

DMP31D0U
30V P-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

$V_{(BR)DSS}$	Max $R_{DS(on)}$	Max I_D @ $T_A = 25^\circ\text{C}$
-30V	1Ω @ $V_{GS} = -4.5\text{V}$	-0.67A
	1.5Ω @ $V_{GS} = -2.5\text{V}$	-0.54A
	2Ω @ $V_{GS} = -1.8\text{V}$	-0.47A

Description and Applications

This MOSFET has been designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Load Switch in portable electronics

Features and Benefits

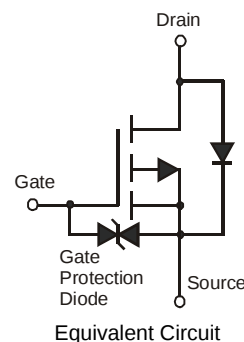
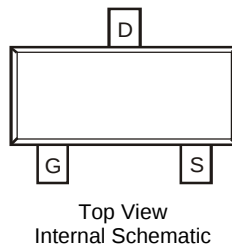
- Low Gate Threshold Voltage
- Fast Switching Speed
- "Lead Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free. "Green" Device (Note 2)
- ESD Protected Gate 2KV
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin
- Weight: 0.08 grams (approximate)

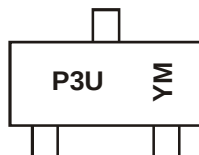


SOT23


Ordering Information (Note 3)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DMP31D0U-7	P3U	7	8	3,000

- Notes:
- EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. No purposely added lead. Halogen and Antimony free.
 - Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>.
 - For packaging details, go to our website at <http://www.diodes.com>.

Marking Information


P3U = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: Y = 2011)
 M = Month (ex: 9 = September)

Date Code Key

Year	2011	2012	2013	2014	2015	2016	2017
Code	Y	Z	A	B	C	D	E

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-30	V
Gate-Source Voltage			V _{GSS}	±8	V
Continuous Drain Current	Steady State	T _A = 25°C (Note 5)	I _D	-0.67	A
		T _A = 85°C (Note 5)		-0.48	
		T _A = 25°C (Note 4)		-0.53	
Pulsed Drain Current (Note 6)			I _{DM}	2.5	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 4)	P _D	0.45	W
	(Note 5)		0.71	W
Thermal Resistance, Junction to Ambient	(Note 4)	R _{θJA}	275	°C/W
	(Note 5)		177	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout
 - Device mounted on 25mm X 25mm square copper plate with FR-4 substrate PC board, 2oz copper
 - Device mounted on minimum recommended pad layout test board, 10μs pulse duty cycle = 1%.

