Forward Current	$T_J=100^{\circ}\text{C}$		300		A
$I_{FRM}$	Diode Peak Forward Current	$t_p=1\text{ms}$		600		A
$V_F$	Diode Forward Voltage	$I_F=200\text{A}, T_J=25^{\circ}\text{C}$		1.9		V
		$I_F=200\text{A}, T_J=125^{\circ}\text{C}$		2.0		
$Q_{rr}$	Recovered Charge	$I_F=200\text{A}, V_R=600\text{V}$ $-di_F/dt=2300\text{A}/\mu\text{S}$ $T_J=25^{\circ}\text{C}$		23.8		$\mu\text{C}$
$I_{rr}$	Peak Reverse Recovery Current			182		A
$t_{rr}$	Reverse Recovery Time			232		ns
$E_{rec}$	Reverse Recovery Energy			12.3		mJ
$Q_{rr}$	Recovered Charge	$I_F=200\text{A}, V_R=600\text{V}$ $-di_F/dt=2300\text{A}/\mu\text{S}$ $T_J=125^{\circ}\text{C}$		56.4		$\mu\text{C}$
$I_{rr}$	Peak Reverse Recovery Current			272		A
$t_{rr}$	Reverse Recovery Time			531		ns
$E_{rec}$	Reverse Recovery Energy			31.1		mJ

## Module Characteristics

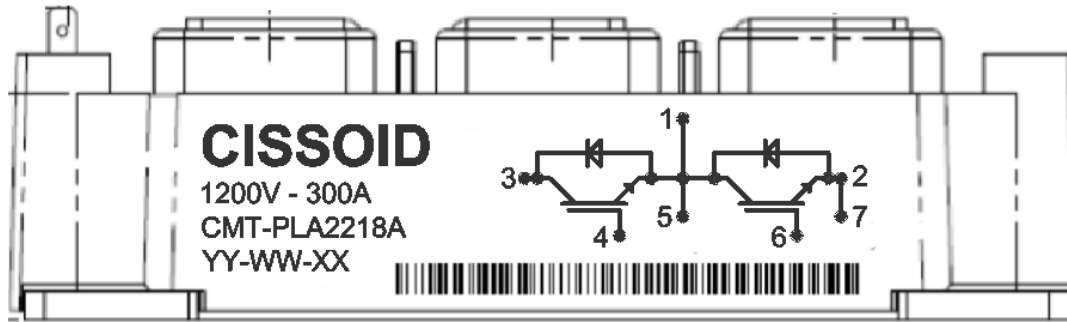
Symbol	Parameter	Test conditions	Min.	Typ	Max.	Units
$R_{\theta JC}$	Junction-to-Case Thermal Resistance	per IGBT			0.076	$^{\circ}\text{C}/\text{W}$
		per Diode			0.1	$^{\circ}\text{C}/\text{W}$
$R_{\theta CS}$	Case-to-Sink Thermal Resistance	Conductive grease applied		0.035		$^{\circ}\text{C}/\text{W}$
$M_t$	Module Electrodes Torque	Recommended M5	2.5		5	N.m
$M_s$	Module-to-Sink Torque	Recommended M6	3		5	N.m
$W$	Module weight			300		g

**Package Drawing**



*Physical dimensions in mm (tolerance : +/- 0.2 mm)*

### Marking information



YY	Year (last 2 digits)
WW	Week
XX	Assembly lot ID

### Ordering Information

Product Name	Ordering Reference	Package	Marking
CMT-PLA2218	CMT-PLA2218A	62mm HB	CMT-PLA2218A

**Contact & Ordering****CISSOID S.A.**

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