



Three Terminal Adjustable Voltage Regulators

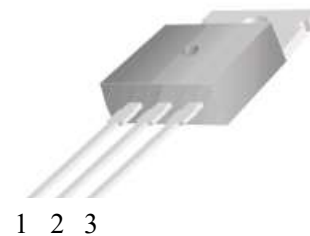
三端可调节稳压管

LM317A

产品特性 Features

输出电压 Output Voltage	1.3V to 37V
最大输出电流 Max Output Current	1.5A
过载保护 Internal thermal overload protection	
短路电流限制 Internal short-current limiting	
输出端最大安全工作区域 Output transistor safe-area compensation	

封装形式 Package



1 2 3

1:ADJ 2:Output 3. Input

功能图 Functional diagram

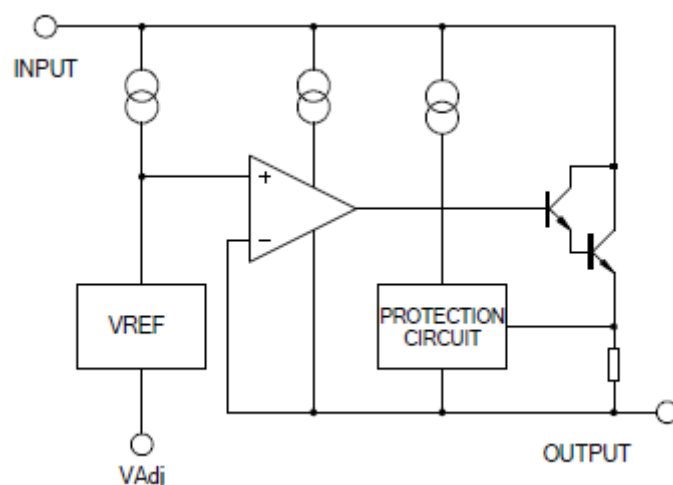


Fig.1

绝对最大额定值 Absolute Maximum Rating ($T_a = 25^\circ\text{C}$ unless otherwise noted)

Parameter 项目	Symbol 符号	Limit 极限值	Unit 单位
输入-输出电压差 Input-Output Voltage Difference	$V_i - V_o$	-40	V
功率损耗 Power Dissipation	P_D	Internal Limited	W
结温 Junction Temperature	T_j	+125	$^\circ\text{C}$
存储温度 Storage Temperature Range	T_{STG}	-65~+150	$^\circ\text{C}$
结-壳的热阻 Thermal Resistance -Junction to Case	$R_{\theta JC}$	5	$^\circ\text{C/W}$
结-环境的热阻 Thermal Resistance -Junction to Ambient	$R_{\theta JA}$	54	$^\circ\text{C/W}$

电参数特性 Electrical Characteristics

($V_i - V_o = 5V$, $I_{out} = 500mA$, $I_{max} = 1.5A$, $P_{max} = 20W$, $0^\circ C \leq T_j \leq 125^\circ C$; unless otherwise specified.)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit	
参考电压 Reference voltage	V_{REF}	$3V \leq V_i - V_o \leq 40V$, $10mA \leq I_o \leq I_{max}$, $P_D \leq P_{max}$	1.20	1.25	1.30	V	
线性调节 Line Regulation	REGline	$T_a = 25^\circ C$, $3V \leq V_{in} \leq 40V$	--	0.01	0.04	% / V	
		$T_a = 0 - 125^\circ C$, $3V \leq V_{in} \leq 40V$	--	0.02	0.07		
负载调节 Load Regulation	REGload	$T_a = 25^\circ C$, $10mA \leq I_o \leq I_{max}$	$V_o \leq 6V$	--	18	25	mV
			$V_o \leq 5V$	--	0.4	0.5	% / V_o
		$10mA \leq I_o \leq I_{max}$	$V_o \leq 5V$	--	40	70	mV
			$V_o \leq 6V$	--	0.8	1.5	% / V_o
可调式引脚端电流 Adjustable Pin Current	I_{ADJ}		--	46	100	μA	
可调式引脚电流变化 Quiescent Current Change	ΔI_{ADJ}	$2.5V \leq V_i - V_o \leq 40V$ $10mA \leq I_o \leq I_{max}$, $P_D \leq P_{max}$	--	2.0	5		
温度稳定性 Temperature Stability	STT		--	0.7	--	% / V_o	
最小负载调节电流 Minimum Load Current for regulation	$I_L(\min)$	$V_i - V_o = 40V$		3.5	10	mA	
最大输出电流 Maximum output Current	$I_o(\max)$	$V_i - V_o \leq 15V$, $P_D \leq P_{max}$	1.5	2.2		A	
		$V_i - V_o \leq 15V$, $P_D \leq P_{max}$, $T_a = 25^\circ C$	0.15	0.4			
纹波抑制 Ripple Rejection Ratio	RR	$f = 120Hz$, $V_o = 10V$, $C_{ADJ} = 0$	--	60	--	dB	
		$f = 120Hz$, $V_o = 10V$, $C_{ADJ} = 10\mu F$	66	75	--		
均方根噪声, V_o 的百分比 RMS Noise V.S.% of V_{out}	eN	$T_a = 25^\circ C$, $10Hz \leq f \leq 10KHz$		0.003	0.01	% / V_o	
长期稳定度 Long-term Stability $T_J = T_{HIGH}$	ST	$T_a = 25^\circ C$, 1000hr	--	0.3	1	%	