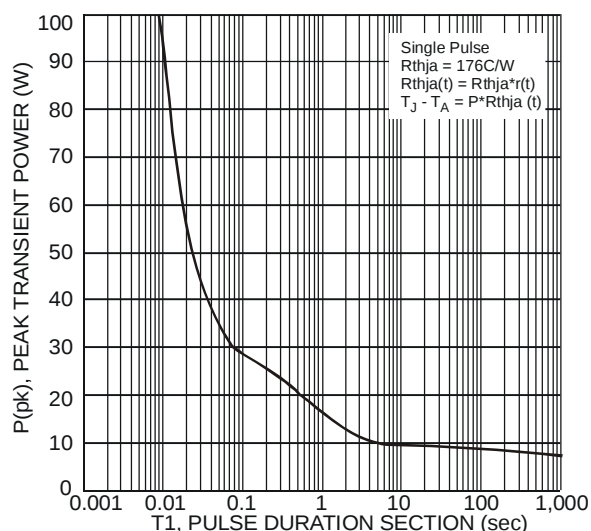


Fig. 1 Single Maximum Power Dissipation

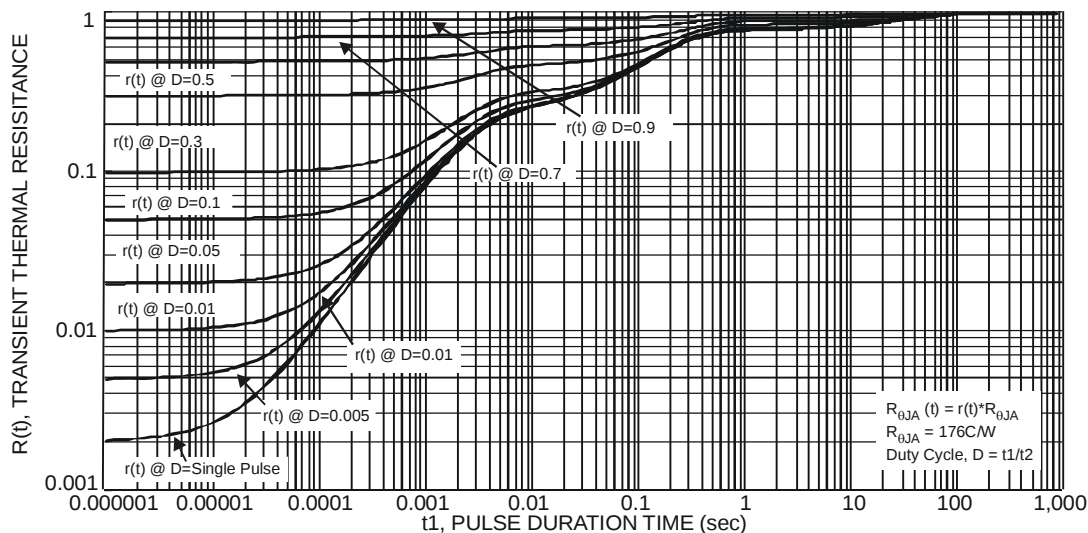


Fig. 2 Transient Thermal Resistance

Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	-30	-	-	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current T _J = 25°C	I _{DSS}	-	-	-1	μA	V _{DS} = -30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	-	-	±3	μA	V _{GS} = ±8V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(th)}	-0.5	-	-1.1	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(on)}	-	-	1	Ω	V _{GS} = -4.5V, I _D = -400mA
				1.5		V _{GS} = -2.5V, I _D = -200mA
				2		V _{GS} = -1.8V, I _D = -100mA
Forward Transfer Admittance	Y _{fs}	50	-	-	mS	V _{DS} = -3V, I _D = -300mA
Diode Forward Voltage	V _{SD}	-	-	-1.2	V	V _{GS} = 0V, I _S = -300mA
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{iss}	-	76	-	pF	V _{DS} = -15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	-	9	-	pF	
Reverse Transfer Capacitance	C _{rss}	-	6.43	-	pF	
Gate Resistance	R _g	-	166.9	-	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _g	-	0.9	-	nC	V _{GS} = -4.5V, V _{DS} = -15V, I _D = -1A
Total Gate Charge	Q _g	-	1.5	-	nC	V _{GS} = -8V, V _{DS} = -15V, I _D = -1A
Gate-Source Charge	Q _{gs}	-	0.1	-	nC	
Gate-Drain Charge	Q _{gd}	-	0.2	-	nC	
Turn-On Delay Time	t _{D(on)}	-	4.98	-	ns	V _{DD} = -10V, R _L = 10Ω V _{GS} = -4.5V, R _G = 6Ω
Turn-On Rise Time	t _r	-	5.85	-	ns	
Turn-Off Delay Time	t _{D(off)}	-	35.71	-	ns	
Turn-Off Fall Time	t _f	-	16.64	-	ns	

Notes: 7. Short duration pulse test used to minimize self-heating effect.

