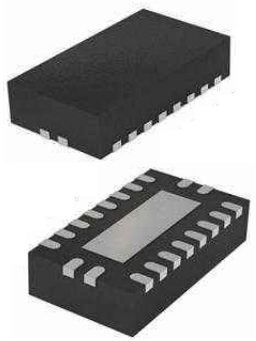
CMOS Low Voltage, 4Ω Eight-Channel Switch

PRODUCT DESCRIPTION

The MS714 is a CMOS optional eight-channel switch with several features, such as low power dissipation, high switch speed, low on-resistance, low leakage current and wide bandwidth. The operating voltage ranges from 1.8V to 5.5V. The MS714 can be widely used in battery-powered devices, new generation DAC and ADC systems. The wide bandwidth feature makes it ideal for USB1.1 signal and video signal processing systems. When the switch is turned on, on-resistance is matched well.

The MS714 has lead TSSOP20 and QFN20 packages.

TSSOP20



QFN20

FEATURES

- Operating Voltage : 1.8V to 5.5V
- Low On-resistance : 2.5Ω Typ
- Low On-resistance Flatness
- -3dB Bandwidth : 200MHz
- Low Power Dissipation
- Fast On and Off Time
- Package : TSSOP20, QFN20

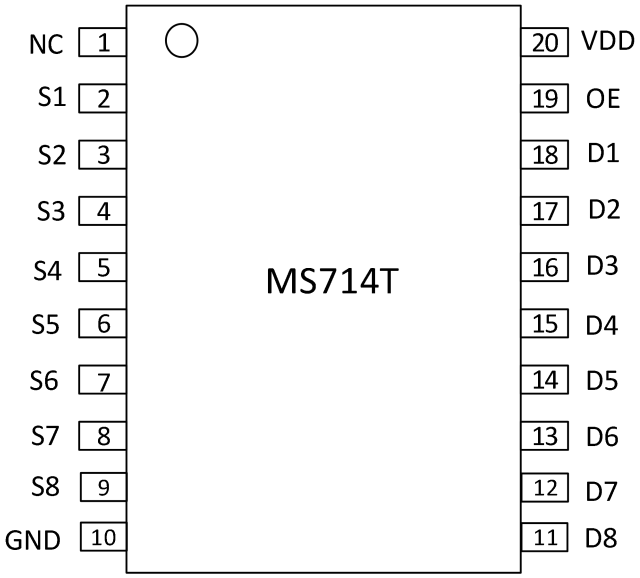
APPLICATIONS

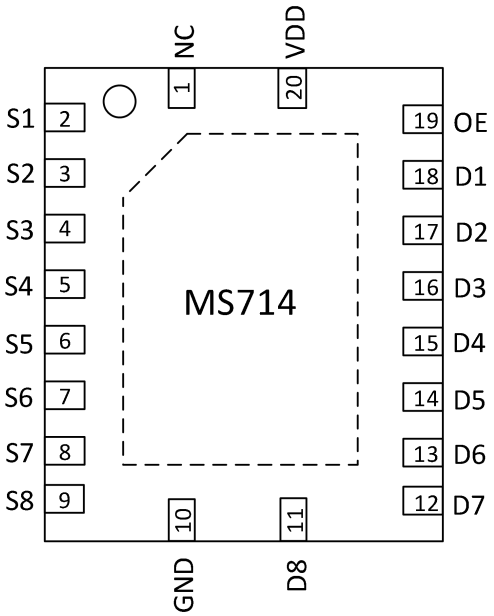
- USB1.1 Signal Switching System
- Earphone
- PDAs
- Battery-powered System
- Sample Hold Circuit
- Audio System
- Video Switching System

PRODUCT SPECIFICATION

Part Number	Package	Marking
MS714T	TSSOP20	MS714T
MS714	QFN20	MS714

PIN CONFIGURATION





PIN DESCRIPTION

Pin	Name	Type	Description
1	NC	-	Not Connection
2, 18	S1, D1	IO	Source, Drain Pin for Channel 1
3, 17	S2, D2	IO	Source, Drain Pin for Channel 2
4, 16	S3, D3	IO	Source, Drain Pin for Channel 3
5, 15	S4, D4	IO	Source, Drain Pin for Channel 4
6, 14	S5, D5	IO	Source, Drain Pin for Channel 5
7, 13	S6, D6	IO	Source, Drain Pin for Channel 6
8, 12	S7, D7	IO	Source, Drain Pin for Channel 7
9, 11	S8, D8	IO	Source, Drain Pin for Channel 8
10	GND	-	Ground
19	OE	I	Logic Control Input
20	VDD	-	Power Supply