注：应采用低占空比脉冲测试，以免产生发热效果。

Note: Testing with low duty pulse should be used to avoid heating effect.

典型特性曲线 Typical Characteristics curves

Fig.1. Load Regulation vs temperature

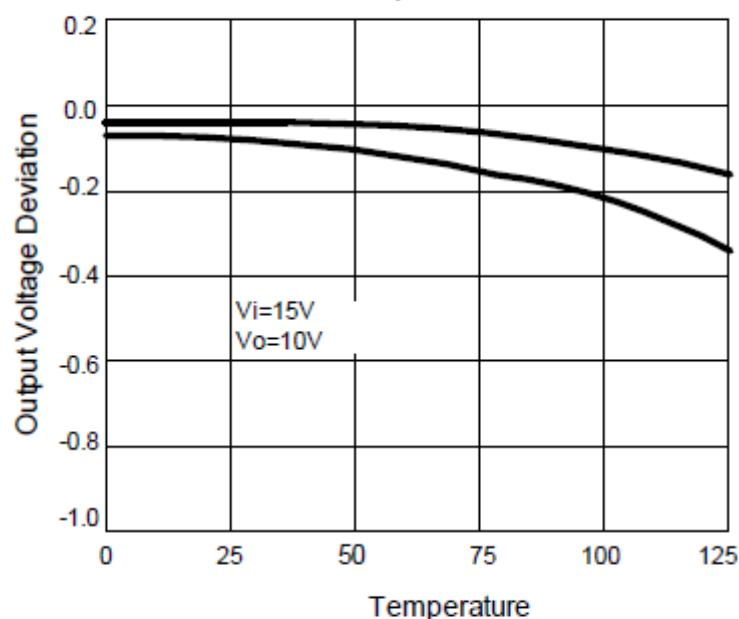


