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TD250N06

產品規格說明書

N 沟道增强型场效应晶体管
N-CHANNEL MOSFET
TD250N06

主要参数 MAIN CHARACTERISTICS

ID (Silicon limit)	250 A
VDSS	60 V
Rdson-typ（@Vgs=10V）	1.88 mΩ
Qg-typ	77 nC

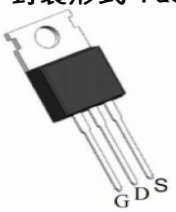
产品特性 FEATURES

低栅极电荷	Low gate charge
低 Crss (典型值 115 pF)	Low Crss (typical 115 pF)
开关速度快	Fast switching
100%经过 Rg 测试	100% Rg tested
100%经过雪崩测试	100% avalanche tested
100%经过热阻测试	100% DVDS tested
SGT 工艺	SGT process
符合 RoHS 标准	ROHS compliant

用途 APPLICATIONS

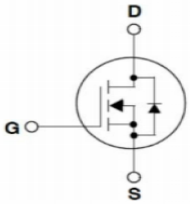
UPS不间断电源	Uninterrupible Power Supplies
直流转换器	DC-DC Converter
逆变电源	Power management for inverter systems

封装形式 Package



TO-220
P series

等效电路 Equivalent Circuit



绝对最大额定值 ABSOLUTE RATINGS (Tc=25℃)

项目 Parameter	符号 Symbol	数值 Value	单位 Unit
		TD250N06	
最高漏极—源极直流电压 Drain-Source Voltage	V_{DS}	60	V
连续漏极电流* Drain Current -continuous *	I_D(TC=25℃) (Silicon limit)	250	A
	I_D(TC=25℃) (Package limit)	120	
	I_D(TC=100℃) (Silicon limit)	157	
最大脉冲漏极电流（注 1） Drain Current – pulse（note 1）	I_{DM}	480	A
最高栅源电压 Gate-Source Voltage	V_{GS}	±20	V
单脉冲雪崩能量（注 2） Single Pulsed Avalanche Energy（note 2）	E_{AS}	450	mJ
雪崩电流（注 1） Avalanche Current（note 1）	I_{AR}	30	A
二极管反向恢复最大电压变化速率（注 3） Peak Diode Recovery dv/dt（note 3）	dv/dt	5.0	V/ns
耗散功率 Power Dissipation	P_D （TC=25℃）	249	W
	-Derate above 25℃	2.0	W/℃
最高结温及存储温度 Operating and Storage Temperature Range	T_J，T_{STG}	150，-55～+150	℃
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T_L	260	℃

*漏极电流由最高结温限制

*Drain current limited by maximum junction temperature

电特性 ELECTRICAL CHARACTERISTICS

项目 **Parameter**	符号 **Symbol**	测试条件 **Tests conditions**	最小 **Min**	典型 **Typ**	最大 **Max**	单位 **Units**
关态特性 **Off –Characteristics**						
漏－源击穿电压 Drain-Source Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	60	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta$ TJ	I_D=250μA, referenced to 25℃	-	0.06	-	V/℃
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V, T_C=25℃	-	-	1	μA
		V_{DS}=48V, T_C=125℃	-	-	100	μA
栅极体漏电流 Gate-body leakage current	I_{GSS}（F/R）	V_{DS}=0V, V_{GS} =±20V	-	-	±100	nA
通态特性 **On-Characteristics**						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = VGS , I_D=250μA	2.0	-	4.0	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} =10V , I_D=50A	-	1.88	2.2	mΩ
动态特性 **Dynamic Characteristics**						
栅电阻 Gate Resistance	Rg	f=1.0MHz,V_{DS} OPEN	-	0.7	-	Ω
输入电容 Input capacitance	Ciss	V_{DS}=30V, V_{GS} =0V, f=1.0MHz	-	5072	-	pF
输出电容 Output capacitance	Coss		-	1273	-	
反向传输电容 Reverse transfer capacitance	Crss		-	115	-	
开关特性 **Switching Characteristics**						
延迟时间 Turn-On delay time	td(on)	V_{DD}=30V, I_D=50A, R_G=2.5Ω V_{GS} =10V （note 4，5）	-	23	-	ns
上升时间 Turn-On rise time	tr		-	21	-	ns
延迟时间 Turn-Off delay time	td(off)		-	35	-	ns
下降时间 Turn-Off Fall time	tf		-	12	-	ns
栅极电荷总量 Total Gate Charge	Qg	V_{DS} =30V , I_D=50A , V_{GS} =10V （note 4，5）	-	77	-	nC
栅－源电荷 Gate-Source charge	Qgs		-	27	-	nC
栅－漏电荷 Gate-Drain charge	Qgd		-	10	-	nC
漏－源二极管特性及最大额定值 **Drain-Source Diode Characteristics and Maximum Ratings**						
正向最大连续电流 Maximum Continuous Drain-Source Diode Forward Current	I_S		-	-	120	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}		-	-	480	A
正向压降 Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=50A	-	-	1.2	V
反向恢复时间 Reverse recovery time	trr	V_{GS}=0V, I_S=50A ,dI_F/dt=100A/μs (note 4)	-	88	-	ns
反向恢复电荷 Reverse recovery charge	Qrr		-	252	-	nC

