

**MM118-XX
 SERIES**

**600 / 1200 Volts
 150 Amps**

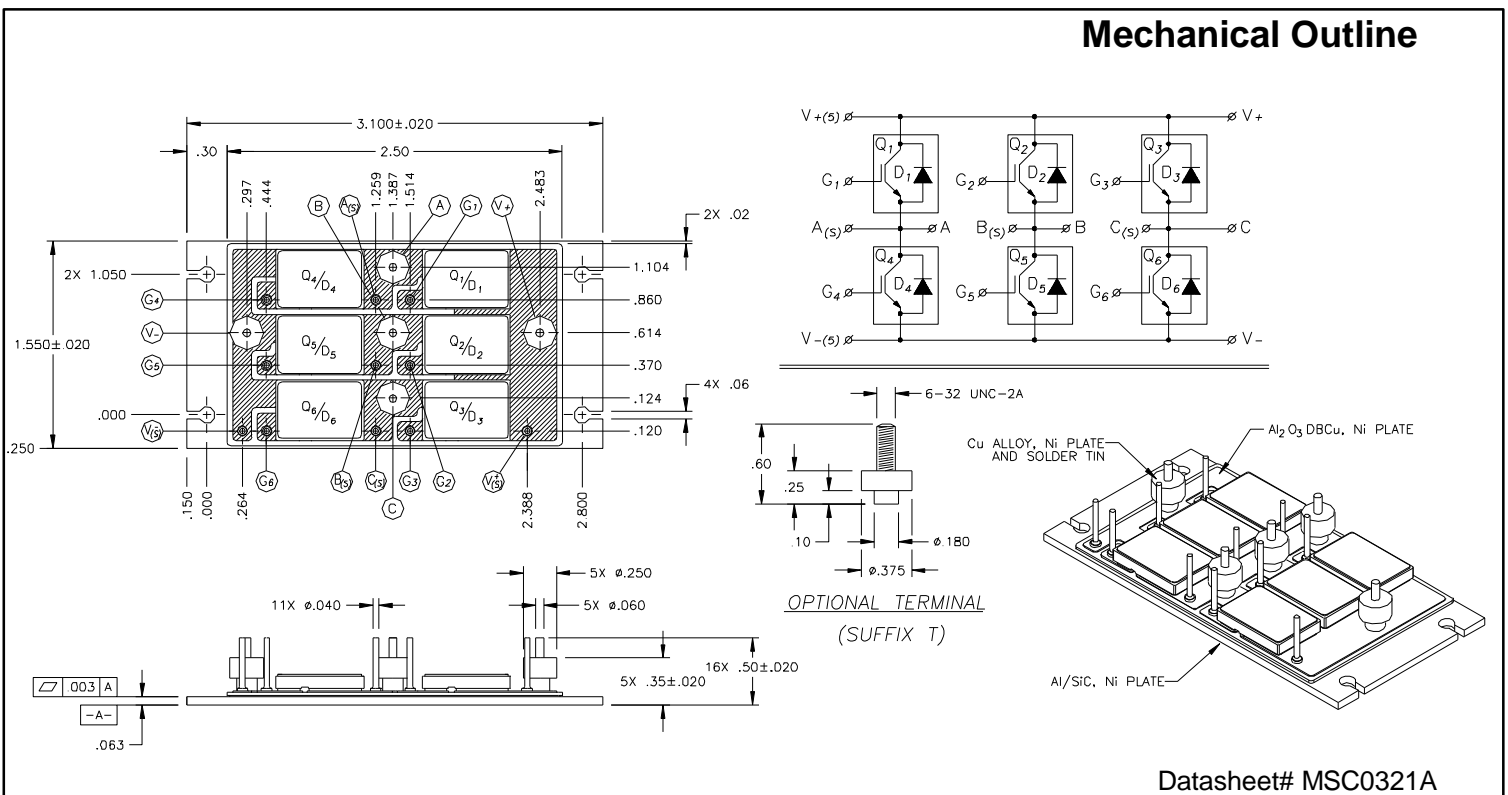
**3 PHASE N-CHANNEL
 INSULATED GATE
 BIPOLAR
 TRANSISTOR (IGBT)
 BRIDGE**

Features

- Available in Low Conduction Loss Class as MM118-xxL or Fast Switching Class as MM118-xxF
- Compact and rugged construction offering weight and space savings
- Available with PC board solderable pins (see mechanical outline below) or threaded terminals (add "T" suffix to part number, see option below)
- HPM (Hermetic Power Module)
- Isolation voltage capability (in reference to the base) in excess of 3kV
- Very low thermal resistance
- Thermally matched construction provides excellent temperature and power cycling capability
- Additional voltage ratings or terminations available upon request

Maximum Ratings per switch @ 25°C (unless otherwise specified)