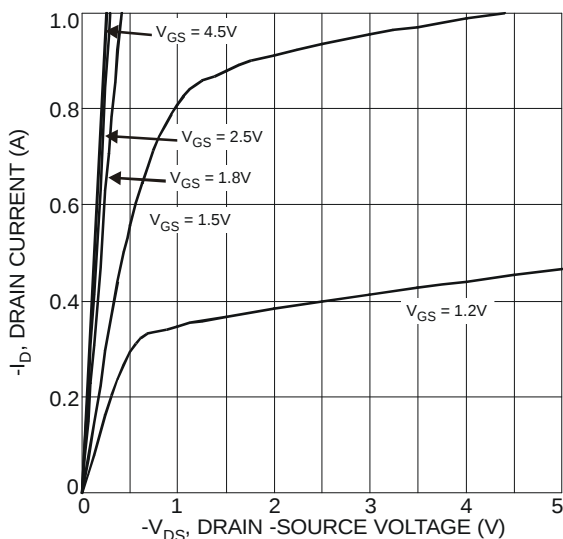
Typical Electrical Characteristics


Fig. 3 Typical Output Characteristics

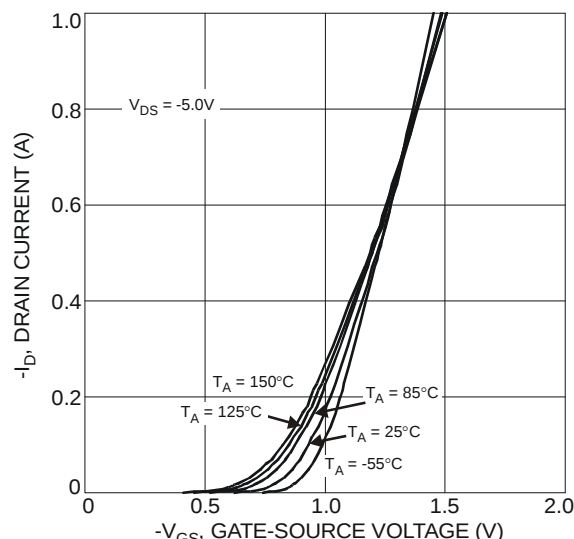


Fig. 4 Typical Transfer Characteristics

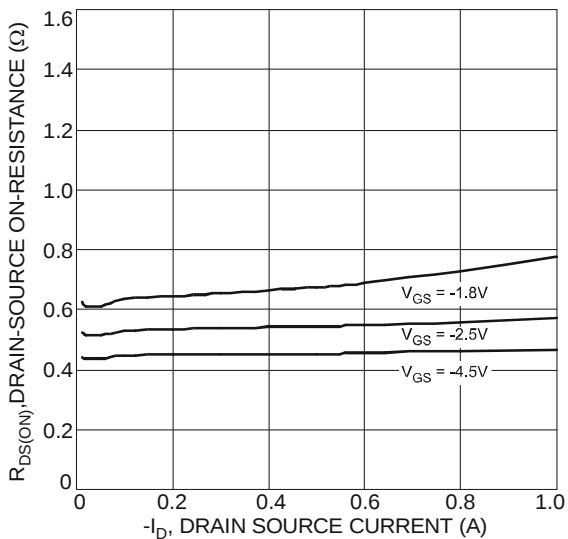


Fig. 5 Typical On-Resistance vs. Drain Current and Gate Voltage

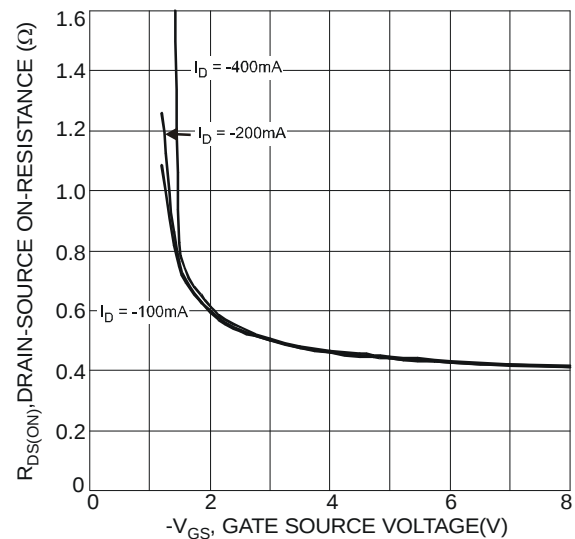


Fig. 6 Typical On-Resistance vs. Drain Current and Gate Voltage

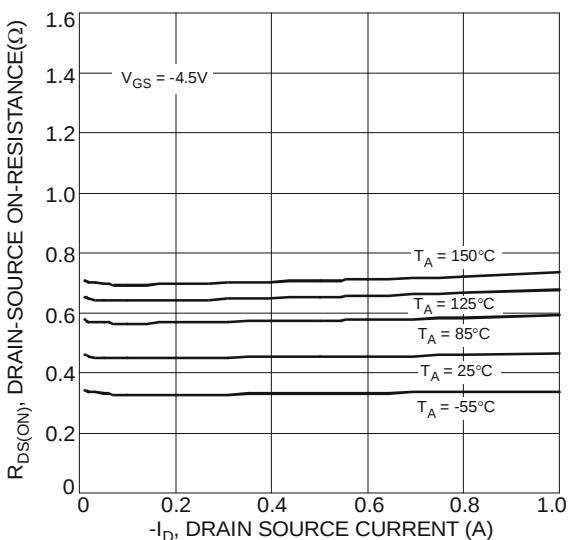


