

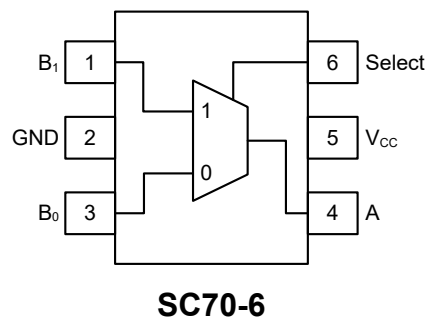
1.Description

ET3157 is an analog switch based on CMOS technology. It has low power consumption, low transmission delay and low output impedance. The voltage output range of analog signal and digital signal can be from V_{CC} or GND. The select input terminal has over-voltage protection, which allows the input voltage to be higher than V_{CC} , up to 7V, and the pin will not be burned.

2.Features

- low power consumption
- High transmission speed
- Flip standard CMOS logic level
- High bandwidth, high linearity
- Switch for NTSC / PAL video, audio, SPDIF and HDTV
- Package form SC70-6 (3157)
- It can be used for clock switch and data selection switch
- Low output impedance
- First break and then open protection to prevent short circuit
- Working temperature - 55°C ~ + 125°C

3.Pinning Information



Pin description

Pin	I/O	Function
A, B ₀ , B ₁	I/O	Data Port
Select	I	Control Selection
V_{CC}	-	Power Supply Terminal
GND	-	Land



Function Description

Select Input	Function
L	B ₀ to A
H	B ₁ to A

4.Thermal Resistance Data

Parameter	Symbol	Numerical Value	Company
Thermal Resistance	θ_{JA}	270	°C/W

5.Limit Parameter

Parameter	Symbol	Range	Units
Supply voltage	V _{CC}	-0.5~+7.0	V
Switching voltage (Note 1)	V _S	-0.5~V _{CC} +0.5	V
Input voltage (Note 1)	V _{IN}	-0.5~+7.0	V
Vin @ 0V input current clamp diode	I _{IK}	-50	mA
Output current	I _{OUT}	128	mA
Power to ground current	I _{CC} /I _{GND}	100	mA
Storage temperature range	T _{STG}	-65~+150	°C
Maximum junction temperature	T _J	150	°C
Wire temperature (welding, 10 seconds)	T _L	260	°C
Total power consumption (85°C)	P _D	180	mW

Exceeding the maximum value of DC limit parameters may cause irreparable damage to the circuit.If there is no special case, ensure that the power supply voltage, operating temperature and load characteristics of input / output of the whole working system are within the above range.

Note 1: the negative voltage of I/O can be exceeded according to the clamping diode current range of input / output.



6.Working Environment (Note 2)

Parameter		Symbol	Mid	Max	Units
Supply voltage		V_{CC}	1.65	5.5	V
Select terminal input voltage		V_{IN}	0	V_{CC}	V
Switch input voltage		V_{IN}	0	V_{CC}	V
Output voltage		V_{OUT}	0	V_{CC}	V
Working temperature		T_A	-55	+125	°C
Enter the rising and falling time	Input voltage $V_{CC}=2.3V - 3.6V$	t_r, t_f	0	10	ns/V
	Input voltage $V_{CC}=4.5V - 5.5V$		0	5	ns/V

Note: The input voltage of 2:Select terminal must be set to a high level or a low level, and cannot be left floating.



