

40V, 250mA, 2 μ A Ultra-Low I_q, CMOS Voltage Regulator

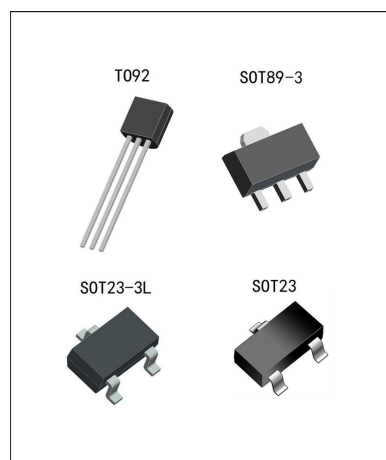
H75RXX-1

General Description

The H75RXX-1 is an ultra-low quiescent current regulator that features low dropout voltage. It has 2 μ A quiescent current when there is no load. The H75RXX-1 retains all the features that are common to low dropout regulators including a low dropout PMOS pass device, foldback current limiter, and thermal shutdown.

The H75RXX-1 offers a 40V maximum operating voltage, excellent load transient response, an operating temperature range of -40°C to 85°C, and $\pm 2\%$ output voltage tolerance across the full range of output current, input voltage, and operating temperature.

The H75RXX-1 regulators are available in standard SOT23-3L, SOT23, SOT89-3 and TO92 packages.



Features

- Input Voltage (VIN) Range: Up to 40V
- Output Range: 2.6V ~ 5.0V
- Maximum Output Current: 250mA
- PSRR: 75dB@1kHz
- Dropout Voltage: 0.5V Typ@I_{OUT}=100mA
- Ultra Low Quiescent Current: 2 μ A Typ
- Output Voltage Tolerance: $\pm 2\%$
- Internal Thermal Overload Protection
- Built-in Foldback Current Limit

Applications

- E-meters, Water Meters and Gas Meters
- Cellphones, Radiophones, Digital Cameras
- Fire Alarms, Smoke Detectors
- Appliances and White Goods

Order Information

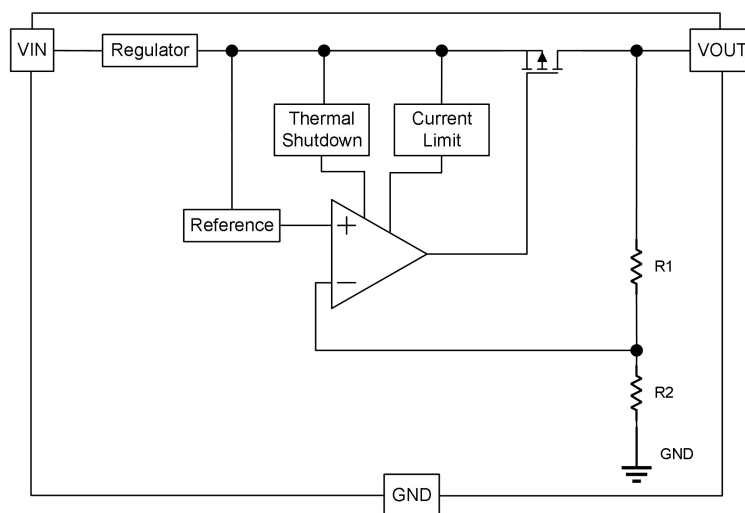
Device	Package	Manner of Packing	Devices per bag/reel
H75RXX-1MR	SOT23-3L	Reel	3000
H75RXX-1NR	SOT23-3	Reel	3000
H75RXX-1PR	SOT89-3	Reel	1000
H75RXX-1TR	TO92	Bag	1000

Selection Table

H75R①②-1③④

Designator	Symbol	Description
①②	Integer	Output Voltage(2.6~5.0V)
③	M	Package: SOT23-3L
	N	Package: SOT23
	P	Package: SOT89-3
	T	Package: TO92
④	R	Halogen Free

Block Diagram and Pin Arrangement Diagram



Pin Assignment

SOT23-3L and SOT23

(Top View)

