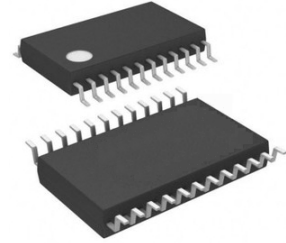


## CMOS Low Voltage, Low On-resistance, Ten-Channel Switch

### PRODUCT DESCRIPTION

The MS715T is a CMOS optional ten-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 MS715T can be widely used in battery-powered devices, new generation DAC and ADC systems. When the switch is turned on, on-resistance is matched well.

The MS715T has lead TSSOP24 package.



TSSOP24

### 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
- TSSOP24 Package

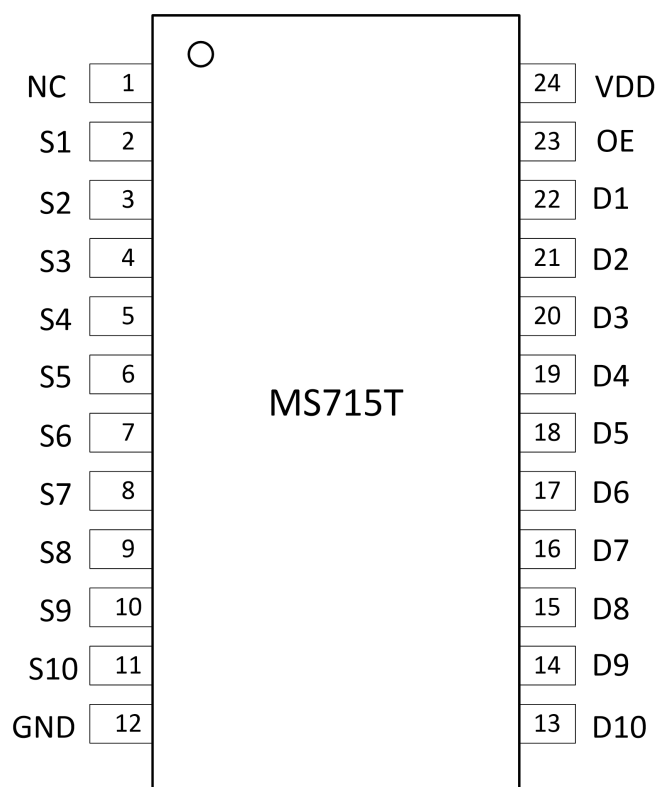
### APPLICATIONS

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

### PRODUCT SPECIFICATION

Part Number	Package	Marking
MS715T	TSSOP24	MS715T

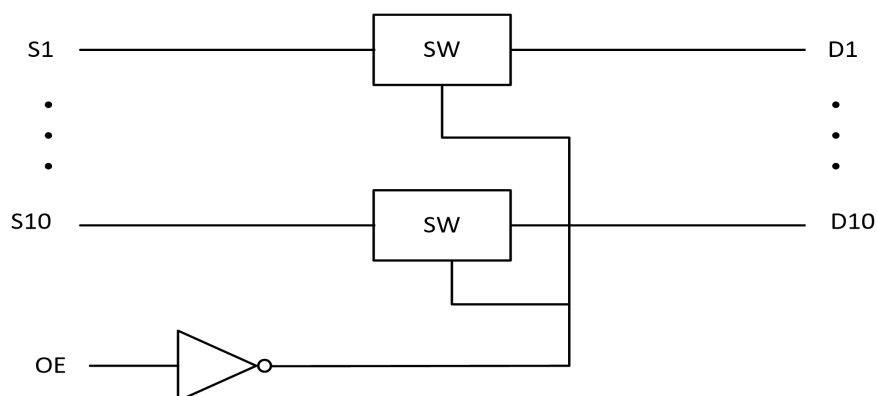
## PIN CONFIGURATION



## PIN DESCRIPTION

Pin	Name	Type	Description
1	NC	-	Not Connection
2, 22	S1, D1	IO	Source, Drain Pin for Channel 1
3, 21	S2, D2	IO	Source, Drain Pin for Channel 2
4, 20	S3, D3	IO	Source, Drain Pin for Channel 3
5, 19	S4, D4	IO	Source, Drain Pin for Channel 4
6, 18	S5, D5	IO	Source, Drain Pin for Channel 5
7, 17	S6, D6	IO	Source, Drain Pin for Channel 6
8, 16	S7, D7	IO	Source, Drain Pin for Channel 7
9, 15	S8, D8	IO	Source, Drain Pin for Channel 8
10, 14	S9, D9	IO	Source, Drain Pin for Channel 9
11, 13	S10, D10	IO	Source, Drain Pin for Channel 10
12	GND	-	Ground
23	OE	I	Logic Control Input
24	VDD	-	Power Supply

## BLOCK DIAGRAM



**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 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	2000	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	Test Circuit 1,VDD=5V, VIS=0~VDD,ID=10mA	+25		2.5	4	Ω
			-40~85			4.5	