7.1 Electrical Characteristics (DC Characteristic)

Parameter	Symbol	Condition	V_{CC}	$T_A=25^{\circ}\text{C}$			$T_A=-40^{\circ}\text{C}\sim 85^{\circ}\text{C}$		Units
				Min	Typ	Max	Min	Max	
High level input	V_{IH}		1.65-1.95	$0.75V_{CC}$			$0.75V_{CC}$		V
			2.3-2.8	1.5			1.5		V
			3-4.2	2.4			2.4		V
			4.5-5.5	$0.7V_{CC}$			$0.6V_{CC}$		V
Input low level	V_{IL}		1.65-1.95	$0.25V_{CC}$				$0.25V_{CC}$	V
			2.3-2.8	0.4				0.4	V
			3-5.5	$0.3V_{CC}$				$0.3V_{CC}$	V
Leakage current input	I_{IN}	$0 < V_{IN} < 5.5\text{V}$	0-5.5		± 0.05	± 0.1		± 1	μA
Closed state leakage electric current	I_{OFF}	$0 < A, B < V_{CC}$	1.65-5.5		± 0.05	± 0.1		± 1	μA
Quiescent current	I_{CC}	$V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$	5.5			1		10	μA
Analog level input Into the scope			V_{CC}	0		V_{CC}	0	V_{CC}	V
Switch on resistance (Note 3)	R_{ON}	$V_{IN}=0\text{V}$, $I_O=30\text{mA}$	4.5		3			7	Ω
		$V_{IN}=2.4\text{V}$, $I_O=-30\text{mA}$			5			12	Ω
		$V_{IN}=4.5\text{V}$, $I_O=-30\text{mA}$			7			15	Ω
		$V_{IN}=0\text{V}$, $I_O=24\text{mA}$	3		4			9	Ω
		$V_{IN}=3\text{V}$, $I_O=-24\text{mA}$			10			20	Ω
		$V_{IN}=0\text{V}$, $I_O=8\text{mA}$	2.3		5			12	Ω
		$V_{IN}=2.3\text{V}$, $I_O=-8\text{mA}$			13			30	Ω
		$V_{IN}=0\text{V}$, $I_O=4\text{mA}$	1.65		6.5			20	Ω
		$V_{IN}=1.65\text{V}$, $I_O=-4\text{mA}$			17			50	Ω



Parameter	Symbol	Condition	V _{CC}	T _A =25°C			T _A =-40°C~85°C		Units
				Min	Typ	Max	Min	Max	
On resistance matching between channels (Note 3) (Note 4) (Note 5)	ΔR_{ON}	I _A =-30mA, V _{Bn} =3.15	4.5		0.15				Ω
		I _A =-24mA, V _{Bn} =2.1	3		0.2				Ω
		I _A =-8mA, V _{Bn} =1.6	2.3		0.5				Ω
		I _A =-4mA, V _{Bn} =1.15	1.65		0.5				Ω
On-resistance flatness (Note 3) (Note 4) (Note 6)	R _{FLAT}	I _A =-30mA, 0≤V _{Bn} ≤V _{CC}	5		6				Ω
		I _A =-24mA, 0≤V _{Bn} ≤V _{CC}	3.3		12				Ω
		I _A =-8mA, 0≤V _{Bn} ≤V _{CC}	2.5		28				Ω
		I _A =-4mA, 0≤V _{Bn} ≤V _{CC}	1.8		125				Ω



7.2 Electrical Characteristics (AC Characteristics)

Parameter	Symbol	Condition	V_{CC}	$T_A=25^{\circ}\text{C}$			$T_A=-40^{\circ}\text{C}\sim 85^{\circ}\text{C}$		Units
				Min	Typ	Max	Min	Max	
Transmission Delay (Note 8)	t_{PHL} t_{PLH}	Fig. 1, $V_I=OPEN$	1.65-1.95					2	nS
			2.3-2.7					1.2	nS
			3.0-3.5					0.8	nS
			4.5-5.5					0.3	nS
Open time (a to Bn)	t_{PZL} t_{PZH}	Fig. 1 $V_I=2*V_{CC}$ for t_{PZL} , $V_I=0V$ for t_{PZH}	1.65-1.95			23	7	24	nS
			2.3-2.7			13	3.5	14	nS
			3.0-3.5			6.9	2.5	7.6	nS
			4.5-5.5			5.2	1.7	5.7	nS
turn - off time (port a to port b)	t_{PLZ} t_{PHZ}	Fig. 1 $V_I=2*V_{CC}$ for t_{PLZ} , $V_I=0V$ for t_{PHZ}	1.65-1.95			12.5	3	13	nS
			2.3-2.7			7	2	7.5	nS
			3.0-3.5			5	1.5	5.3	nS
			4.5-5.5			3.5	0.8	3.8	nS
Break before connect time (Note 7)	t_{B-M}	Fig. 2, $C_L=50pF$, $R_L=600\Omega$	1.65-1.95				0.5		nS
			2.3-2.7				0.5		nS
			3.0-3.5				0.5		nS
			4.5-5.5				0.5		nS
Charge injection (Note 7)	Q	Fig. 3, $C_L=0.1nF$, $V_{GEN}=0V$, $R_{GEN}=0\Omega$	5		7				pC
			3.3		3				pC
Close(note 9) Release	OIRR	Fig.4, $R_L=50\Omega$, $f=10MHz$	1.65-5.5		-57				dB
Cross talk	Xtalk	Fig.5, $R_L=50\Omega$, $f=10MHz$	1.65-5.5		-54				dB
-3dB bandwidth	BW	Fig. 8, $R_L=50\Omega$	1.65-5.5		350M				Hz
total harmonic distortion (Note 7)	THD	$R_L=600\Omega$, $0.5V_{P-P}$, $f=600Hz - 20kHz$	5		0.011				%
Input terminal capacitance (Note 10)	C_{IN}		0		2.3				pF



