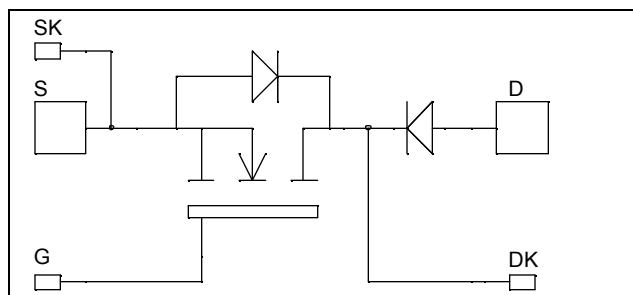


Single switch with Series diodes MOSFET Power Module

$V_{DSS} = 1200V$

$R_{DSon} = 70m\Omega$ typ @ $T_j = 25^\circ C$

$I_D = 171A$ @ $T_c = 25^\circ C$



Application

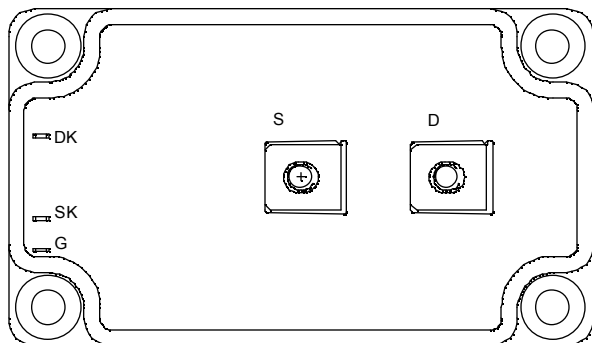
- Zero Current Switching resonant mode

Features

- Power MOS 7[®] MOSFETs
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Avalanche energy rated
 - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
 - Symmetrical design
 - M5 power connectors
- High level of integration
- AlN substrate for improved thermal performance

Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Low profile
- RoHS Compliant



Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Breakdown Voltage	1200	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
I_{DM}	Pulsed Drain current	684	
V_{GS}	Gate - Source Voltage	± 30	V
R_{DSon}	Drain - Source ON Resistance	80	$m\Omega$
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	5000
I_{AR}	Avalanche current (repetitive and non repetitive)	24	A
E_{AR}	Repetitive Avalanche Energy	50	mJ
E_{AS}	Single Pulse Avalanche Energy	3200	



CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

All ratings @ $T_j = 25^\circ\text{C}$ unless otherwise specified

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 1200V$			1.5	mA
		$V_{GS} = 0V, V_{DS} = 1000V$			6	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 85.5A$		70	80	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 30mA$	3		5	V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 600	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		43.5		nF
C_{oss}	Output Capacitance	$V_{DS} = 25V$		6.6		
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		1.2		
Q_g	Total gate Charge	$V_{GS} = 10V$		1650		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 600V$		192		
Q_{gd}	Gate – Drain Charge	$I_D = 171A$		1074		
$T_{d(on)}$	Turn-on Delay Time	Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 800V$ $I_D = 171A$ $R_G = 0.8\Omega$		20		ns
T_r	Rise Time			17		
$T_{d(off)}$	Turn-off Delay Time			245		
T_f	Fall Time			62		
E_{on}	Turn-on Switching Energy	Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 800V$ $I_D = 171A, R_G = 0.8\Omega$		7.6		mJ
E_{off}	Turn-off Switching Energy			6.9		
E_{on}	Turn-on Switching Energy	Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 800V$ $I_D = 171A, R_G = 0.8\Omega$		13.8		mJ
E_{off}	Turn-off Switching Energy			8.5		