On-resistance Match for Channel-to-Channel	ΔRON	Test Circuit 1,VDD=5V, VIS=0~VDD,ID=10mA	+25				Ω
			-40~85		0.05	0.3	
On-resistance Flatness	RFLAT(ON)	Test Circuit 1,VDD=5V, VIS=0~VDD,ID=10mA	+25		0.5		Ω
			-40~85			1.0	
Leakage Current							
Leakage Current on Source Pin (Off)	IS(off)	Test Circuit 3, 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)	Test Circuit 3, VD=1V/4.5V, VS=4.5V/1V	+25		±0.01	±0.1	uA
			-40~85			±0.2	
Leakage Current (On)	ID(ON)	Test Circuit 2, VD=VS=1V/4.5V	+25		±0.01	±0.1	uA
	IS(ON)		-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	Test Circuit 4, RL = 300Ω,CL = 50pF	+25		30		ns
			-40~85			40	
Off Time	tOFF	Test Circuit 4, RL =300Ω,CL = 50pF	+25		6		ns
			-40~85			10	
Charge Injection		Test Circuit 5, Vs=2V,Rs=0Ω,CL=1nF	+25	3			pC
Off Isolation	OISO	Test Circuit 6,RL =50Ω, CL = 5pF,f=10MHz	+25		-58		dB
		Test Circuit 6,RL =50Ω, CL= 5pF,f=1MHz	+25		-78		

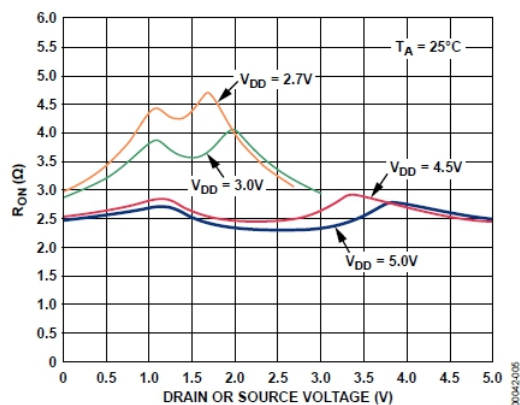
Parameter	Symbol	Condition	TA (°C)	Min	Typ	Max	Unit
Channel-to-Channel Crosstalk	XTALK	Test Circuit 8, RL =50Ω, CL= 5pF, f=10MHz	+25		-35		dB
-3dB Bandwidth	BW	Test Circuit 7, RL =50Ω, CL= 5pF	+25		200		MHz
Capacitance on Source Pin	CS		+25		10		pF
Capacitance on Drain Pin	CD		+25		10		pF
Capacitance on Source, Drain Pin			+25		22		pF
<b>Power Dissipation</b>							
Current	IDD	VDD=5.5V, Digital Input 0V or 5V	+25		0.001		uA
			-40~85			1	