热特性 THERMAL CHARACTERISTIC

项目 Parameter	符号 Symbol	TD250N06	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	Rth(j-c)	0.5	℃/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	Rth(j-A)	62.5	℃/W

注释：
1：脉冲宽度由最高结温限制
2：L=1mH, I_{AS}=30A, V_{DD}=50V, R_G=25 Ω,起始结温 T_J=25℃
3：I_{SD} ≤120A,di/dt ≤300A/μs,V_{DD}≤BV_{DSS},起始结温 T_J=25℃
4：脉冲测试：脉冲宽度 ≤300μs,占空比≤2%
5：基本与工作温度无关

Notes:
1：Pulse width limited by maximum junction temperature
2：L=1mH, I_{AS}=30A, V_{DD}=50V, R_G=25 Ω,Starting T_J=25℃
3：I_{SD} ≤120A,di/dt ≤300A/μs,V_{DD}≤BV_{DSS}, Starting T_J=25℃
4：Pulse Test：Pulse Width ≤300μs,Duty Cycle≤2%
5：Essentially independent of operating temperature

Typical Performance Characteristics

Fig 1: Output Characteristics

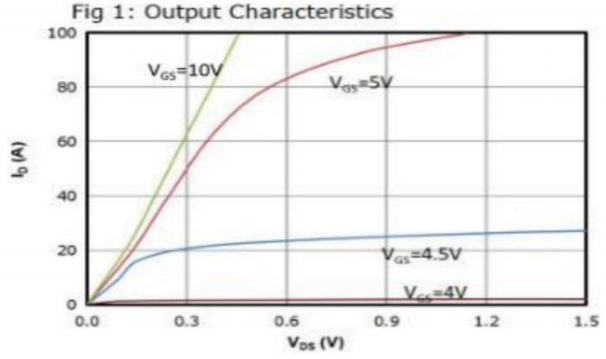


Fig 2: Transfer Characteristics

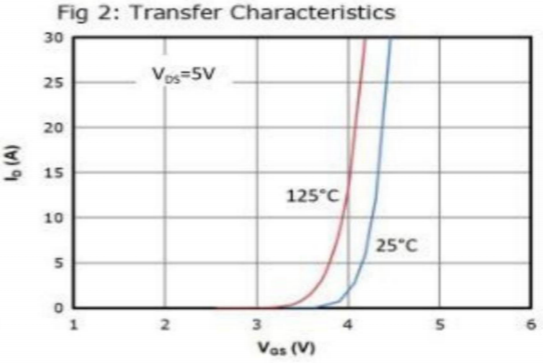


Fig 3: Rds(on) vs Drain Current and Gate Voltage

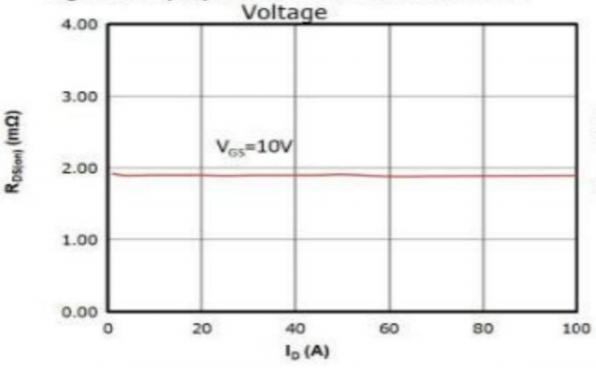


Fig 4: Rds(on) vs Gate Voltage

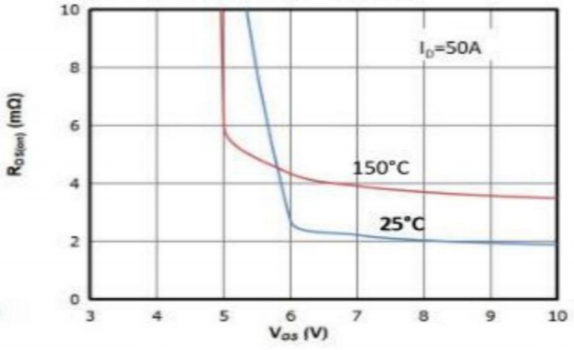


Fig 5: Rds(on) vs. Temperature

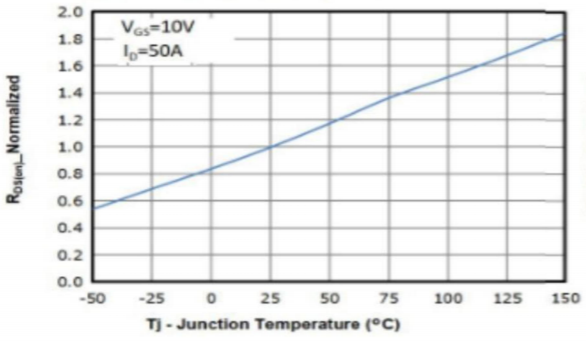


Fig 6: Vgs(th) vs. Temperature

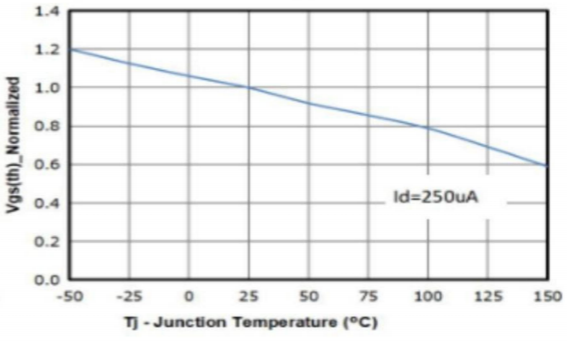


Fig 7: BVdss vs. Temperature

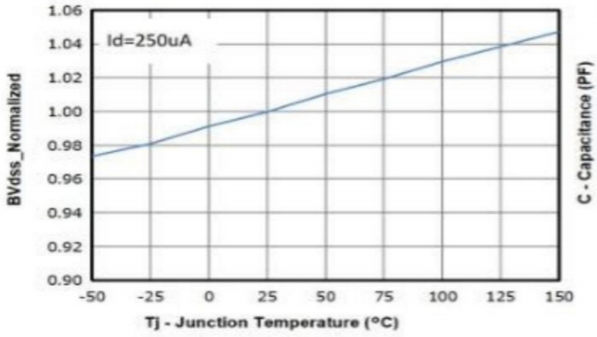