Logic Control

Logic Control Input	MS714
High-level	Switch Off
Low-level	Switch On

ABSOLUTE MAXIMUM RATINGS

Any exceeding absolute maximum rating application causes permanent damage to device. Because long-time absolute operation state affects device reliability. Absolute ratings just conclude from a series of extreme tests. It doesn't represent chip can operate normally in these extreme conditions.

Parameter	Symbol	Ratings	Unit
Power Supply	VDD	-0.3 ~ +6	V
Continuous Current on Source, Drain Pin	I	30	mA
Analog Digital Input Voltage	VIN	-0.3 ~ VDD+0.3	V
Operating Temperature	TA	-40 ~ +85	°C
Storage Temperature	Tstg	-65 ~ +150	°C
Maximum Junction Temperature	Jt	150	°C
Lead Temperature (10s)		260	°C
ESD (HBM)		3000	V

ELECTRICAL CHARACTERISTICS

VDD=5V±10%, GND=0V

Parameter	Symbol	Condition	TA (°C)	Min	Typ	Max	Unit
Analog Switch							
Analog Signal Range	VIS		-40~85	0		VDD	V
On-resistance	RON	VDD=5.0V, VIS=0~VDD,ID=10mA	+25		2.5	4	Ω
			-40~85			4.5	
On-resistance Match for Channel-to-Channel	ΔRON	VDD=5.0V, VIS=0~VDD,ID=10mA	+25				Ω
			-40~85		0.05	0.3	
On-resistance Flatness	RFLAT(ON)	VDD=5.0V, VIS=0~VDD,ID=10mA	+25		0.5		Ω
			-40~85			1.0	
Leakage Current							
Leakage Current on Source Pin (Off)	IS(off)	VDD=+5.5V, VD=1V/4.5V, VS=4.5V/1V	+25		±0.01	±0.1	uA
			-40~85			±0.2	
Leakage Current on Drain Pin (Off)	ID(off)	VDD=+5.5V, VD=1V/4.5V, VS=4.5V/1V	+25		±0.01	±0.1	uA
			-40~85			±0.2	
Leakage Current (On)	ID(ON) IS(ON)	VD=VS=1V/4.5V	+25		±0.01	±0.1	uA
			-40~85			±0.2	
Digital Input							
Input High-level	VIH		-40~85	3.0			V
Input Low-level	VIL		-40~85			0.8	V
Input Leakage Current	IIN	VIN＝VIL or VIH	+25		0.005		uA
			-40~85			±0.1	
Dynamic Performance							
On Time	tON	RL = 300Ω, CL =50pF	+25		30		ns
			-40~85			40	
Off Time	tOFF	RL =300Ω, CL = 50pF	+25		6		ns
			-40~85			10	
Off before On Delay Time	tD	RL=300Ω,CL=50pF, Vs1=Vs2=3V	+25		6		ns
			-40~85	1			
Charge Injection		Vs=2V,Rs=0Ω,CL=1nF	+25	3			pC