Fig.2 Adjustment Current vs Temperature

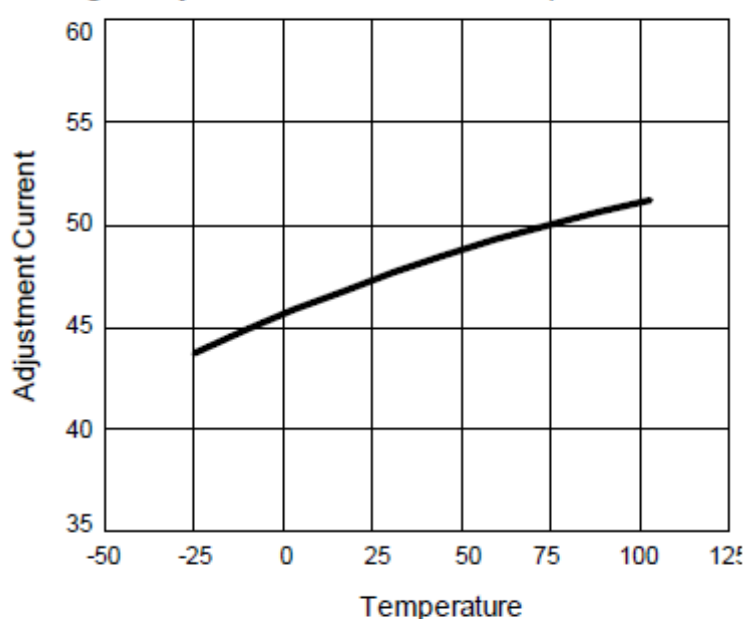


Fig.3. Dropout Voltage vs Input-Output Voltage Difference

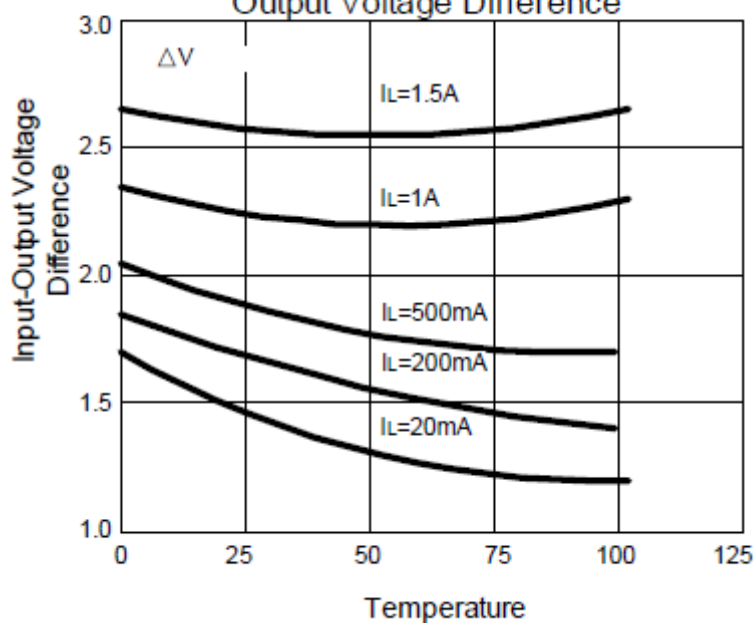
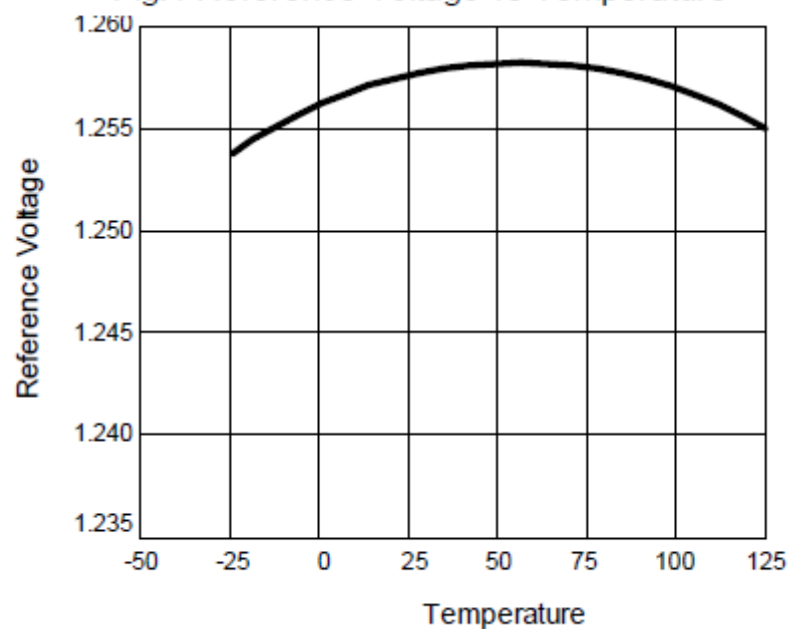