Parameter	Symbol	Condition	V_{CC}	$T_A=25^{\circ}\text{C}$			$T_A=-40^{\circ}\text{C}\sim 85^{\circ}\text{C}$		Units
				Min	Typ	Max	Min	Max	
B disconnection capacitance when the port is turned off (Note 10)	C_{IO-B}	Figure 6	5		5				pF
A conduction capacitance when the port is open (Note 10)	C_{IOA-ON}	Figure 7	5		15.5				pF

Note3: It is obtained by measuring the ratio of the voltage difference between the two ports A and B to the current flowing through the two ports. On-resistance is determined by the lower voltage port of port A and B

Note4: The load characteristics introduced by encapsulation are not included.

Note5: $\Delta RON = RON_{max} - RON_{min}$ in the given V_{CC} , temperature and level range.

Note6: On-resistance flatness refers to the difference between the maximum value and the minimum value of on-resistance under specified conditions.

Note 7: Design simulation value.

Note 8: This parameter is the design simulation value rather than the measured value. In the case of an ideal voltage source (zero output load), the transmission delay will be better than that of a 50pF load capacitor.

Note 9: Turn off isolation $= 20\log_{10}[V_A/V_{Bn}]$.

Note 10: $T_A=+25^{\circ}\text{C}$, $f=1\text{MHz}$, excluding the load capacitance introduced by packaging.

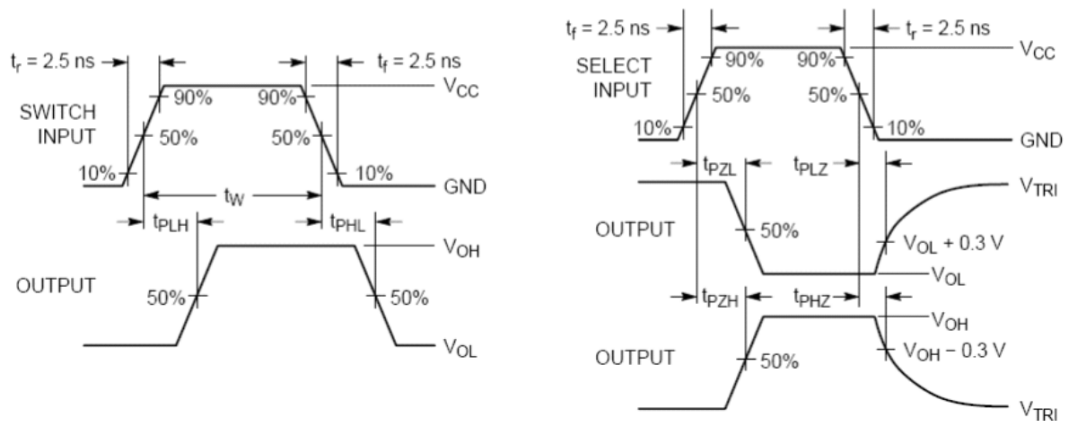
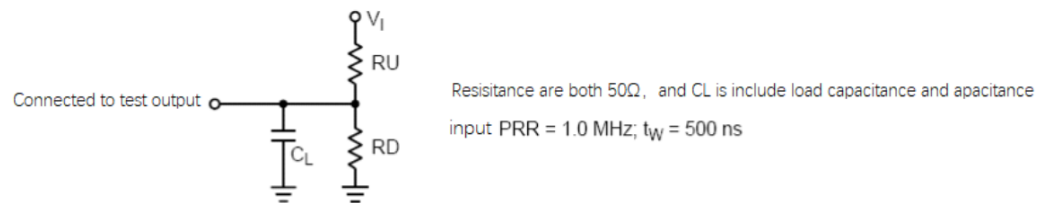