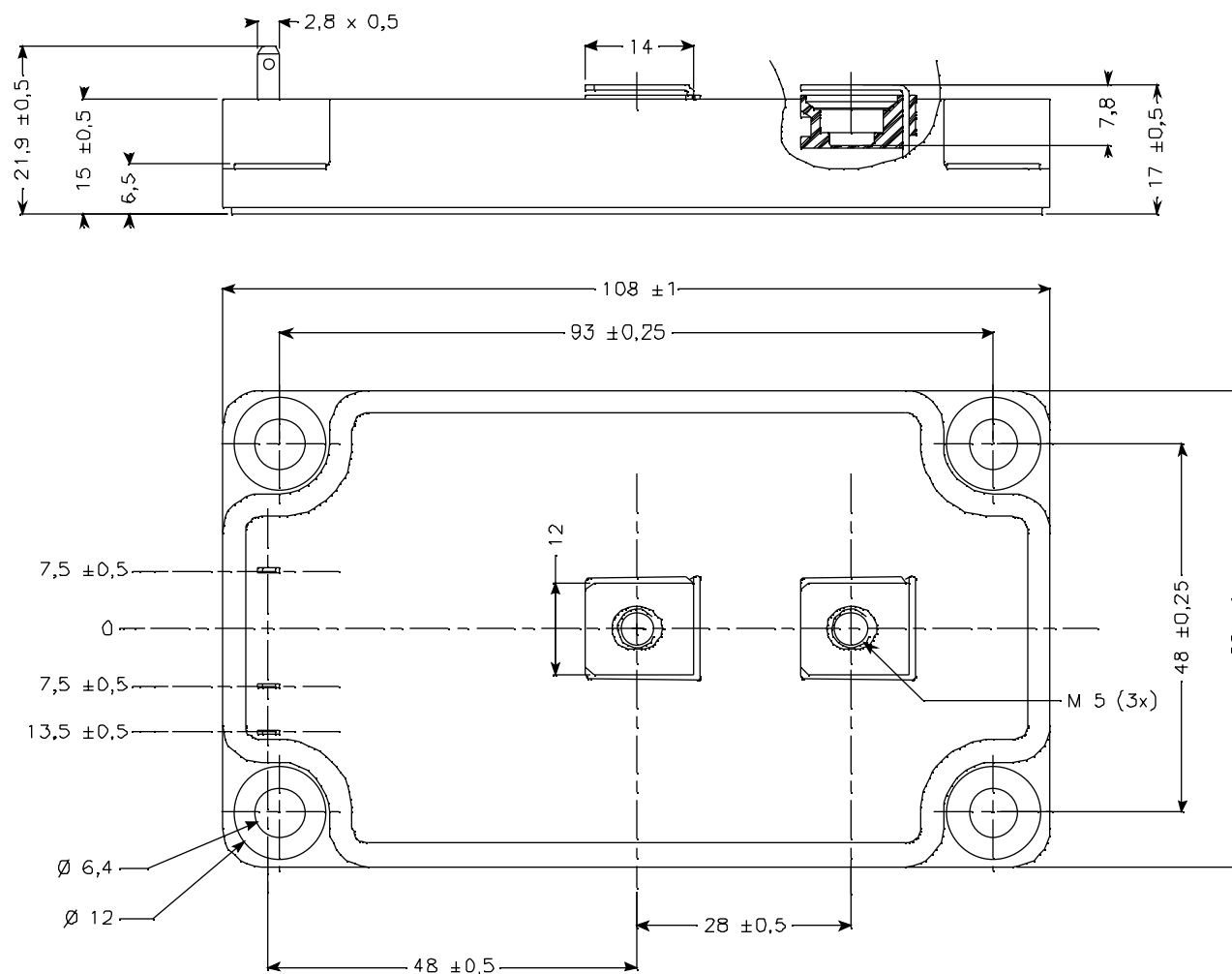
Series diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Repetitive Reverse Voltage		1200			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1200V$	$T_j = 25^\circ\text{C}$		750	μA
			$T_j = 125^\circ\text{C}$		1000	
I_F	DC Forward Current	$T_c = 70^\circ\text{C}$		240		A
V_F	Diode Forward Voltage	$I_F = 240A$		2	2.5	V
		$I_F = 480A$		2.3		
		$I_F = 240A$	$T_j = 125^\circ\text{C}$	1.8		
t_{rr}	Reverse Recovery Time	$I_F = 240A$ $V_R = 800V$ $di/dt = 800A/\mu\text{s}$	$T_j = 25^\circ\text{C}$	400		ns
			$T_j = 125^\circ\text{C}$	470		
Q_{rr}	Reverse Recovery Charge	$I_F = 240A$ $V_R = 800V$ $di/dt = 800A/\mu\text{s}$	$T_j = 25^\circ\text{C}$	4.8		μC
			$T_j = 125^\circ\text{C}$	16		