PART NUMBER	SYMBOL	MM118-06	MM118-12
Collector-to-Emitter Breakdown Voltage (Gate shorted to Emitter), @ $T_j \geq 25^\circ\text{C}$	BV_{CES}	600 V	1200 V
Collector-to-Gate Breakdown Voltage @ $T_j \geq 25^\circ\text{C}$, $R_{GS} = 1 \text{ M}\Omega$	BV_{CGR}	600 V	1200 V
Gate-to-Emitter Voltage	V_{GES} V_{GEM}	+/- 20 V +/- 30 V	+/- 20 V +/- 30 V
Continuous Collector Current 25°C	I_{C25} I_{C90}	60 A 32 A	52 A 33 A
	$T_j =$		
	$T_j = 90^\circ\text{C}$		
Peak Collector Current, pulswidth limited by $T_{j \text{ max}}$	I_{CM}	120 A	104 A
Power Dissipation	P_D	165 W	165 W
Thermal resistance, junction to base	$R_{\theta_{jc}}$, max	0.75°C/W	0.75°C/W
	per switch		



Maximum Ratings @ 25°C (unless otherwise specified) - continued

DESCRIPTION	SYMBOL	MM118-06	MM118-12
Short Circuit Reverse Current (RBSOA) @ $T_j = 125^\circ\text{C}$, $V_{CE} = 0.8 \times V_{CES}$	I_{max}	64 A	66 A
Junction and Storage Temperature Range ($^\circ\text{C}$)	T_j, T_{stg}	-55 to +150	-55 to +150
Continuous Source Current (parallel Diode)	I_S	60 A	50 A
Pulse Source Current (parallel Diode)	I_{SM}	100 A	100 A

Electrical Parameters, per switch @ 25°C (unless otherwise specified)

DESCRIPTION	SYMBOL	CONDITIONS	PART	MIN	TYP.	MAX	UNIT
Collector-to-Emitter Breakdown Voltage (Gate Shorted to Emitter)	BV_{CES}	$V_{GS} = 0\text{ V}$, $I_C = 250\ \mu\text{A}$	MM118-06 MM118-12	600 1200			V
Gate Threshold Voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$, $I_C = 250\ \mu\text{A}$ $V_{CE} = V_{GE}$, $I_C = 2.5\ \text{mA}$ $V_{CE} = V_{GE}$, $I_C = 350\ \mu\text{A}$	MM118-06F MM118-06L MM118-12	2.5 4 4.5	4 5.5	5.0 7 6.5	V
Gate-to-Emitter Leakage Current	I_{GES}	$V_{GE} = \pm 20V_{DC}$, $V_{CE} = 0$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	(ALL)			± 100 ± 200	nA
Collector-to-Emitter Leakage Current (Zero Gate Voltage Collector Current)	I_{CES}	$V_{CE} = 0.8 \cdot BV_{CES}$ $V_{GE} = 0\ \text{V}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	(ALL)			200 1000	μA
Collector-to-Emitter Saturation Voltage (1)	$V_{CE(sat)}$	$V_{GE} = 15\text{V}$, $I_C = 30\text{A}$ $I_C = 60\text{A}$ $I_C = 30\text{A}$ $I_C = 30\text{A}$ $V_{GE} = 15\text{V}$, $I_C = 25\text{A}$ $I_C = 50\text{A}$ $I_C = 25\text{A}$ $T_J = 25^\circ\text{C}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ $T_J = 25^\circ\text{C}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	MM118-06F MM118-06F MM118-06F MM018-06L MM118-12 MM118-12 MM118-12		2.2 3.5 2.2 2.2 2.7 3.4 3.3	2.9 tbd tbd 2.5 3.2 tbd 3.9	V
Forward Transconductance (1)	g_{fs}	$V_{CE} \geq 10\ \text{V}$; $I_C = 30\ \text{A}$ $V_{CE} \geq 10\ \text{V}$; $I_C = 30\ \text{A}$	MM118-06F MM118-06L MM118-12	15 7 8.5	20 13 20		S
Input Capacitance Output Capacitance Reverse Transfer Capacitance	C_{ies} C_{oes} C_{res}	$V_{GE} = 0\ \text{V}$, $V_{CE} = 25\ \text{V}$, $f = 1\ \text{MHz}$	MM118-06F MM118-06L MM118-12 MM118-06F MM118-06L MM118-12 MM118-06F MM118-06L MM118-12		2500 2760 1650 230 240 250 70 51 110	tbd tbd 2200 tbd tbd 380 tbd tbd 160	pF
INDUCTIVE LOAD, $T_j = 25^\circ\text{C}$ (2,3) Turn-on Delay Time	$t_{d(on)}$	$V_{GE} = 15\ \text{V}$, $L = 100\ \mu\text{H}$ note 2, 3 for MM118-06: $V_{CE} = 480\ \text{V}$, $I_C = 30\ \text{A}$, $R_G = 4.7\ \Omega$ for MM118-12: $V_{CE} = 600\ \text{V}$, $I_C = 25\ \text{A}$, $R_G = 47\ \Omega$	MM118-06F MM118-06L MM118-12		25 60 75	tbd tbd 110	ns ns ns
Rise Time	t_{ri}		MM118-06F MM118-06L MM118-12		30 130 65	tbd tbd 100	ns ns ns
On Energy	E_{on}		MM118-12		3.6	-	mJ
Turn-off Delay Time	$t_{d(off)}$		MM118-06F MM118-06L MM118-12		175 400 420	tbd tbd 560	ns ns ns
Fall Time	t_{fi}		MM118-06F MM118-06L MM118-12		125 400 45	175 tbd 60	ns ns ns
Off Energy	E_{off}		MM118-06F MM118-06L MM118-12		1.3 5 2.4	- - -	mJ mJ mJ