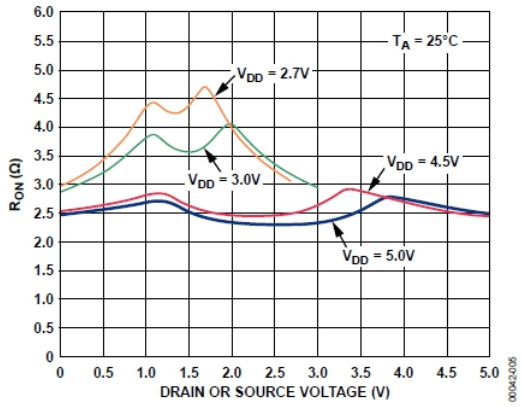
Parameter	Symbol	Condition	TA (°C)	Min	Typ	Max	Unit
Off Isolation	OISO	RL =50Ω, CL = 5pF, f=10MHz	+25		-58		dB
		RL =50Ω, CL= 5pF, f=1MHz	+25		-78		
Channel-to-Channel Crosstalk	XTALK	RL =50Ω, CL= 5pF, f=10MHz	+25		-90		dB
-3dB Bandwidth	BW	RL =50Ω, CL= 5pF	+25		200		MHz
Capacitance on Source Pin	CS		+25		10		pF
Capacitance on Drain Pin	CD		+25		10		pF
Capacitance on Source, Drain Pin	CS,CD(on)		+25		22		pF
Power Dissipation							
Current	IDD	VDD = 5.5V, Digital Input 0V or 5V	+25		0.001		uA
			-40~85			1	

VDD=3V±10%, GND=0V

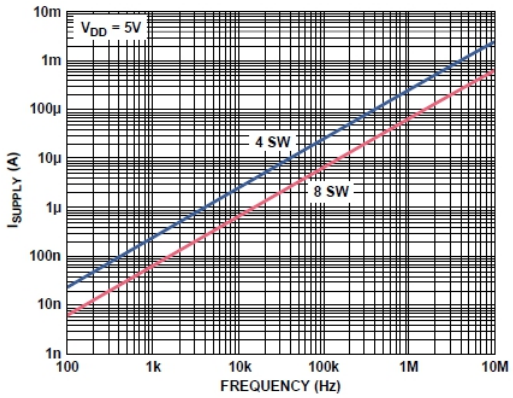
Parameter	Symbol	Condition	TA (°C)	Min	Typ	Max	Unit
Analog Switch							
Analog Signal Range	VIS		-40~85	0		VDD	V
On-resistance	RON	VDD=3.0V, VIS=0~VDD, ID=10mA	+25		5		Ω
			-40~85		5.5	8	
On-resistance Match for Channel-to-Channel	ΔRON	VDD=3.0V, VIS=0~VDD, ID=10mA	+25		0.1		Ω
			-40~85			0.3	
On-resistance Flatness	RFLAT(ON)	VDD=3.0V, VIS=0~VDD,ID=10mA	+25		2.5		Ω
			-40~85				
Leakage Current							
Leakage Current on Source Pin (Off)	IS(off)	VD=1V/3V, VS=3V/1V	+25		±0.01	±0.1	uA
			-40~85			±0.2	
Leakage Current on Drain Pin (Off)	ID(off)	VD=1V/3V, VS=3V/1V	+25		±0.01	±0.1	uA
			-40~85			±0.2	
Leakage Current (On)	ID(ON) IS(ON)	VD=VS＝1V/3V	+25		±0.01	±0.1	uA
			-40~85			±0.2	
Digital Input							
Input High-level	VIH		-40~85	2.0			V
Input Low-level	VIL		-40~85			0.4	V
Input Leakage Current	IIN	VIN＝VIL or VIH	+25		0.005		uA
			-40~85			±0.1	
Dynamic Performance							
On Time	tON	RL = 300Ω, CL = 50pF	+25		30		ns
			-40~85			40	
Off Time	tOFF	RL =300Ω, CL = 50pF	+25		7		ns
			-40~85			12	
Off before On Delay Time	tD	RL=300Ω, CL =50pF, Vs1=Vs2=3V	+25		7		ns
			-40~85	1			
Charge Injection		Vs=2V,Rs=0Ω,CL=1nF	+25	3			pC
Off Isolation	OISO	RL =50Ω, CL = 5pF, f=10MHz	+25		-58		dB
		RL =50Ω, CL= 5pF, f=1MHz	+25		-78		

Parameter	Symbol	Condition	TA (°C)	Min	Typ	Max	Unit
Channel-to-Channel Crosstalk	XTALK	RL =50Ω, CL= 5pF, f=10MHz	+25		-90		dB
-3dB Bandwidth	BW	RL =50Ω, CL= 5pF	+25		200		MHz
Capacitance on Source Pin	CS		+25		10		pF
Capacitance on Drain Pin	CD		+25		10		pF
Capacitance on Source, Drain Pin	CS,CD(on)		+25		22		pF
Power Dissipation							
Current	IDD	VDD = 5.5V, Digital Input 0V or 5V	+25		0.001		uA
			-40~85			1	