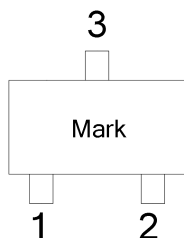


Table1: H75RXX-1MR/NR series (SOT23-3L and SOT23 PKG)

PIN NO.	PIN NAME	FUNCTION
1	GND	GND pin
2	VOUT	Output voltage pin
3	VIN	Input voltage pin

SOT89 (Top View)

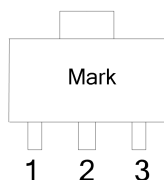


Table2: H75RXX-1PR series (SOT89-3 PKG)

PIN NO.	PIN NAME	FUNCTION
1	GND	GND pin
2	VIN	Input voltage pin
3	VOUT	Output voltage pin

TO92 (Top View)

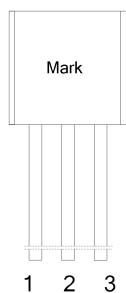


Table3: H75RXX-1TR series (TO92 PKG)

PIN NO.	PIN NAME	FUNCTION
1	GND	GND pin
2	VIN	Input voltage pin
3	VOUT	Output voltage pin

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Input Voltage	VIN	-0.3~45	V
Output Voltage	VOUT	-0.3~12	V
ESD Rating		5.5	kV
Storage Temperature	Tstr	-55~150	°C
Lead Temperature(Soldering, 10 sec.)	Tst	260	°C
Operating Temperature		-40~85	°C

Note: These are stress ratings only. Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

Thermal Information

Symbol	Parameter	Package	Max.	Unit
θ_{JA}	Thermal Resistance (Junction to Ambient) (Assume no ambient airflow, no heat sink)	SOT23-3L	260	°C/W
		SOT23	500	
		SOT89	200	
		TO92	200	
P_D	Power Dissipation(Max)	SOT23-3L	0.4	W
		SOT23	0.2	
		SOT89	0.5	
		TO92	0.5	

Note: PD is measured at Ta= 25°C

Electrical Characteristics

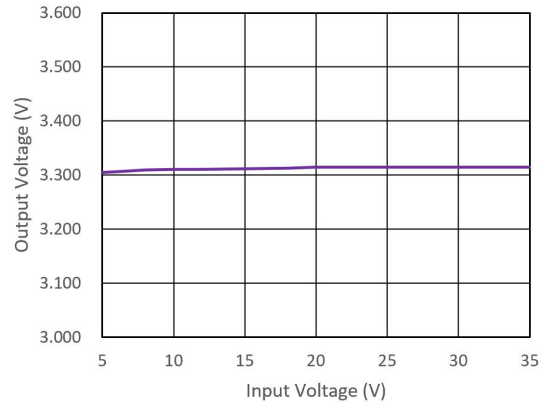
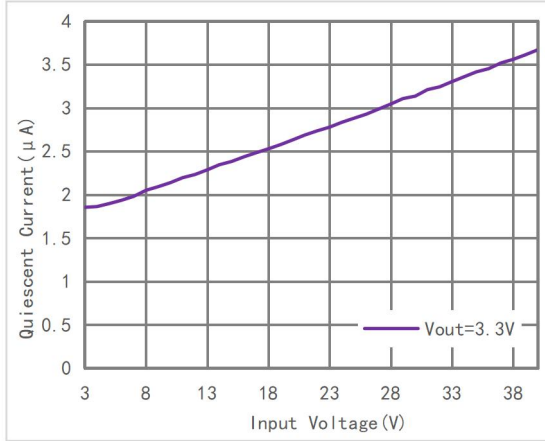
The following specifications apply for $V_{IN}=12V$, $I_{OUT}=1mA$, $C_{IN}=C_{OUT}=10\mu F$, $T_J=25^{\circ}C$, unless specified otherwise.