Fig.4 Reference Voltage vs Temperature



典型应用电路 Typical application circuit

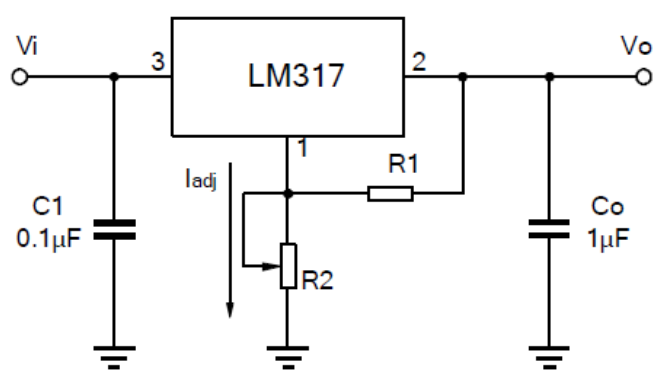


Fig.5 Programmable voltage regulator

$$V_o = 1.25V \cdot (1 + R_2/R_1) + I_{adj} \cdot R_2$$

C1 is required when regulator is located an appreciated distance from power supply. Co is needed to improve transient response.

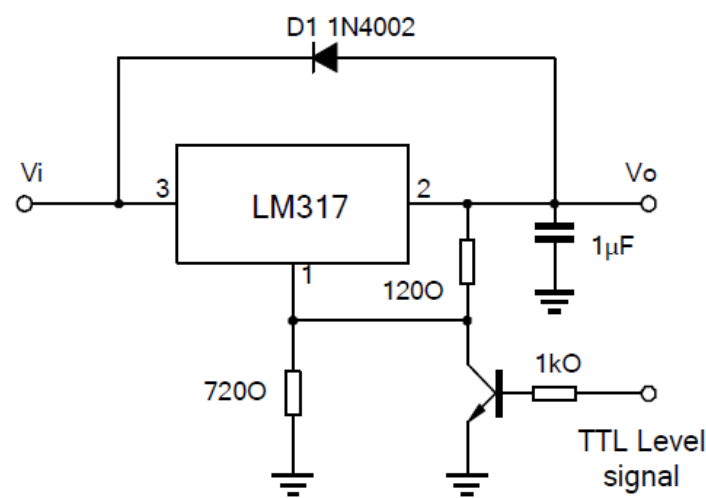


Fig.6 Regulator with On-off control

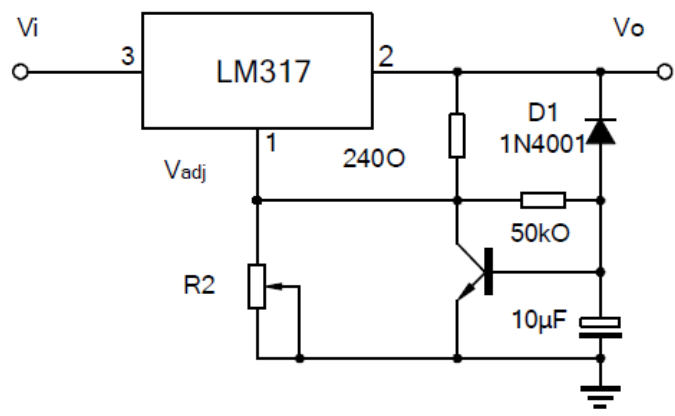
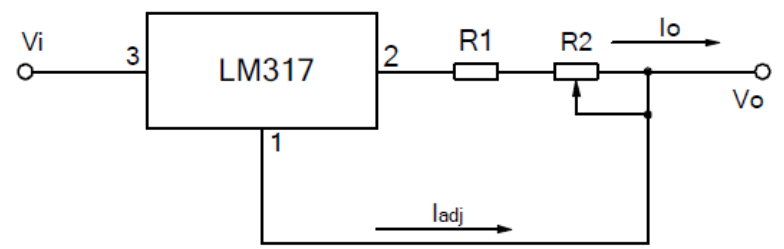