Figure 1 Transmission delay, opening time, closing time



Figure 2: Cut off before opening time

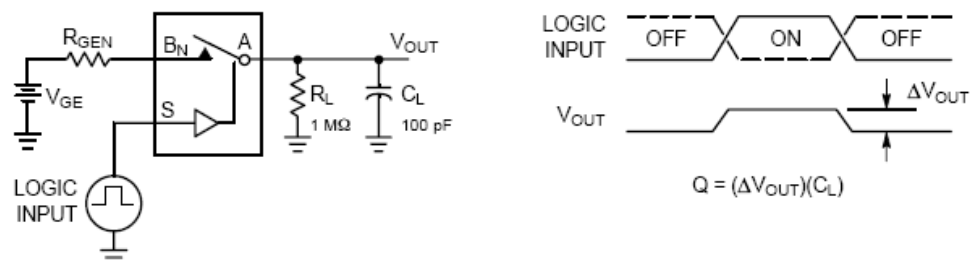


Figure 3 Charge injection test

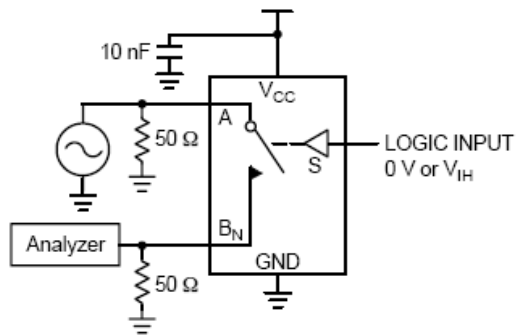


Figure 4 Close quarantine

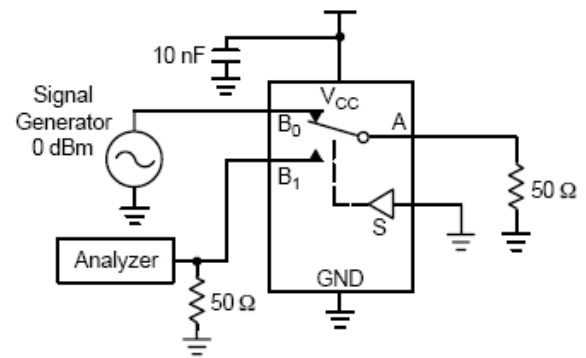