ITEMS	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage	V_{IN}		2.7		40	V
Output Range	V_{OUT}		2.6		5.0	V
Output Voltage Accuracy	ΔV_{OUT}		-2	--	2	%
Quiescent Current	I_Q	$V_{IN} = V_{OUT} + 1V$	--	2	--	μA
Dropout Voltage	V_{DROP}	$I_{OUT}=100mA$	--	0.5	--	V
		$I_{OUT}=250mA$	--	1.3	--	
Line Regulation	ΔV_{LINE}	$V_{IN} = V_{OUT} + 1V$ to 40V, or $V_{IN} = 5V$ to 40V, if $V_{OUT} < 4V$	--	30	--	mV
Load Regulation	ΔV_{LOAD}	$I_{OUT} = 1mA$ to 100mA	--	50	--	mV
Power Supply Rejection Rate $V_{IN}=V_{OUT}+1V$ Ripple=0.2Vp-p $I_{OUT}=10mA$	PSRR	Freq.=1kHz	--	75	--	dB
I_{OUT} @ V_{OUT} Short to Ground	I_{SHORT}	$V_{IN}=6V$, $V_{OUT}=0V$	--	50	--	mA

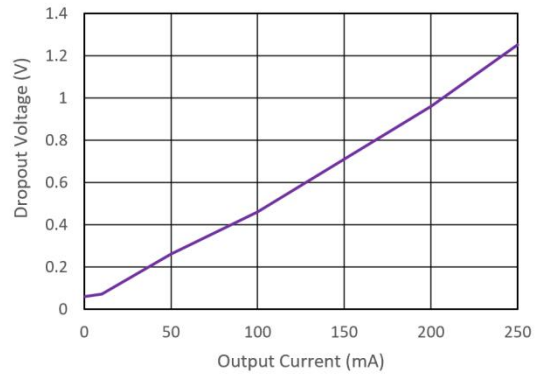
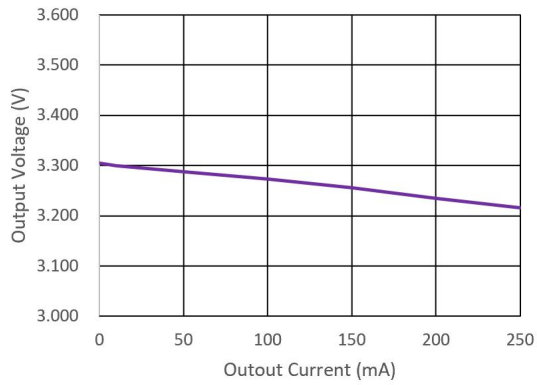
Note1: The parameters of C_{in} and C_{out} must be greater than 10 μF .