Fig.7 Soft start application



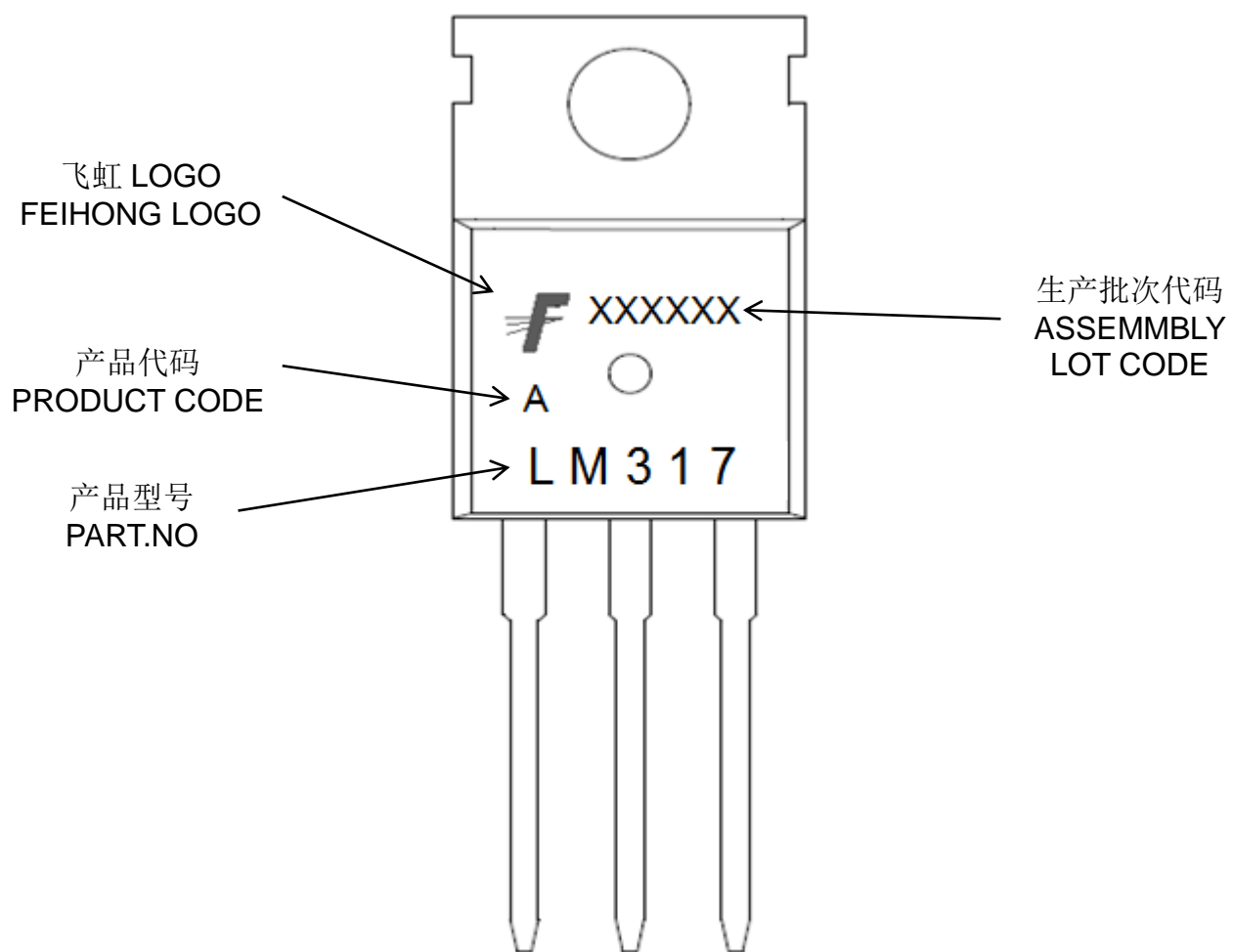
$$I_{\text{omax}} = \left(\frac{V_{\text{ref}}}{R1} \right) + I_{\text{adj}} = \frac{1.25V}{R1}$$

$$I_{\text{omin}} = \left(\frac{V_{\text{ref}}}{R1+R2} \right) + I_{\text{adj}} = \frac{1.25V}{R1+R2}$$