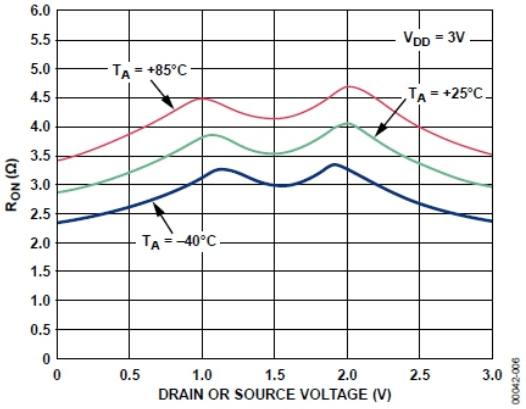
TYPICAL CURVES



On-resistance VS. Source or Drain Voltage

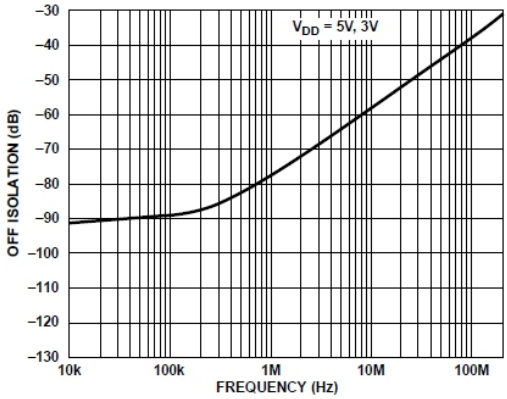


Power Supply Current VS. Switching Frequency

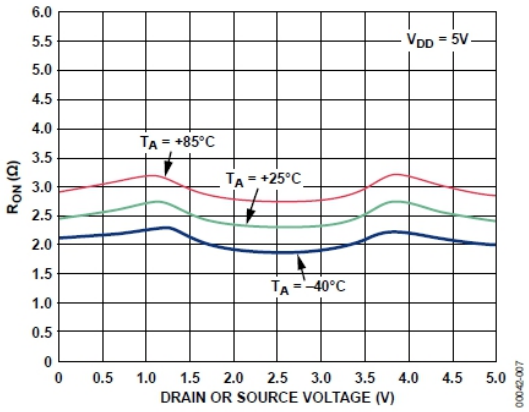


On-resistance VS. Source or Drain Voltage (Different Temperatures)

VDD=3V

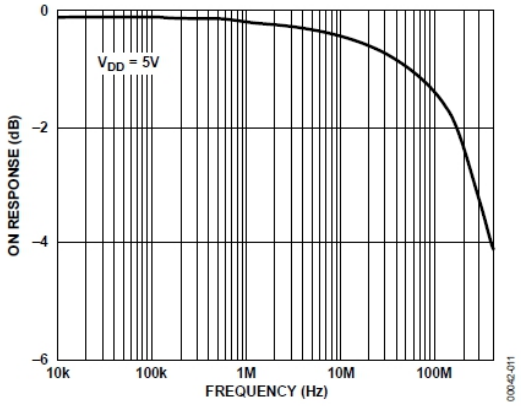


Off Isolation VS. Frequency

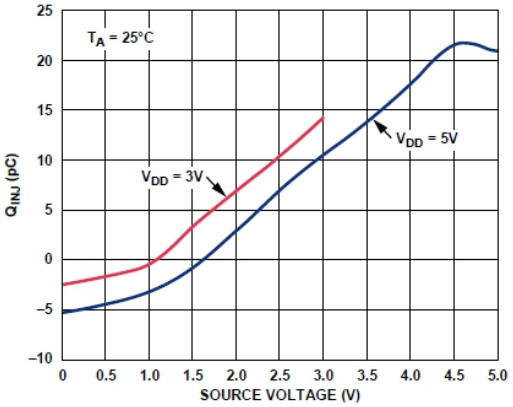


On-resistance VS. Source or Drain Voltage (Different Temperatures)