VDD=3V±10%, GND=0V

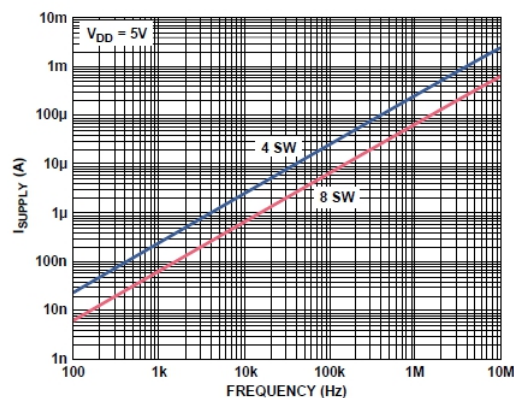
Parameter	Symbol	Condition	TA (°C)	Min	Typ	Max	Unit
Analog Switch							
Analog Signal Range	VIS		-40~85	0		VDD	V
On-resistance	RON	Test Circuit 1,VDD=3V, VIS=0~VDD, ID=10mA	+25		5		Ω
			-40~85		5.5	8	
On-resistance Match for Channel-to-Channel	ΔRON	Test Circuit 1,VDD=3V, VIS=0~VDD, ID=10mA	+25		0.1		Ω
			-40~85			0.3	
On-resistance Flatness	RFLAT(ON)	Test Circuit 1,VDD=3V, VIS=0~VDD,ID=10mA	+25		2.5		Ω
			-40~85				
Leakage Current							
Leakage Current on Source Pin (Off)	IS(off)	Test Circuit 3, VD=1V/3V, VS=3V/1V	+25		±0.01	±0.1	uA
			-40~85			±0.2	
Leakage Current on Drain Pin (Off)	ID(off)	Test Circuit 3, VD=1V/3V, VS=3V/1V	+25		±0.01	±0.1	uA
			-40~85			±0.2	
Leakage Current (On)	ID(ON)	Test Circuit 2, VD=VS=1V/3V	+25		±0.01	±0.1	uA
	IS(ON)		-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	Test Circuit 4, RL = 300Ω, CL = 50pF	+25		30		ns
			-40~85			40	
Off Time	tOFF	Test Circuit 4, RL =300Ω, CL = 50pF	+25		7		ns
			-40~85			12	
Charge Injection		Test Circuit 5, Vs=2V,Rs=0Ω,CL=1nF	+25	3			pC
Off Isolation	OISO	Test Circuit 6,RL =50Ω, CL = 5pF, f=10MHz	+25		-58		dB
		Test Circuit 6,RL =50Ω, CL= 5pF.f=1MHz	+25		-78		

Parameter	Symbol	Condition	TA (°C)	Min	Typ	Max	Unit
Channel-to-Channel Crosstalk	XTALK	Test Circuit 8, RL = 50Ω, CL = 5pF, f = 10MHz	+25		-35		dB
-3d Bandwidth	BW	Test Circuit 7, RL = 50Ω, CL = 5pF	+25		200		MHz
Capacitance on Source Pin	CS		+25		10		pF
Capacitance on Drain Pin	CD		+25		10		pF
<b>Power Dissipation</b>							
Current	IDD	VDD = 5.5V, Digital Input 0V or 5V	+25		0.001		uA
			-40~85			1	