$$5\text{mA} < I_o < 100\text{mA}$$

Fig.8 Constant current application

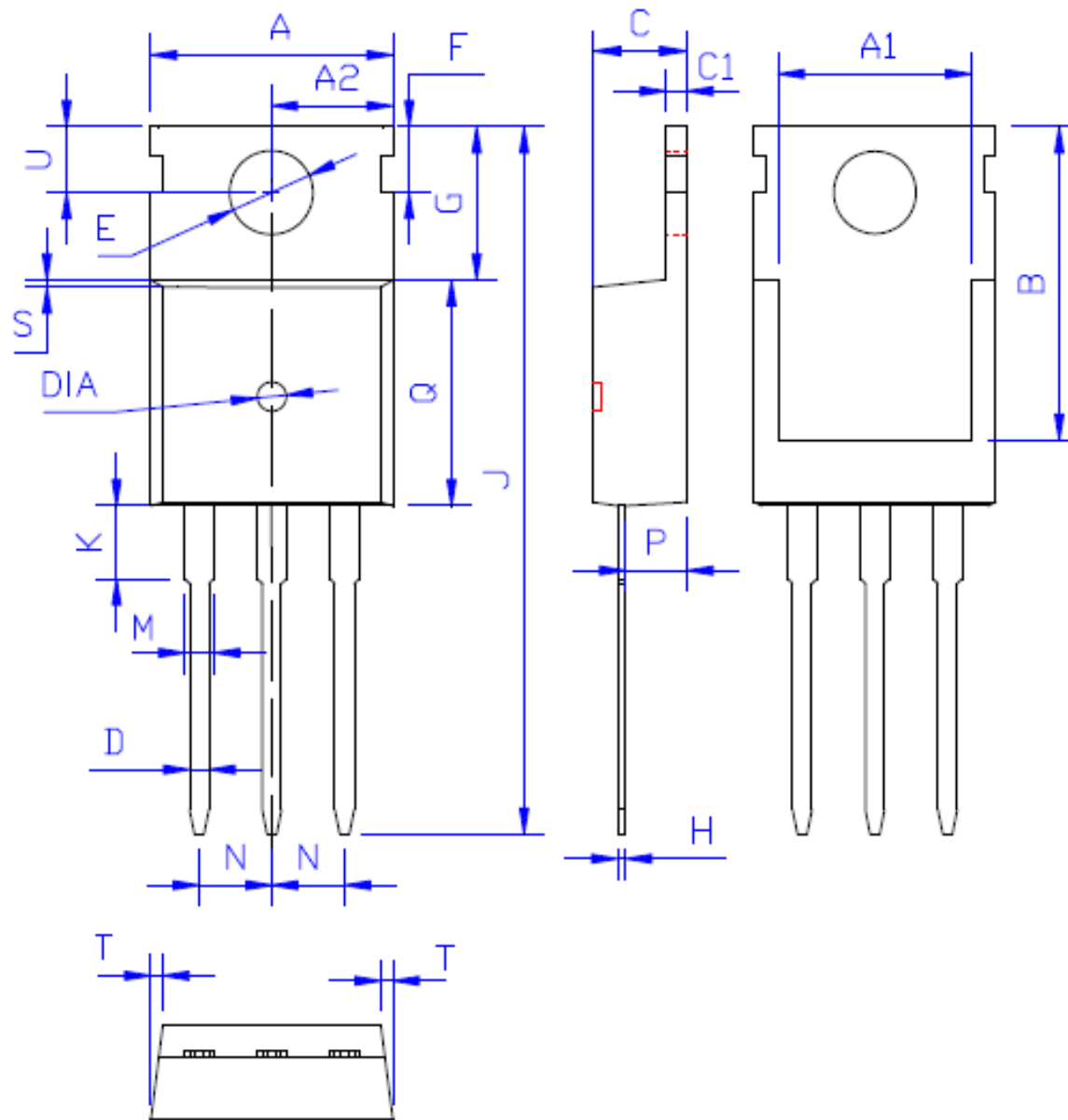
印记 Marking:



外形尺寸:

Package Dimension:

TO-220



DIM	MILLIMETERS
A	10.00 ± 0.30
A1	8.00 ± 0.30
A2	5.00 ± 0.30
B	13.20 ± 0.40
C	4.50 ± 0.20
C1	1.30 ± 0.20
D	0.80 ± 0.20
E	3.60 ± 0.20
F	3.00 ± 0.30
G	6.60 ± 0.40
H	0.50 ± 0.20
J	28.88 ± 0.50
K	3.00 ± 0.30
M	1.30 ± 0.30
N	Typical 2.54
P	2.40 ± 0.40
Q	9.20 ± 0.40
S	0.25 ± 0.15
T	0.25 ± 0.15
U	2.80 ± 0.30
DIA	宽 1.50 ± 0.10 深 0.50 MAX

(Unit: mm)