VDD=5V

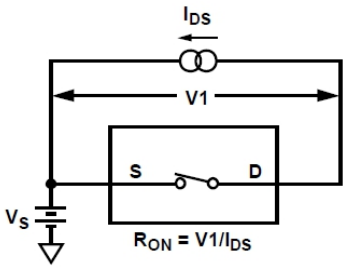


On Response VS. Frequency

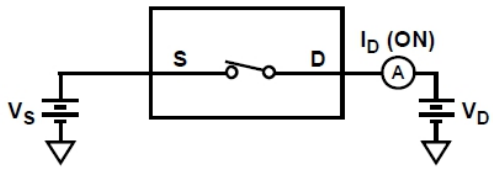


Charge Injection VS. Source Voltage

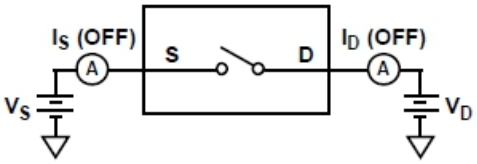
TEST CIRCUITS



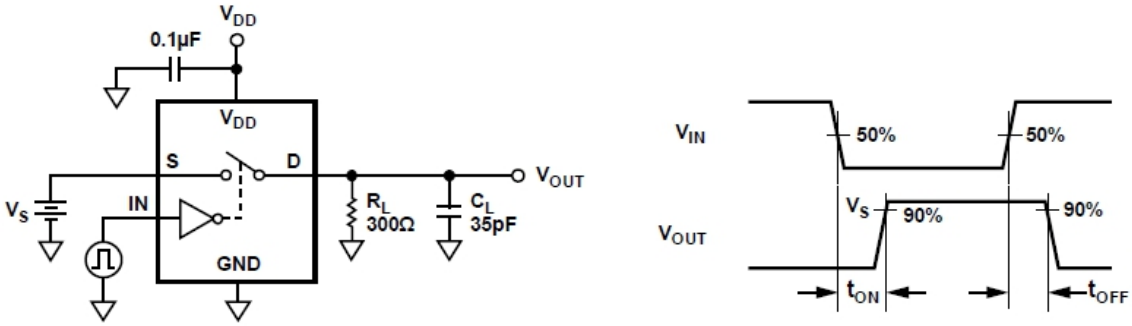
On-resistance Test Circuit



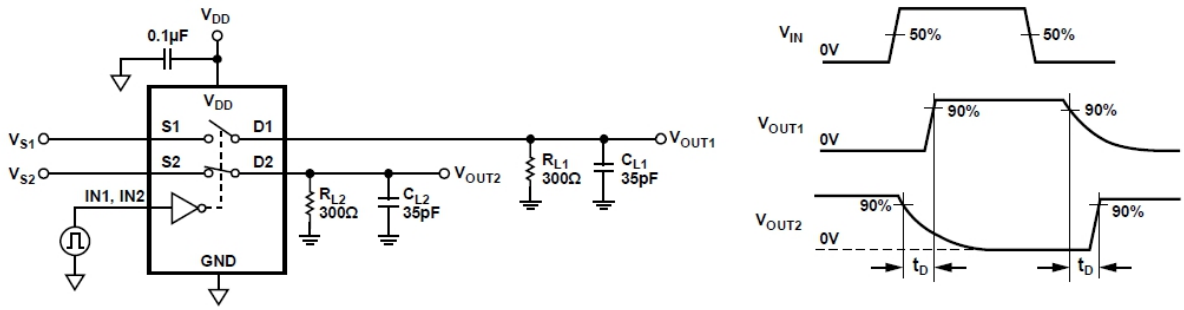
Leakage Current (On) Test Circuit



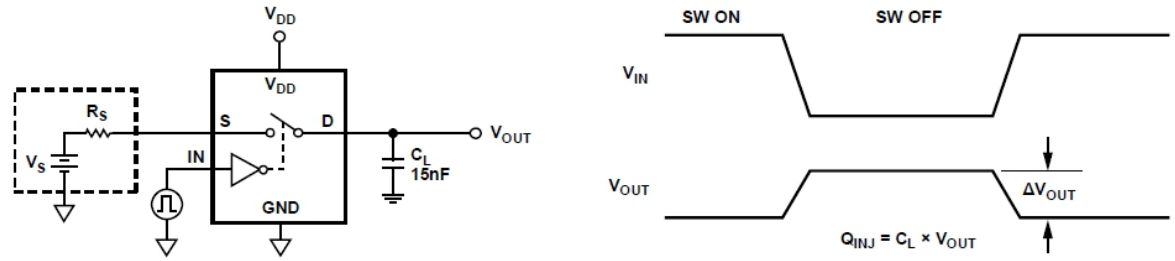
Leakage Current (Off) Test Circuit



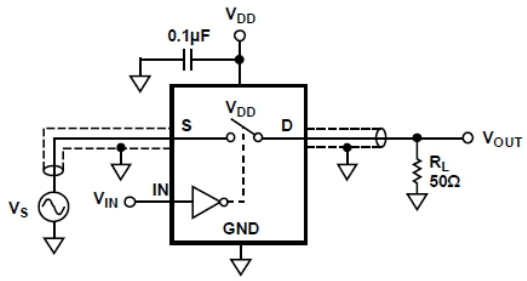
Switching Time Test Circuit



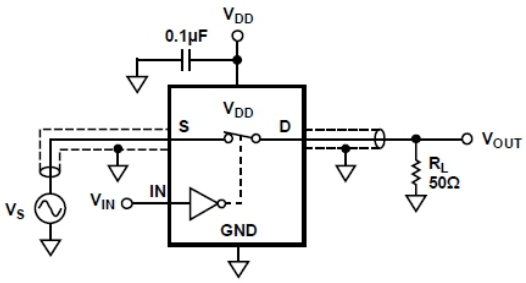
Off before On Delay Time Test Circuit



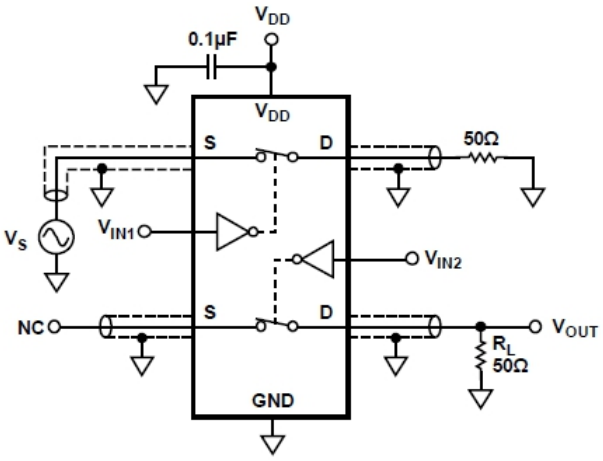
Charge Injection Test Circuit



Off Isolation Test Circuit



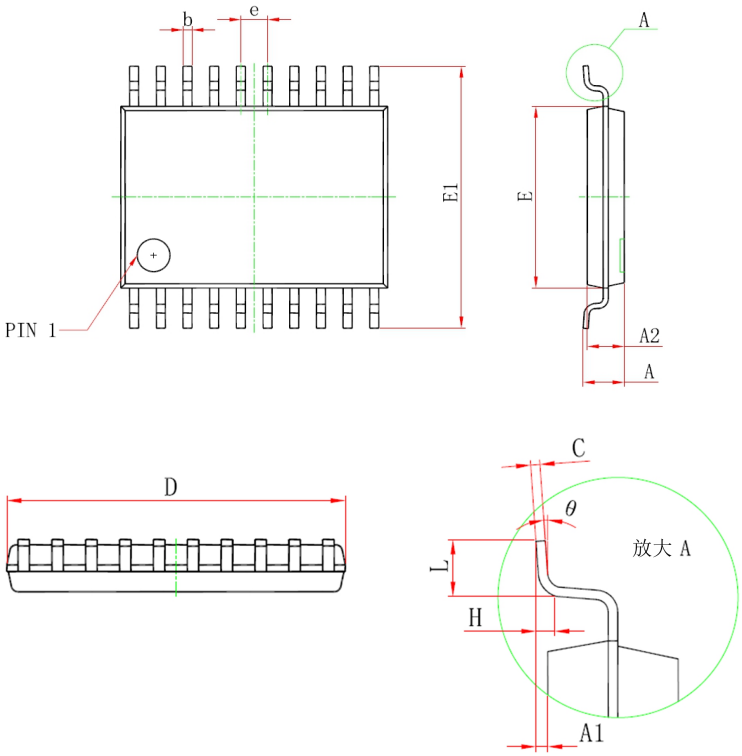
-3dB Bandwidth Test Circuit



Channel-to-Channel Crosstalk Test Circuit

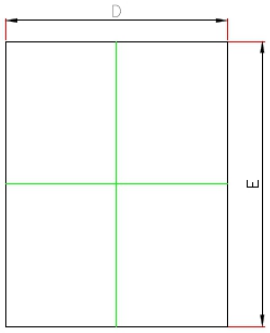
PACKAGE OUTLINE DIMENSIONS

TSSOP20

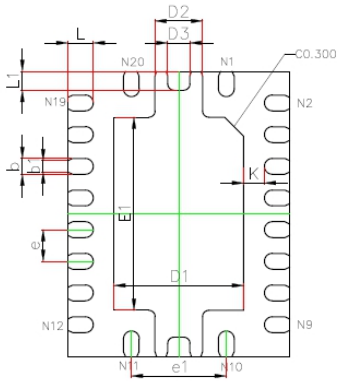


Symbol	Dimensions in Millimeters		Dimensions Inches	
	Min	Max	Min	Max
D	6.400	6.600	0.252	0.259
E	4.300	4.500	0.169	0.177
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
