

MM1000HF10B1H

MOSFET Module

Preliminary Data

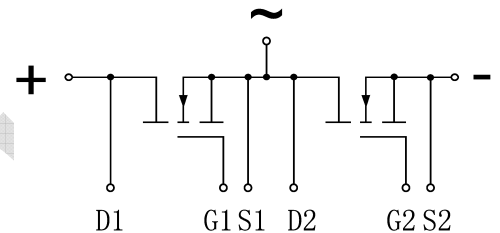
Features:

- Improved Gate, Avalanche and Dynamic dv/dt Ruggedness
- Fully Characterized Capacitance and Avalanche SOA
- Enhanced body diode dv/dt and di/dt Capability
- Lead-Free Halogen-Free



Applications:

- Hard Switched and High Frequency Circuits
- Main And Auxiliary AC Drives of Electric Vehicles



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

Symbol	Description		Value	Units
V_{DSS}	Drain-Source Blocking Voltage		100	V
V_{GSS}	Gate-Source Voltage		± 20	V
I_D	Continuous Drain Current, $V_{GS}=10\text{V}$	Wire Bond Limited	1000	A
		Silicon Limited	1440	A
I_{DM}	Pulsed Drain Current	Pulse width limited by max. junction temperature	2400	A
I_S	Continuous Source Current (diode)		1500	A
I_{SM}	Pulsed Source Current	Pulse width limited by max. junction temperature	2400	A
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$ $T_{Jmax}=175^\circ\text{C}$	2080	W

Electrical Characteristics of MOSFET ($T_J=25^\circ\text{C}$ unless otherwise specified)

Static Characteristics

Symbol	Description	Conditions	Min	Typ	Max	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$I_D=4\text{mA}$, $V_{DS}=V_{GS}$	2.0	3.2	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$I_D=600\text{A}$, $V_{DS}=10\text{V}$		0.46		m Ω
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=V_{DSS}$, $V_{GS}=0\text{V}$ $T_J=25^\circ\text{C}$			160	μA
I_{GSS}	Gate- Source Leakage Current	$V_{GS}=V_{GSS}$, $V_{DS}=0\text{V}$ $T_J=25^\circ\text{C}$			1	μA
C_{iss}	Input Capacitance			77		nF
C_{oss}	Output Capacitance	$V_{DS}=50\text{V}$, $V_{GS}=0\text{V}$, $f=1\text{MHz}$		5.4		nF
C_{rss}	Reverse Transfer Capacitance			2.0		nF

Switching Characteristics

Q_g	Total Gate Charge	$I_D=600\text{A}$, $V_{DS}=50\text{V}$, $V_{GS}=10\text{V}$		1200	1680	nC
Q_{gs}	Gate-Source Charge			280		nC
Q_{gd}	Gate-Drain (Miller) Charge			344		nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=65\text{V}$, $I_D=600\text{A}$; $R_g=0.33\Omega$; $V_{GS}=10\text{V}$; $T_J=25^\circ\text{C}$		200		ns
t_r	Rise Time			536		ns
$t_{d(off)}$	Turn-off Delay Time			624		ns
t_f	Fall Time			704		ns
R_{Gint}	Internal Gate Resistor			2.0		Ω
$R_{\theta JC}$	MOSFET Thermal Resistance: Junction-To-Case			0.072		$^\circ\text{C/W}$

Electrical Characteristics of Body Diode ($T_J=25^\circ\text{C}$ unless otherwise specified)

Symbol	Description	Conditions	Min	Typ	Max	Unit	
V_{SD}	Forward Voltage	$I_S=600\text{A}$, $V_{GS}=0\text{V}$	$T_J=25^\circ\text{C}$		1.3	V	
t_{rr}	Reverse Recovery Time	$I_F=600\text{A}$, $V_R=85\text{V}$, $di/dt=100\text{A}/\mu\text{s}$,	$T_J=25^\circ\text{C}$		400	600	ns
			$T_J=125^\circ\text{C}$		480	720	ns
Q_{rr}	Reverse Recovery Charge		$T_J=25^\circ\text{C}$		0.75	1.12	μC
			$T_J=125^\circ\text{C}$		1.12	1.68	μC

Module

Symbol	Description	Min	Typ	Max	Unit
V_{iso}	Isolation Voltage (All Terminals Shorted) $f = 50\text{Hz}, 1\text{minute}$	2500			V
T_J	Maximum Junction Temperature			175	$^{\circ}\text{C}$
T_{JOP}	Maximum Operating Junction Temperature Range	-40		+150	$^{\circ}\text{C}$
T_{stg}	Storage Temperature	-40		+125	$^{\circ}\text{C}$
CTI	Comparative Tracking Index	200			V
$R_{\theta CS}$	Case-To-Sink Thermally (Conductive Grease Applied)		0.1		$^{\circ}\text{C}/\text{W}$
M	Power Terminals Screw:M5	3.0		6.0	N·m
M	Mounting Screw:M5	3.0		6.0	N·m
G	Weight		230		g