Typical Performance Characteristics

- (1) Quiescent Current vs Input Voltage (2) Output Voltage vs Input Voltage



- (3) Output Voltage vs Output Current (4) Dropout Voltage vs Output Current



Application Circuits

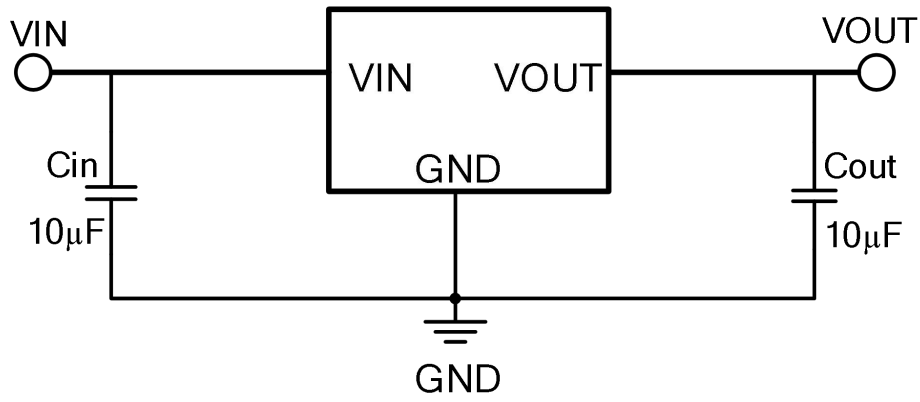


Figure1

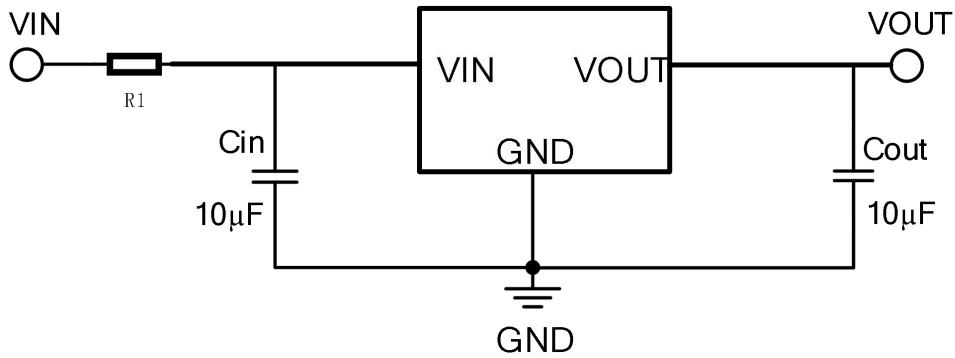
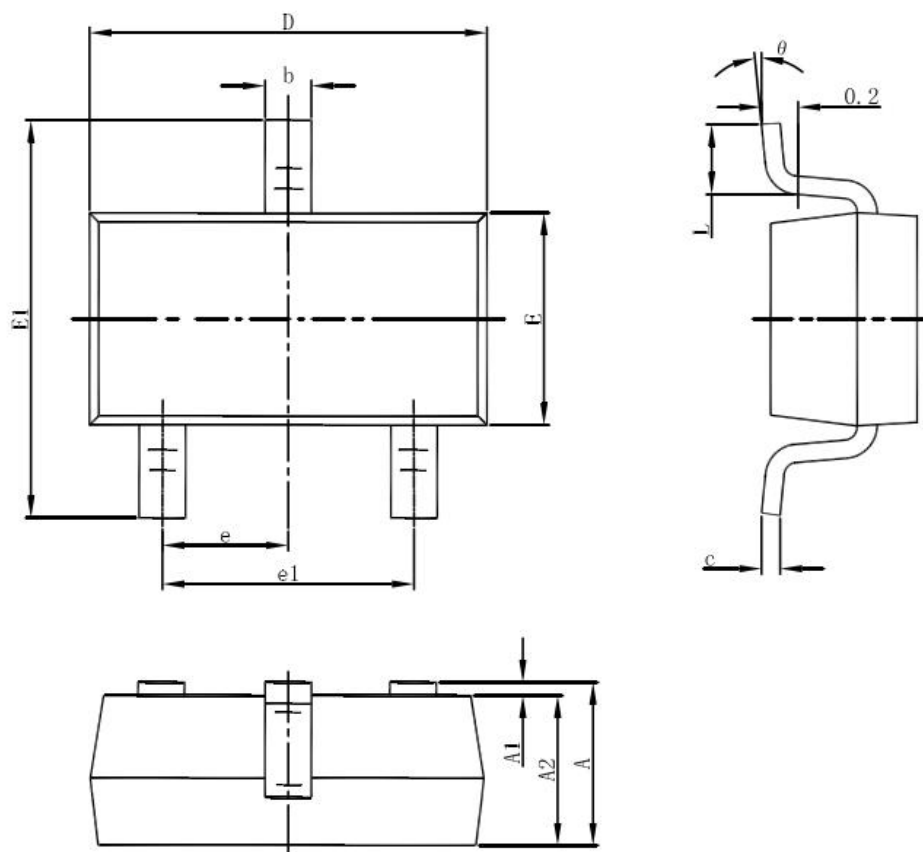


Figure2

Note1: The parameters of C_{in} and C_{out} must be greater than $10\mu F$.