Thermal and package characteristics

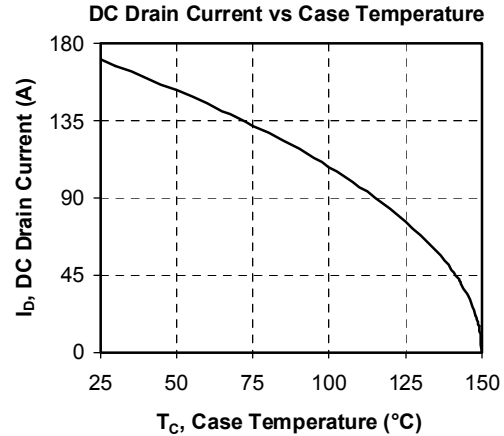
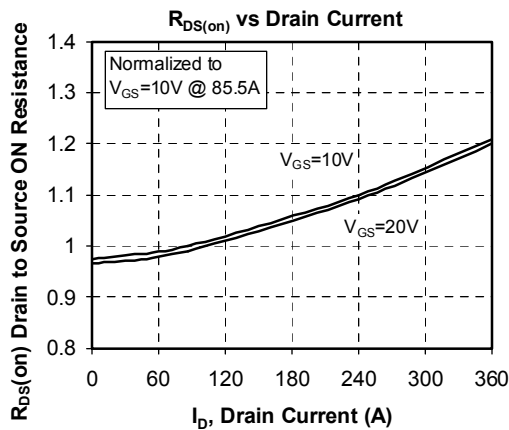
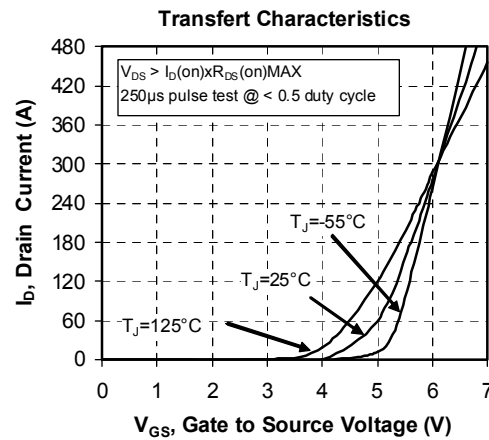
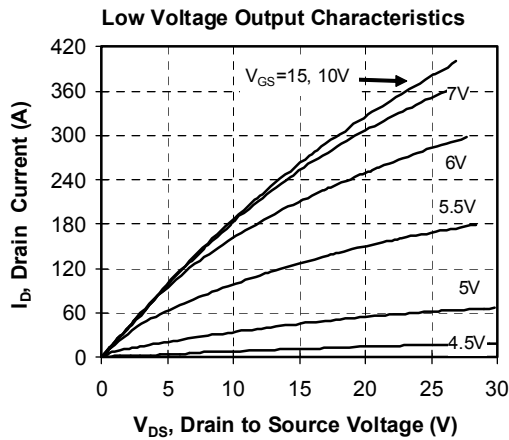
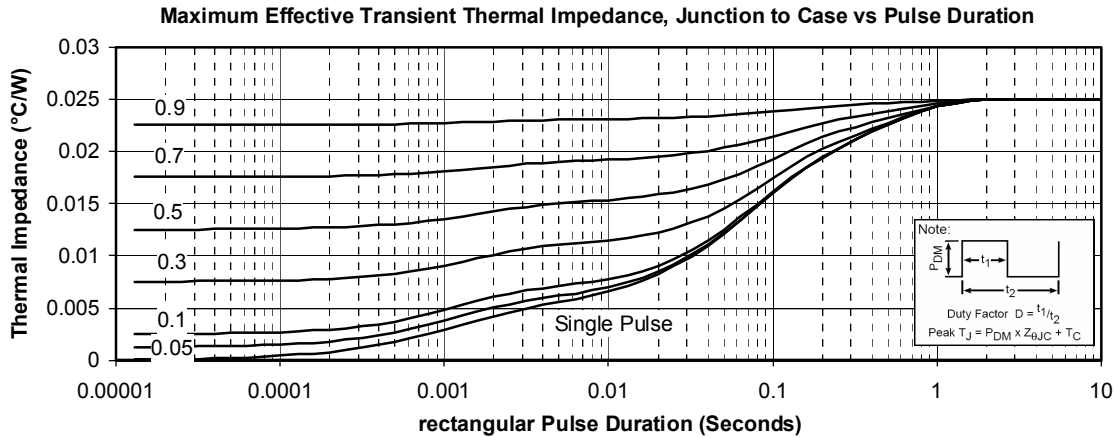
Symbol	Characteristic			Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance		Transistor			0.025	°C/W
			Series diode			0.23	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t =1 min, I isol<1mA, 50/60Hz			2500			V
T _J	Operating junction temperature range			-40		150	°C
T _{STG}	Storage Temperature Range			-40		125	
T _C	Operating Case Temperature			-40		100	
Torque	Mounting torque	To heatsink	M6	3		5	N.m
		For terminals	M5	2		3.5	
Wt	Package Weight					280	g