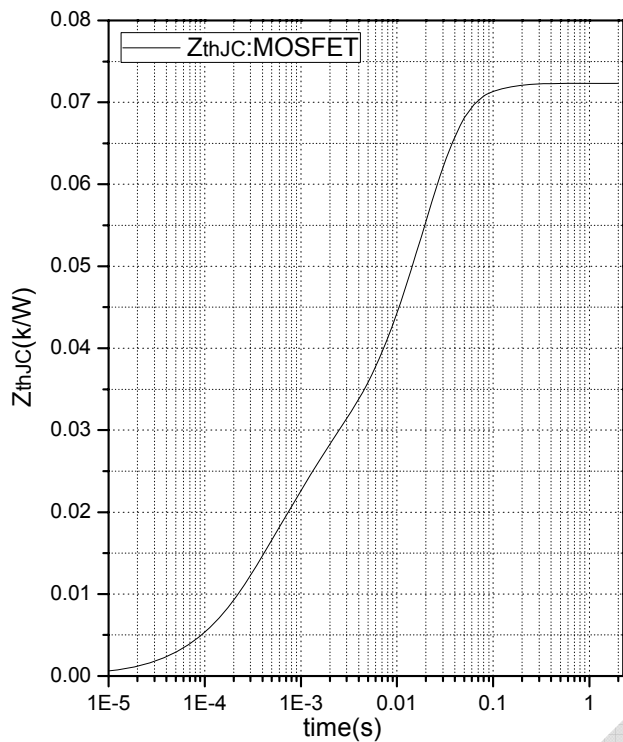
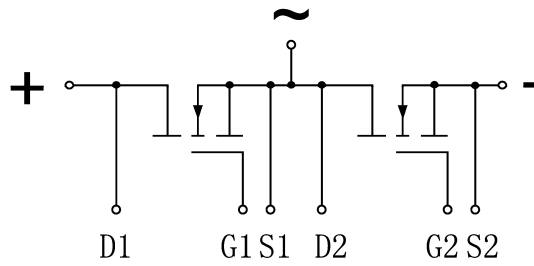


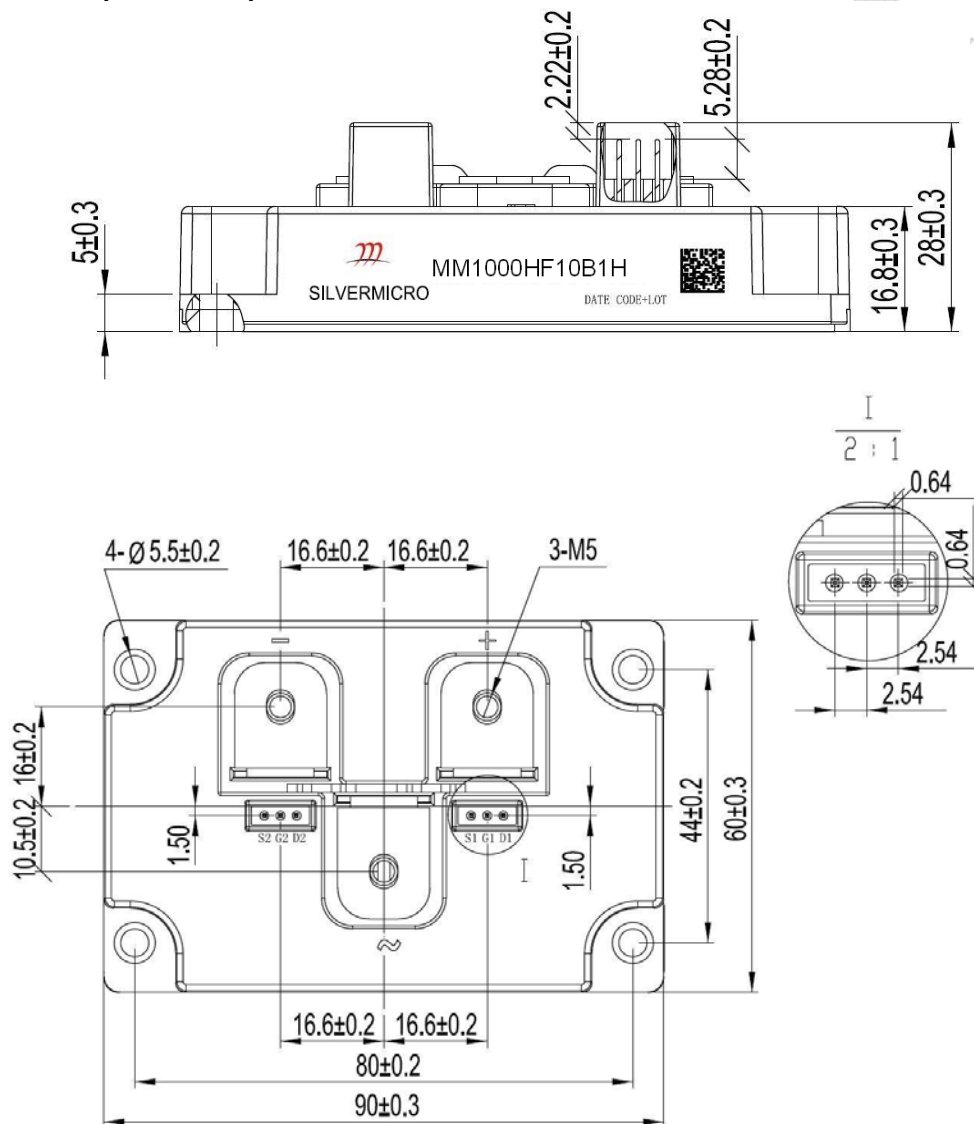
Fig.1 Transient Thermal Impedance (MOSFET)

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Internal Circuit:



Package Outline (Unit: mm):



Announcement

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