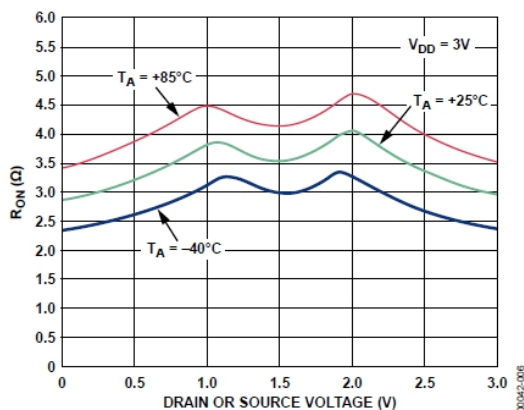
## TYPICAL CURVES



On-resistance VS. Source or Drain Voltage

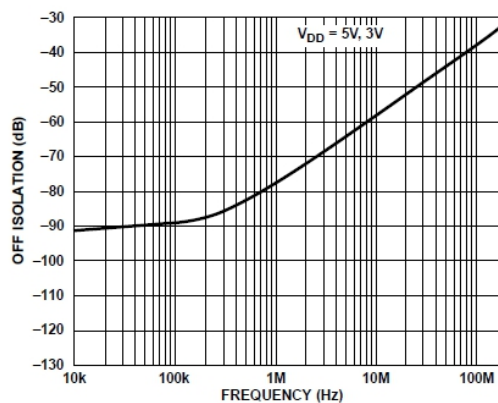


Power Supply Current VS. Switching Frequency

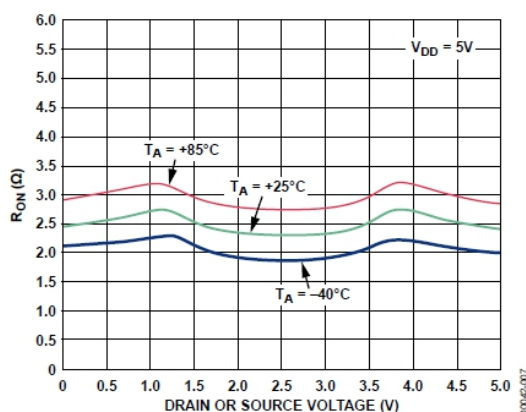


On-resistance VS. Source or Drain Voltage (Different Temperatures)

VDD=3V

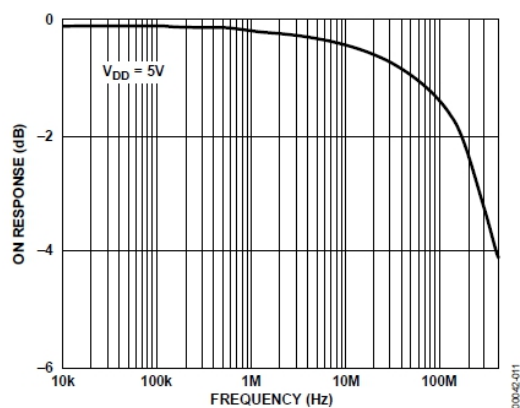


Off Isolation VS. Frequency

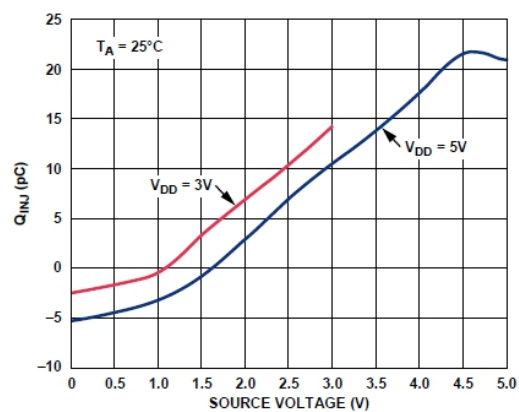


On-resistance VS. Source or Drain Voltage (Different Temperatures)