Figure 5 Crosstalk

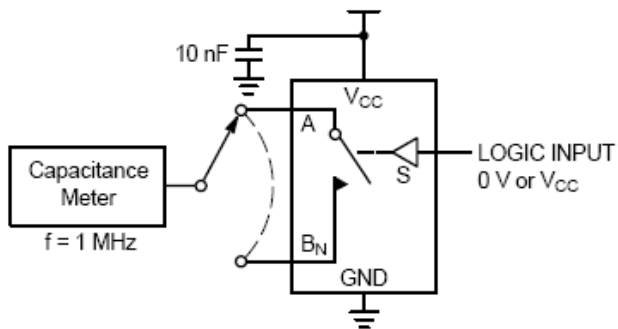


Figure 6 Output capacitance when channel is closed

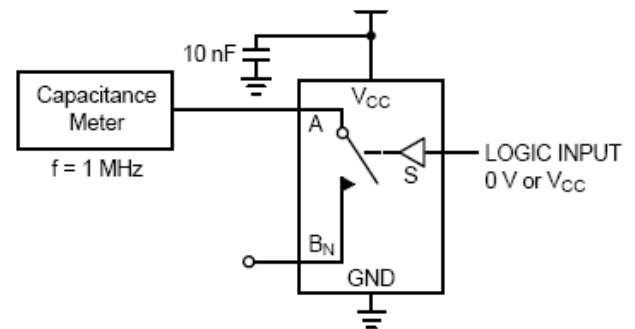


Figure 7 Output capacitance when channel is open

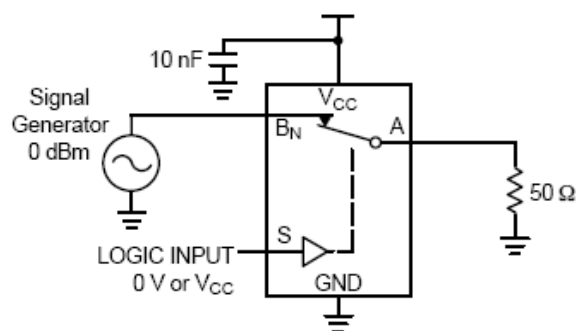
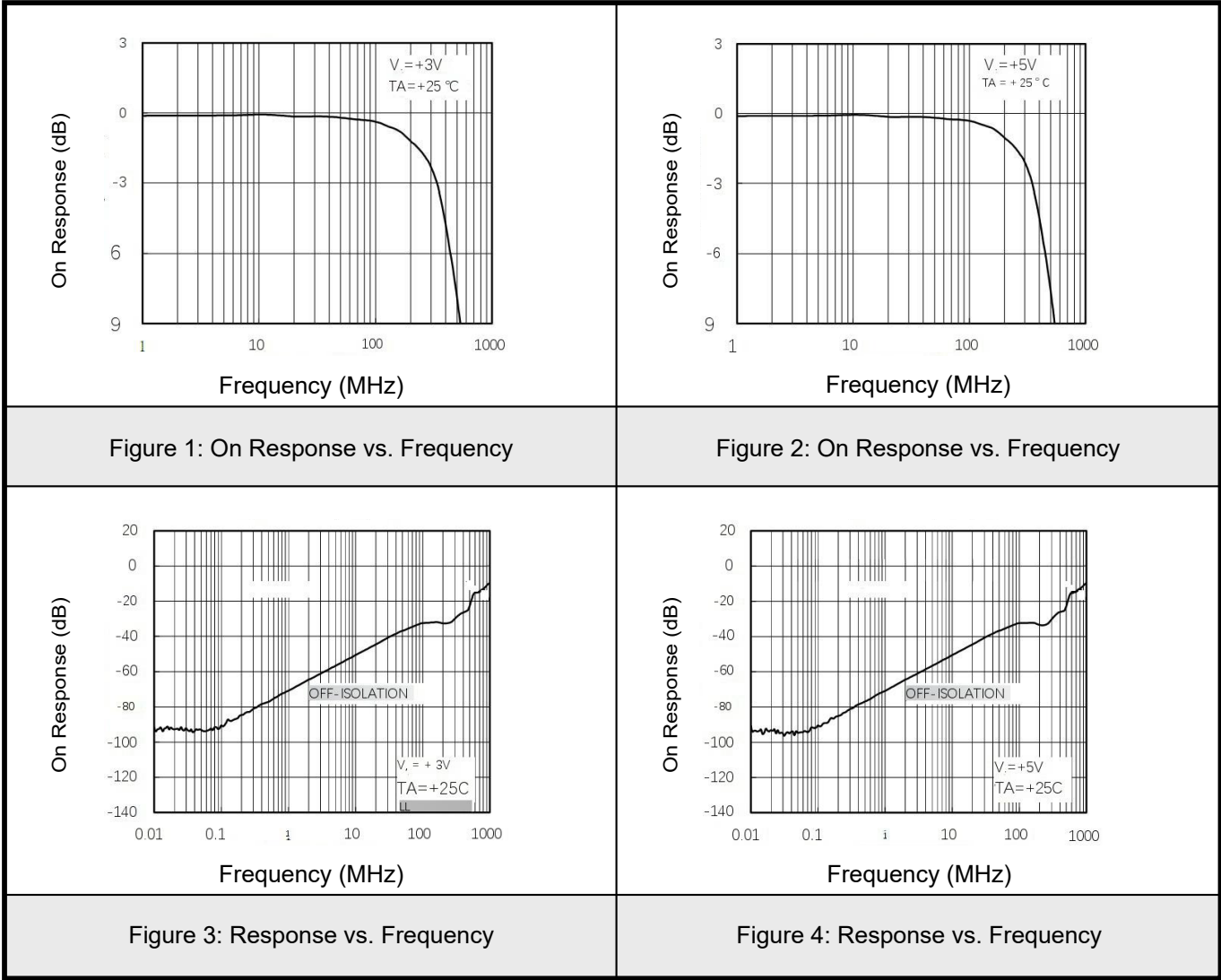