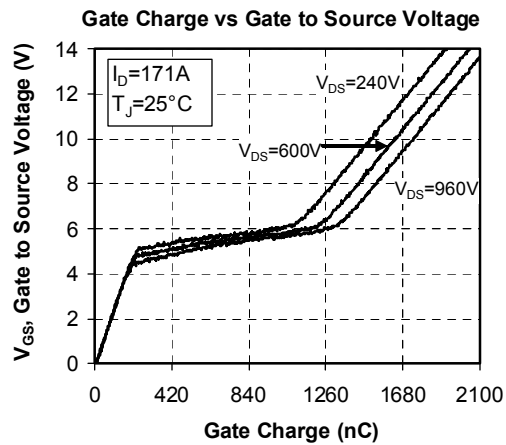
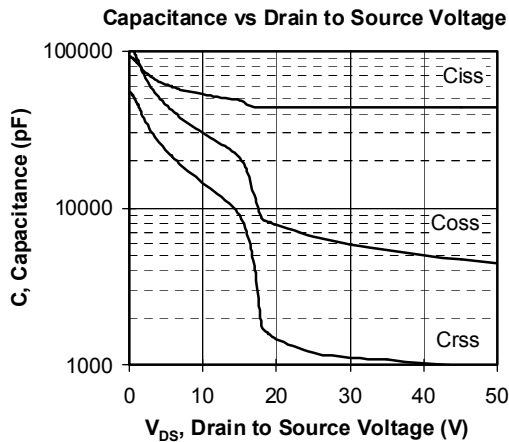
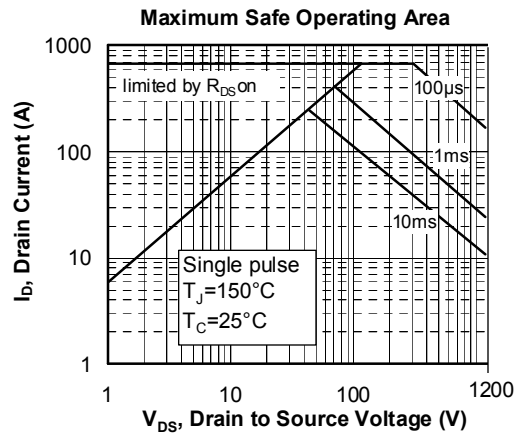
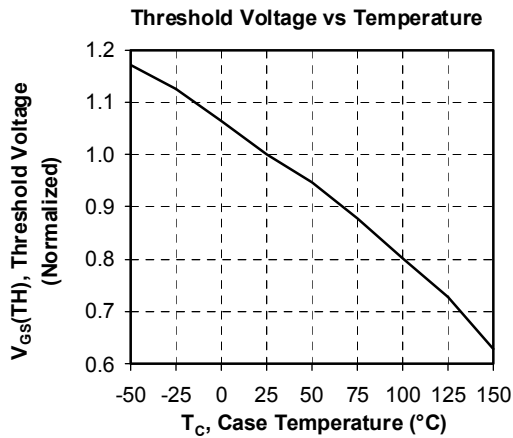
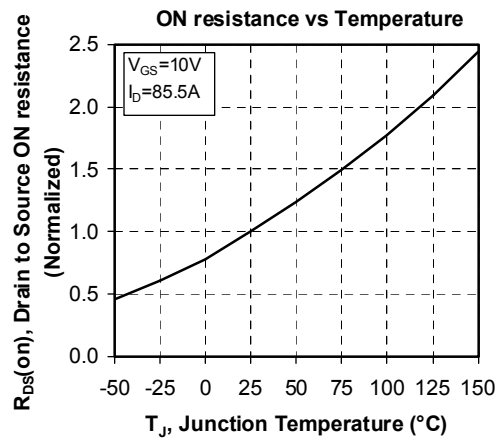
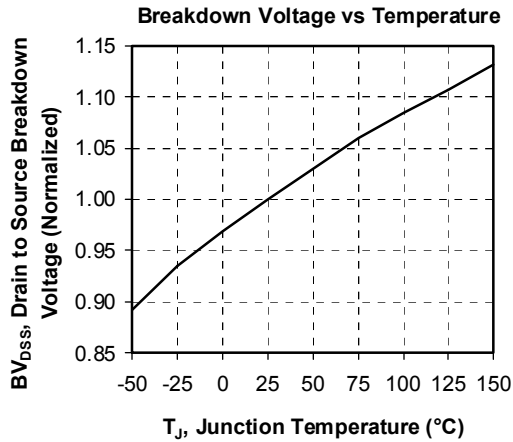
SP6 Package outline (dimensions in mm)