INDUCTIVE LOAD, T_j = 125°C (2,3) Turn-on Delay Time Rise Time On Energy Turn-off Delay Time Fall Time Off Energy	t _{d(on)}	V _{GE} = 15 V, L = 100 μH note 2, 3 for MM118-06: V _{CE} = 480 V, I _C = 30 A, R _G = 4.7 Ω for MM118-12: V _{CE} = 600 V, I _C = 25 A, R _G = 47 Ω	MM118-06F	25	tbd	ns
			MM118-06L	60	tbd	ns
			MM118-12	95	tbd	ns
	t _{ri}		MM118-06F	35	tbd	ns
			MM118-06L	130	tbd	ns
			MM118-12	90	tbd	ns
	E _{on}		MM118-06F	1	-	mJ
			MM118-06L	4.2	-	mJ
			MM118-12	10	-	mJ
	t _{d(off)}		MM118-06F	250	tbd	ns
	MM118-06L	540	1000	ns		
	MM118-12	420	tbd	ns		
t _{fi}	MM118-06F	260	tbd	ns		
	MM118-06L	600	1500	ns		
	MM118-12	45	tbd	ns		
E _{off}	MM118-06F	4	-	mJ		
	MM118-06L	12	-	mJ		
	MM118-12	4.2	-	mJ		
Total Gate Charge	Q _g	V _{GE} = 15 V, for MM118-06: V _{CE} = 300V, I _C = 30 A for MM118-12: V _{CE} = 600 V, I _C = 25 A	MM118-06F	125	150	nC
Gate-to-Emitter Charge	Q _{ge}		MM118-06L	110	150	
			MM118-12	160	tbd	
Gate-to-Collector (Miller) Charge	Q _{gc}		MM118-06F	23	35	
			MM118-06L	34	45	
		MM118-12	20	tbd		
		MM118-06F	50	75		
		MM118-06L	47	63		
		MM118-12	75	tbd		
Antiparallel diode forward voltage (1)	V _F	I _E = 15 A T _J = 25 °C I _E = 30 A T _J = 25 °C I _E = 50 A T _J = 25 °C I _E = 15 A T _J = 150 °C I _E = 10 A T _J = 25 °C I _E = 10 A T _J = 100 °C	MM118-06 MM118-06 MM118-06 MM118-06 MM118-12 MM118-12	- 1.7 1.9 - 2.4 2	1.5 - - 1.3 3 -	V
Antiparallel diode reverse recovery time	t _{rr}	I _E = 10 A, dI _E /dt = 100 A/us, T _J = 25°C I _E = 30 A, dI _E /dt = 100 A/us, T _J = 25°C I _E = 10 A, dI _E /dt = 100 A/us, T _J = 25°C I _E = 10 A, dI _E /dt = 100 A/us, T _J = 125°C	MM118-06 MM118-06 MM118-12 MM118-12	- 140 - 60	100 - tbd -	ns
Antiparallel diode reverse recovery charge	Q _{rr}	I _E = 10 A, dI _E /dt = 100 A/us, T _J = 25°C I _E = 30 A, dI _E /dt = 100 A/us, T _J = 25°C I _E = 10 A, dI _E /dt = 100 A/us, T _J = 25°C I _E = 10 A, dI _E /dt = 100 A/us, T _J = 125°C	MM118-06 MM118-06 MM118-12 MM118-12	160 320 tbd 800		nC
Antiparallel diode peak recovery current	I _{RM}	I _E = 10 A, dI _E /dt = 100 A/us, T _J = 25°C I _E = 30 A, dI _E /dt = 100 A/us, T _J = 25°C I _E = 10 A, dI _E /dt = 100 A/us, T _J = 25°C I _E = 10 A, dI _E /dt = 100 A/us, T _J = 125°C	MM118-06 MM118-06 MM118-12 MM118-12	3 4.2 tbd 22		A

Notes

- (1) Pulse test, t ≤ 300 ns, duty cycle ≤ 2%
- (2) switching times and losses may increase for larger V_{CE} and/or R_G values or higher junction temperatures.
- (3) switching losses include "tail" losses
- (4) Microsemi does not manufacture the igbt die; contact Microsemi for details.