VDD=5V

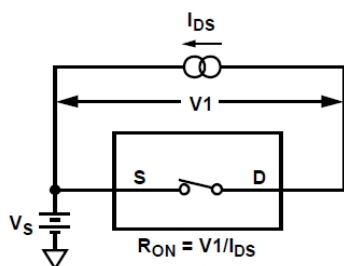


On Response VS. Frequency

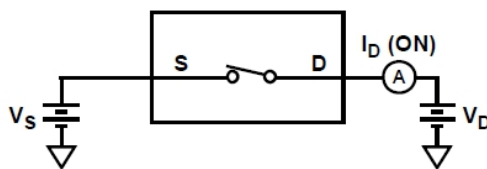


Charge Injection VS. Source Voltage

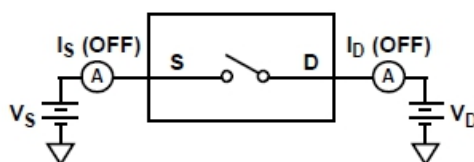
## TEST CIRCUITS



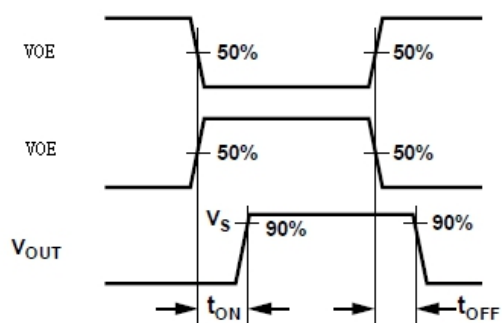
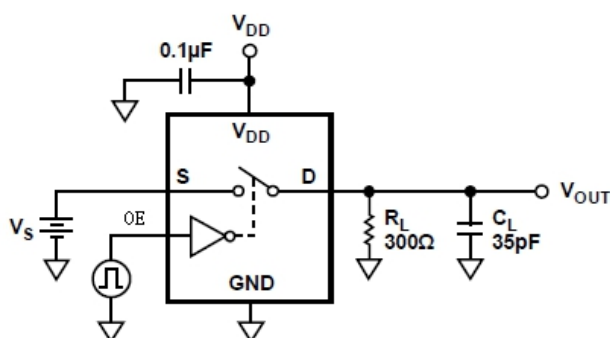
Test Circuit 1. On-resistance



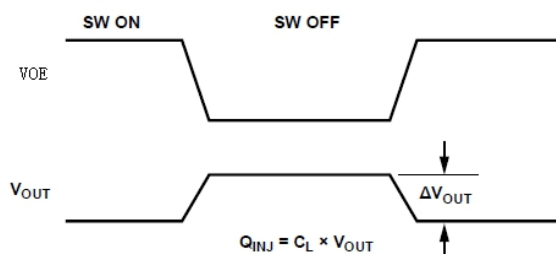
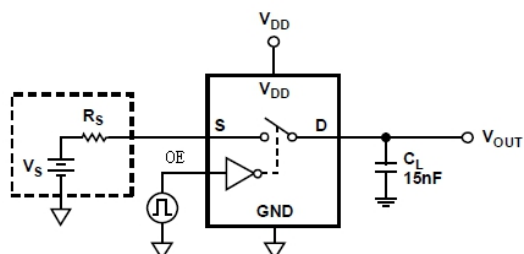
Test Circuit 2. Leakage Current (On)



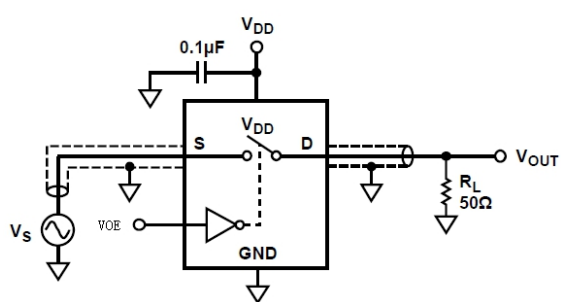
Test Circuit 3. Leakage Current (Off)