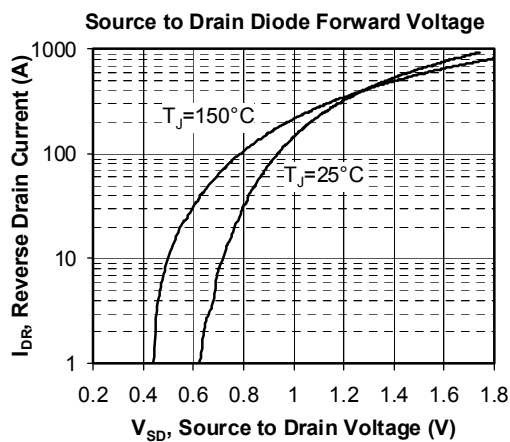
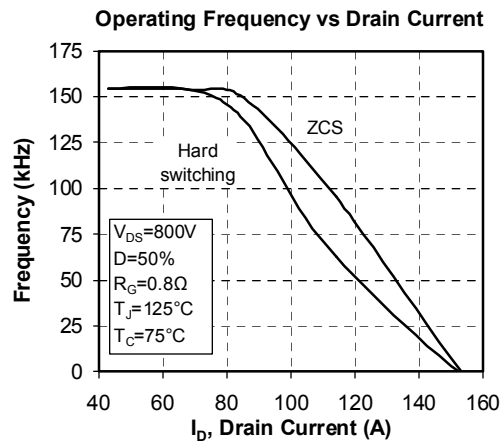
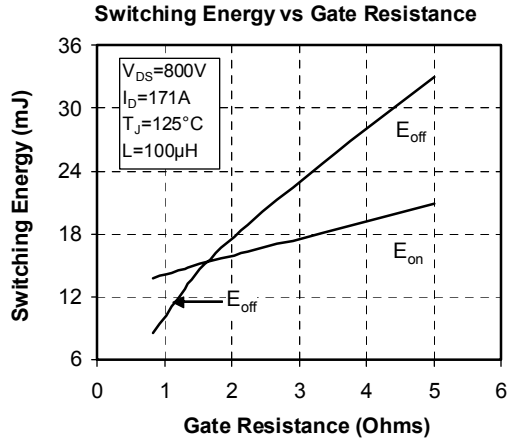
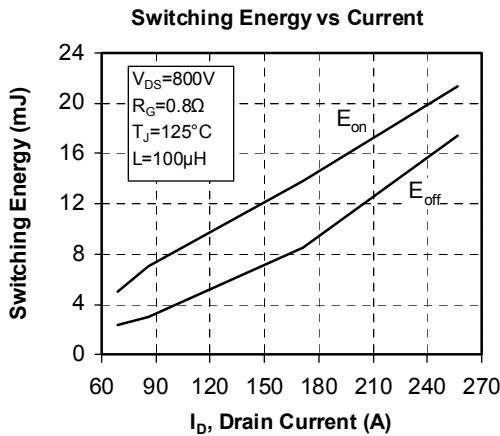
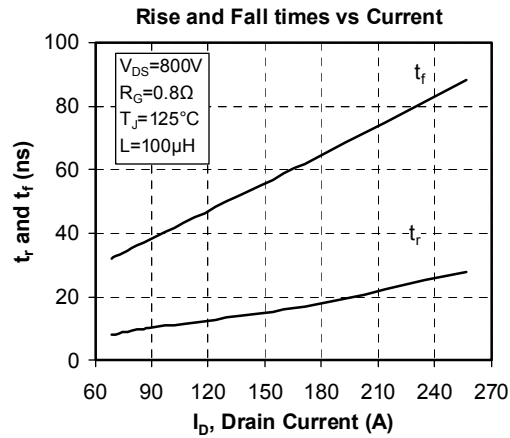
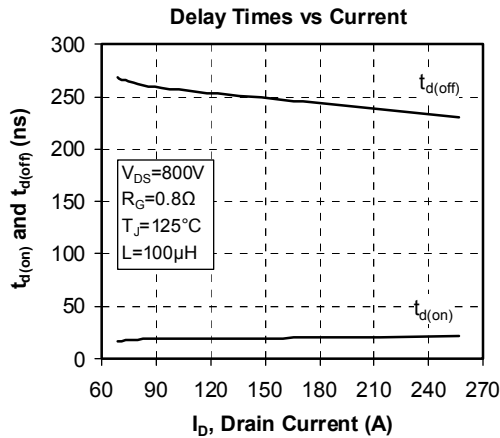


See application note APT0601 - Mounting Instructions for SP6 Power Modules on www.microsemi.com

Typical Performance Curve







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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9