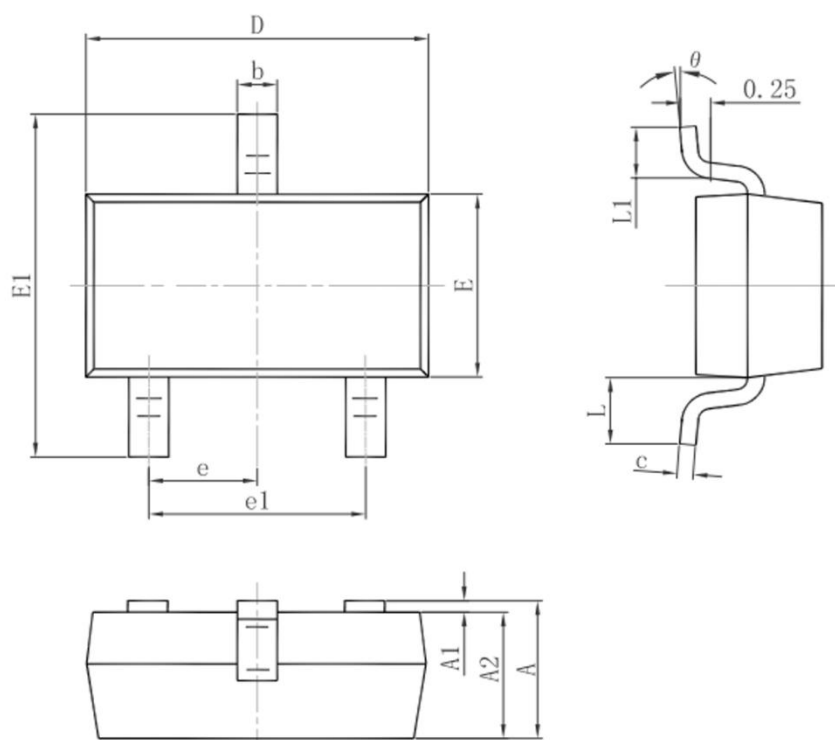
Note2: If $V_{IN} > 18V$, it is recommended to add a series resistor at the input, with R_1 sized to 0.25Ω .

Package Information (SOT23-3L)



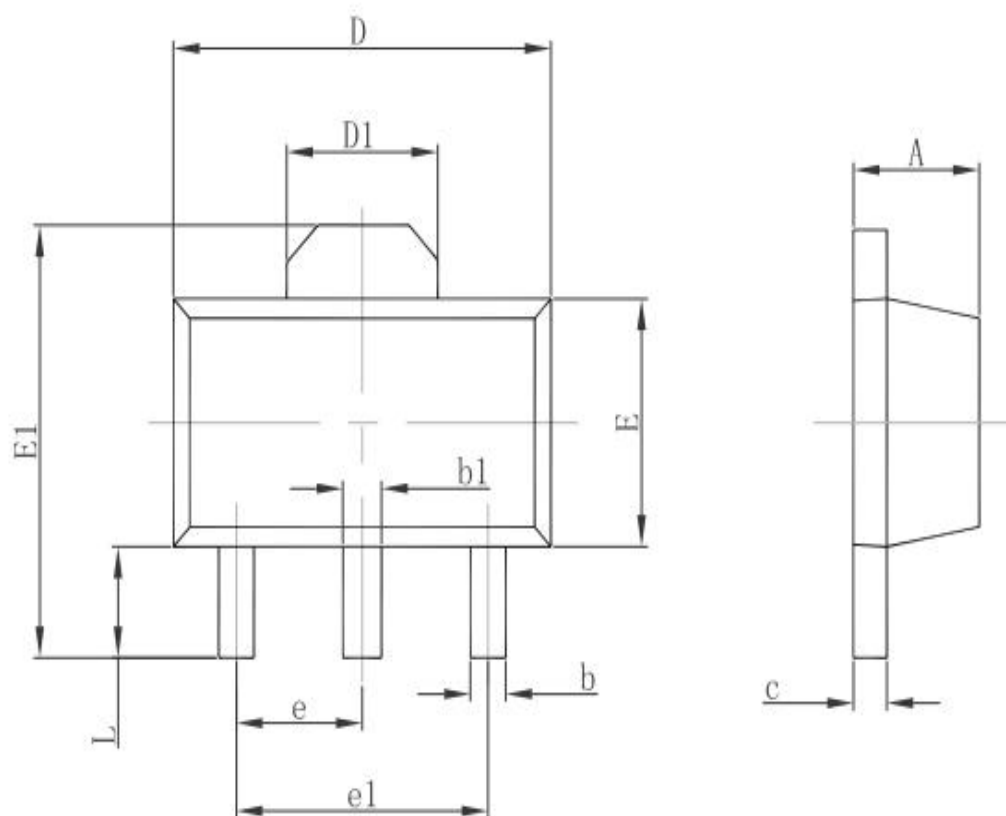
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