Fig. 7 Typical On-Resistance vs. Drain Current and Temperature

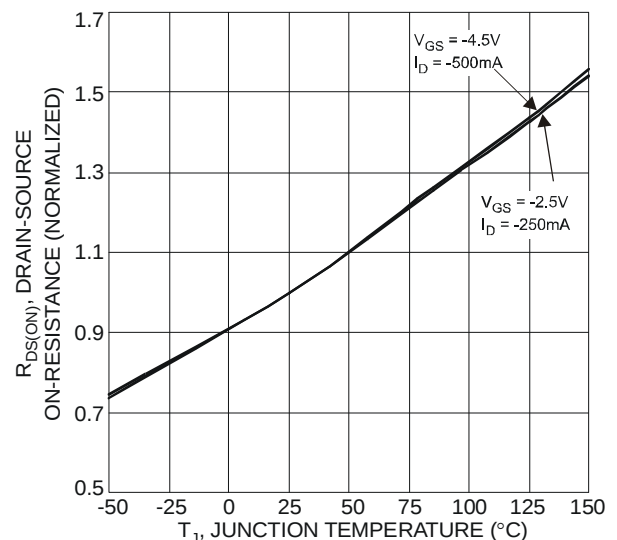


Fig. 8 On-Resistance Variation with Temperature

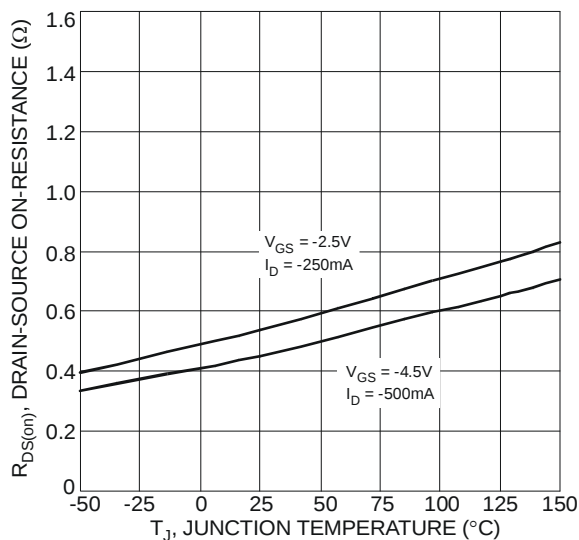


Fig. 9 On-Resistance Variation with Temperature

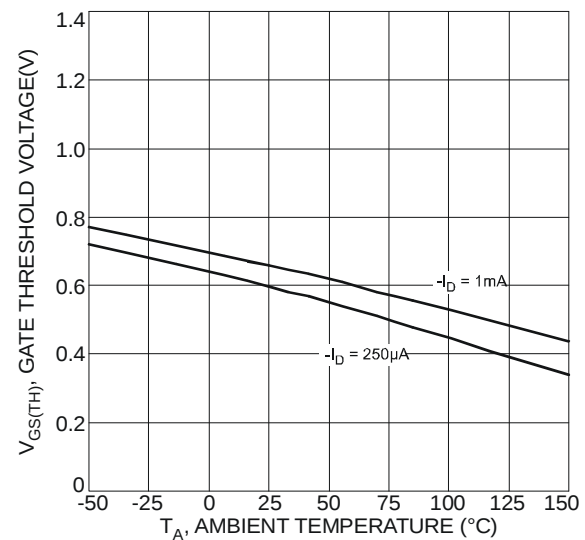


Fig. 10 Gate Threshold Variation vs. Ambient Temperature

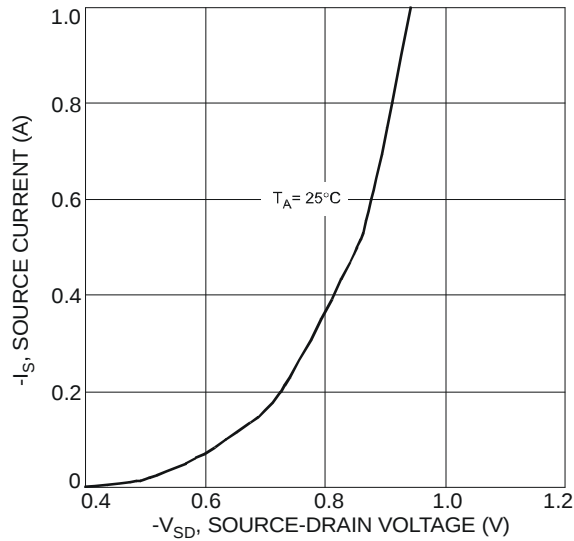


Fig. 11 Diode Forward Voltage vs. Current

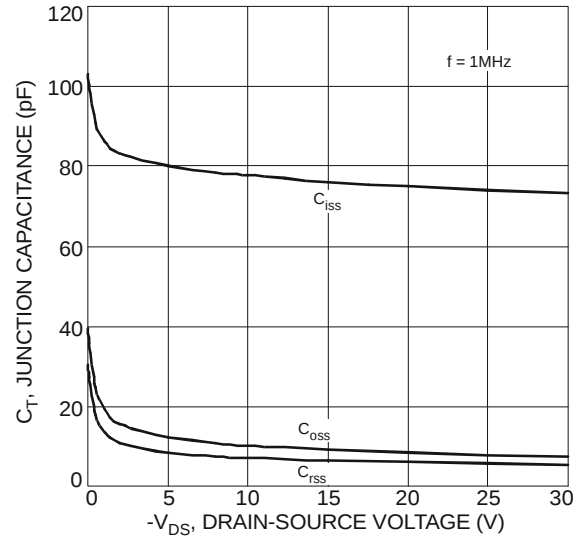