Figure 8 Bandwidth

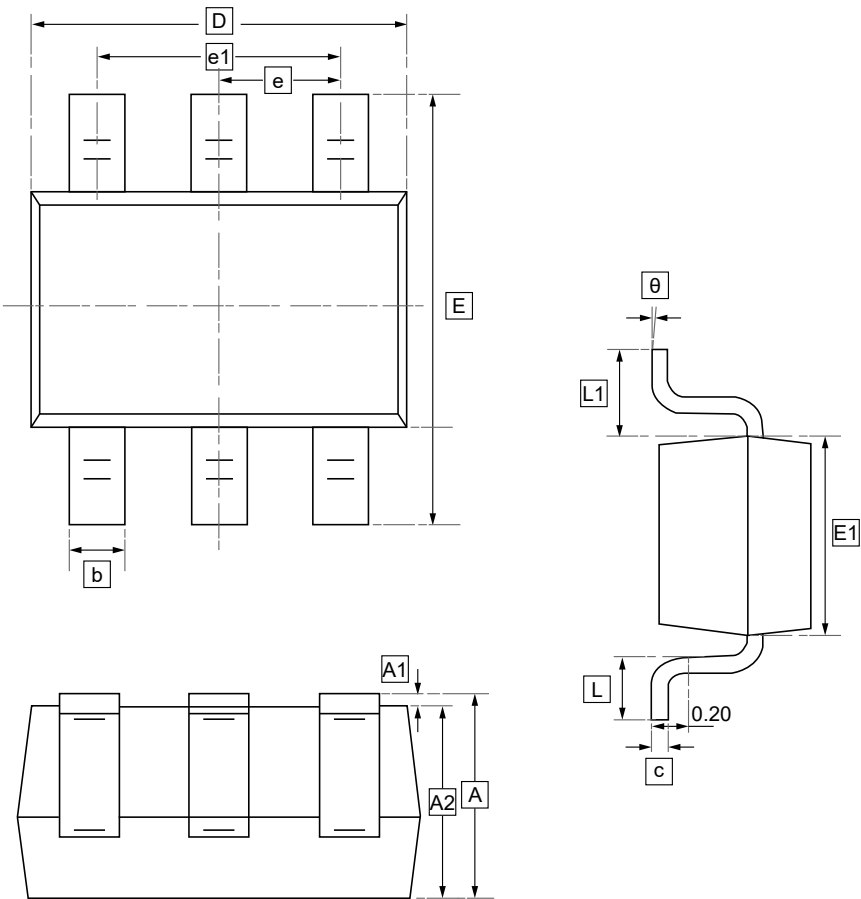


8. Typical Characteristic





9.SC70-6 Package Outline Dimensions



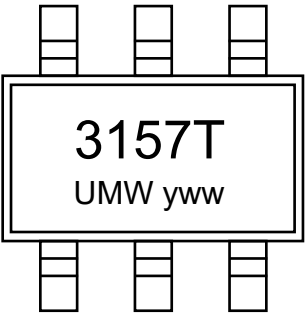
DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	e1	L	L1
Min	0.90	0.00	0.90	0.15	0.08	2.05	2.15	1.15	0.65	1.2	0.26	0.525
Max	1.10	0.10	1.00	0.35	0.15	2.25	2.45	1.35	TYP.	1.4	0.46	REF.

Symbol	θ
Min	0°
Max	8°



15.Ordering Information



yww: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW ET3157	SC-70-6	3000	Tape and reel



16.Disclaimer

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