E1	6.250	6.550	0.246	0.258
A		1.200		0.047
A2	0.800	1.000	0.031	0.039
A1	0.050	0.150	0.002	0.006
e	0.65(BSC)		0.026(BSC)	
L	0.500	0.700	0.020	0.028
H	0.25(TYP)		0.01(TYP)	
θ	1°	7°	1°	7°

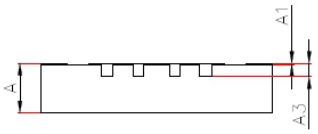
QFN20



TOP VIEW



BOTTOM VIEW



SIDE VIEW

Symbol	Dimensions in Millimeters		Dimensions Inches	
	Min	Max	Min	Max
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.203REF		0.008REF	
D	3.400	3.600	0.134	0.142
E	4.400	4.600	0.173	0.181
D1	1.950	2.150	0.077	0.085
E1	2.950	3.150	0.116	0.124
D2	0.650	0.850	0.026	0.033
D3	0.250	0.450	0.010	0.018
k	0.325REF		0.013REF	
b	0.200	0.300	0.008	0.012
b1	0.180REF		0.007REF	
e	0.500REF		0.020REF	
e1	1.500REF		0.060REF	
L	0.300	0.500	0.012	0.020
L1	0.224	0.376	0.009	0.015

MARKING and PACKAGING SPECIFICATIONS

1. Marking Drawing Description

Product Name : MS714T, MS714

Product Code : XXXXXXX

2. Marking Drawing Demand

Laser printing, contents in the middle, font type Arial.

3. Packaging Specifications

Device	Package	Piece/Reel	Reel/Box	Piece /Box	Box/Carton	Piece/Carton
MS714T	TSSOP20	3000	1	3000	8	24000
MS714	QFN20	4000	1	4000	8	32000

STATEMENT

- All Revision Rights of Datasheets Reserved for Ruimeng. Don't release additional notice.

  Customer should get latest version information and verify the integrity before placing order.
- When using Ruimeng products to design and produce, purchaser has the responsibility to observe safety standard and adopt corresponding precautions, in order to avoid personal injury and property loss caused by potential failure risk.
- The process of improving product is endless. And our company would sincerely provide more excellent product for customer.

MOS CIRCUIT OPERATION PRECAUTIONS

Static electricity can be generated in many places. The following precautions can be taken to effectively prevent the damage of MOS circuit caused by electrostatic discharge:

1. The operator shall ground through the anti-static wristband.
2. The equipment shell must be grounded.
3. The tools used in the assembly process must be grounded.
4. Must use conductor packaging or anti-static materials packaging or transportation.

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