Fig. 12 Typical Junction Capacitance

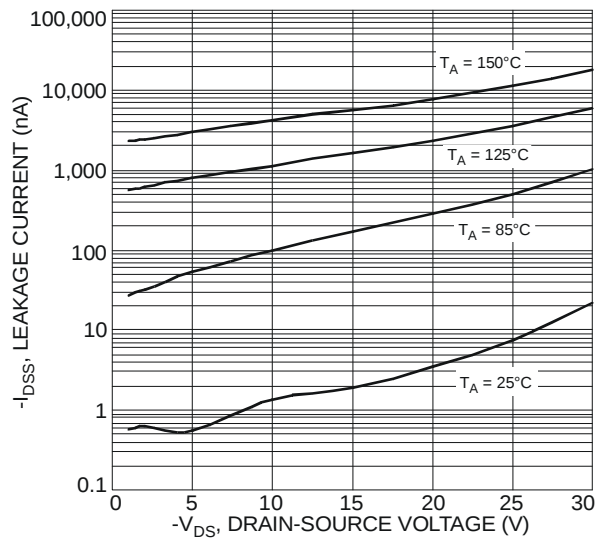


Fig. 13 Typical Drain-Source Leakage Current vs. Voltage

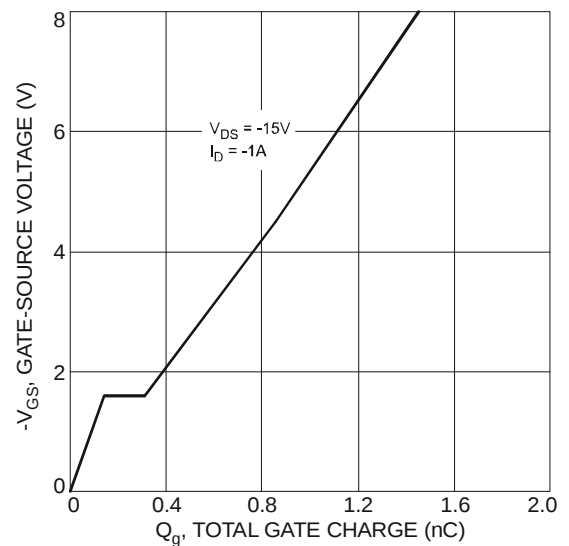
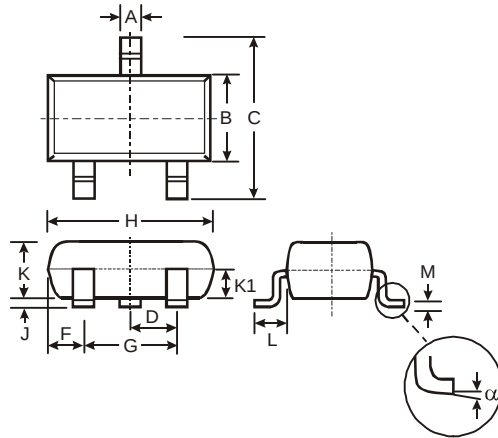


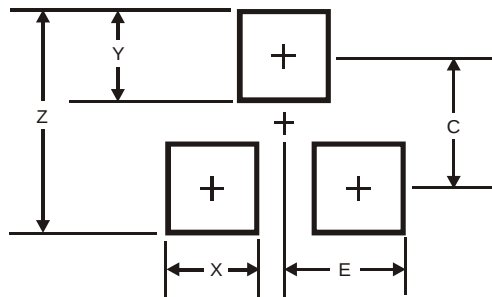
Fig. 14 Gate-Charge Characteristics

Package Outline Dimensions



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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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