Package Information (SOT23)



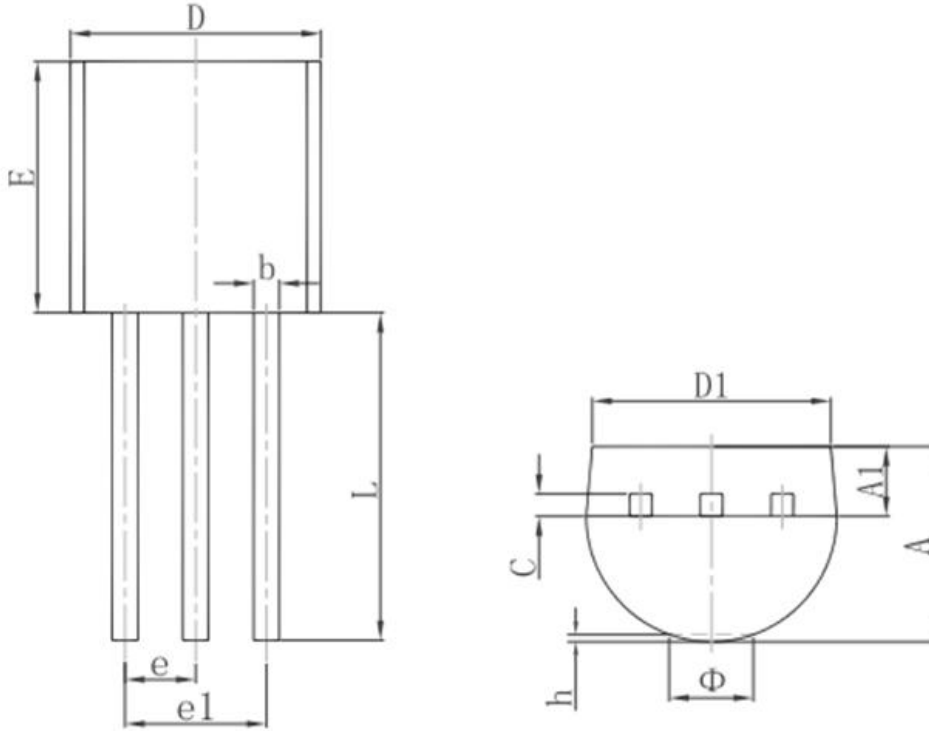
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950TYP.		0.037TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550REF.		0.022REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

Package Information (SOT89-3)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550REF.		0.061REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500TYP.		0.060TYP.	
e1	3.000TYP.		0.118TYP.	
L	0.900	1.200	0.035	0.047

Package Information (TO92)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.300	4.700	0.169	0.185
D1	3.430		0.135	
E	4.300	4.700	0.169	0.185
e	1.270TYP.		0.050TYP.	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571
Φ		1.600		0.063
h	0.000	0.380	0.000	0.015

Special Instructions

The company reserves the right of final interpretation of this specification.

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Author: Yang

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1. Editio princeps

Statement

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