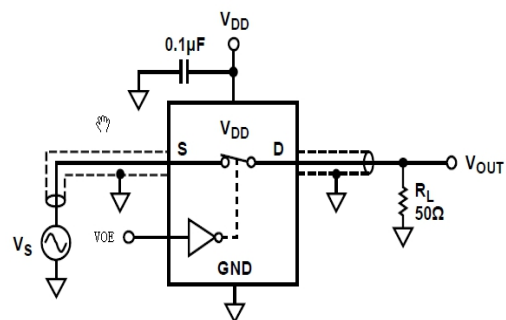
Test Circuit 4. Switching Time



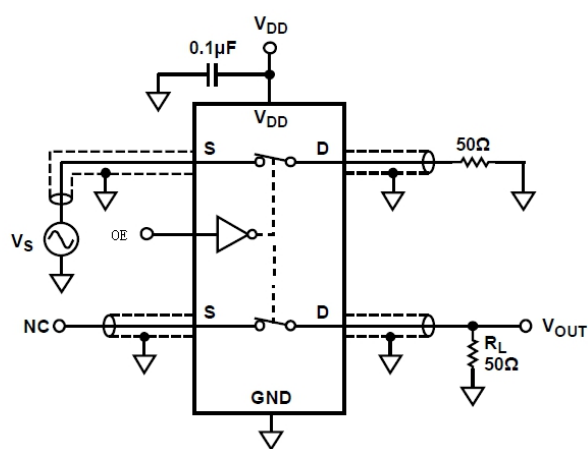
Test Circuit 5. Charge Injection



Test Circuit 6. Off Isolation



Test Circuit 7. -3dB Bandwidth

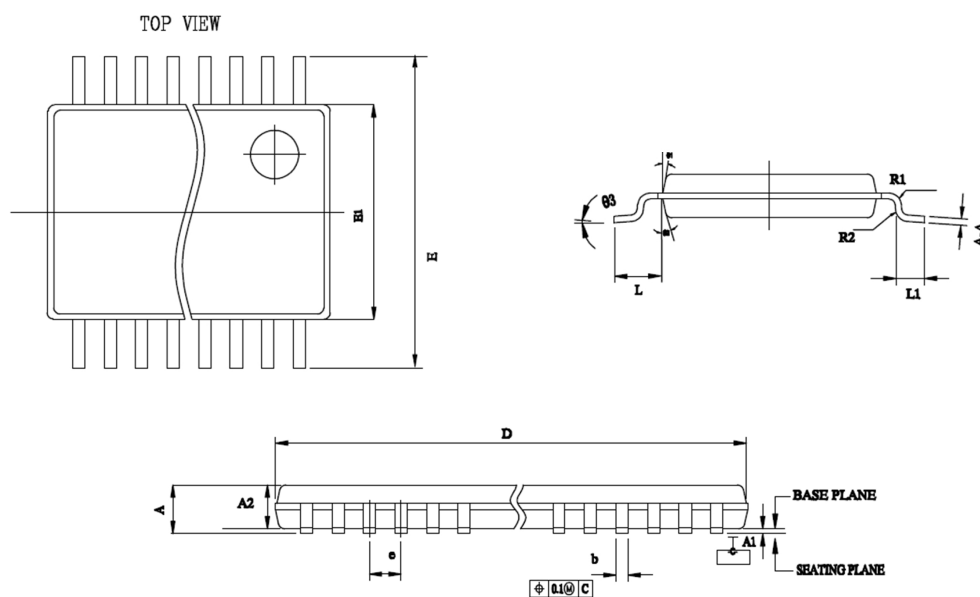


$$\text{CHANNEL-TO-CHANNEL CROSSTALK} = 20 \times \log |V_S/V_{OUT}|$$

Test Circuit 8. Channel-to-Channel Crosstalk

# PACKAGE OUTLINE DIMENSIONS

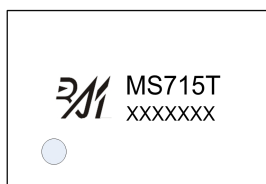
## TSSOP24



Symbol	Dimensions in Millimeters	
	Min	Max
A	-	1.200
A1	0.05	0.15
A2	0.8	1.05
E	6.25	6.55
E1	4.3	4.5
D	7.7	7.9
L		1
L1	0.45	0.75
e	0.650(BSC)	
b	0.19	0.30
R1	0.15TYP	
R2	0.15TYP	
A-A	0.09	0.2
θ1	12°TYP	
θ2	12°TYP	
θ3	0°	8°

## MARKING and PACKAGING SPECIFICATIONS

### 1. Marking Drawing Description



Product Name : MS715T

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
MS715T	TSSOP24	3000	1	3000	8	24000

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- 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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