Fig 8: Capacitance Characteristics

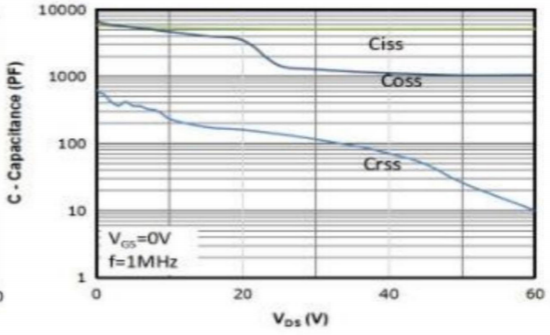


Fig 9: Gate ChargeCharacteristics

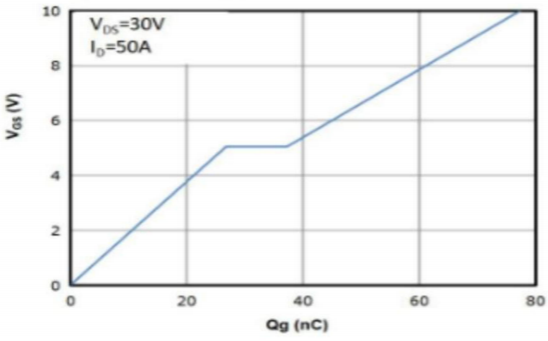


Fig 10: Body-diode Forward Characteristics

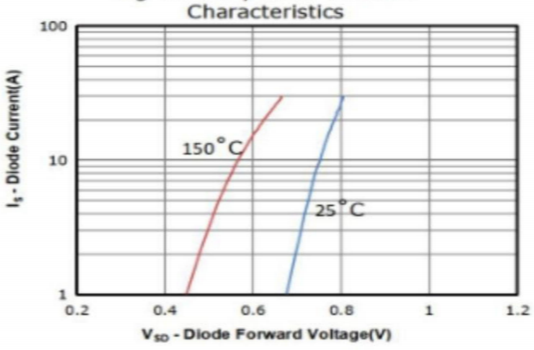


Fig 11: Power Dissipation

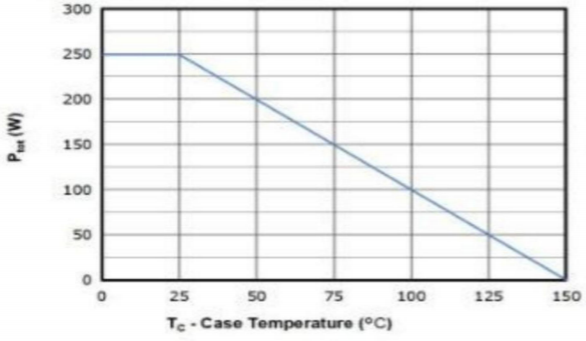


Fig 12: Drain Current Derating

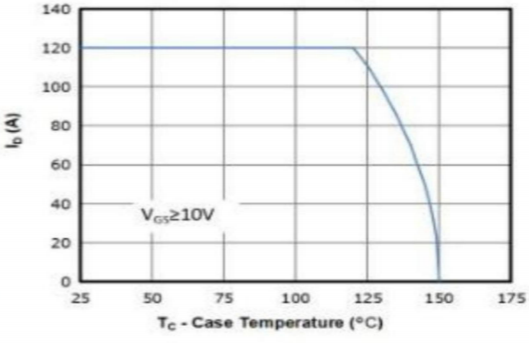


Fig 13: Safe Operating Area

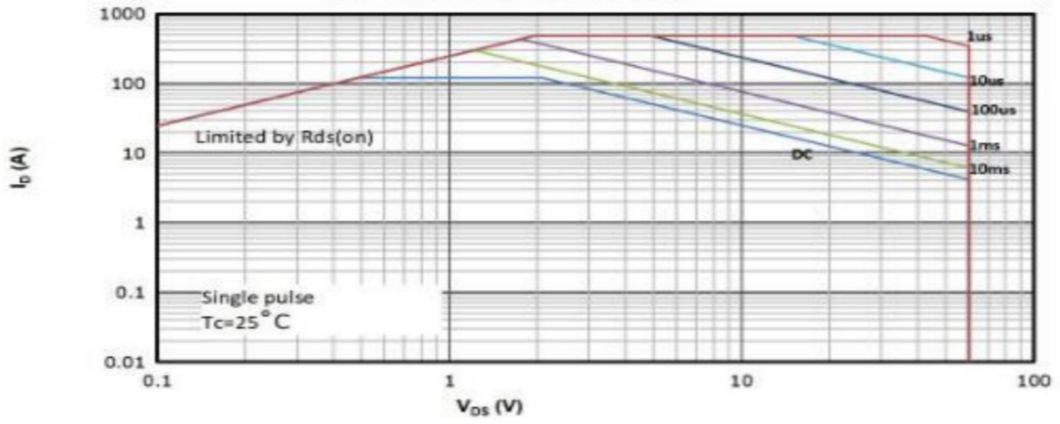
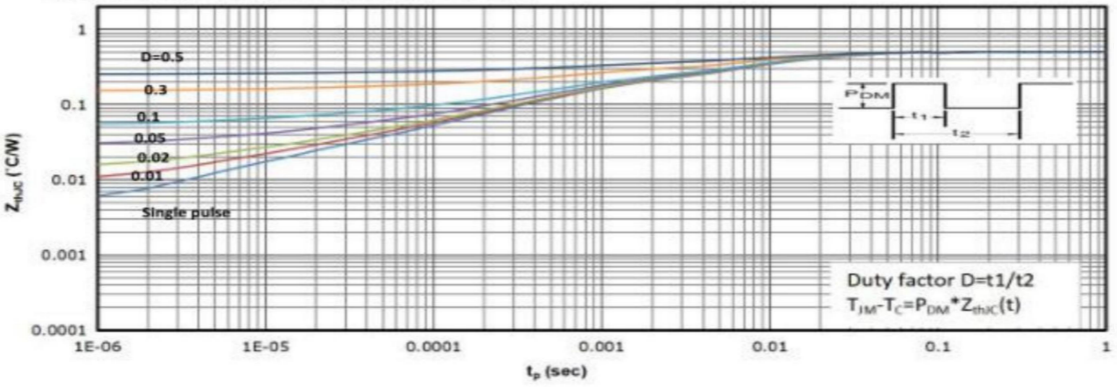
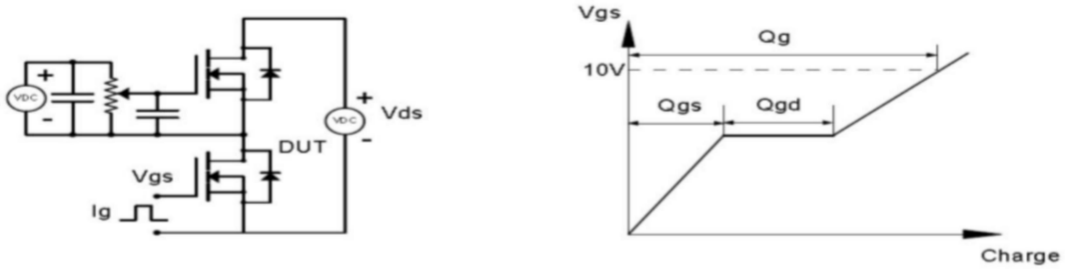


Fig 14: Max. Transient Thermal Impedance

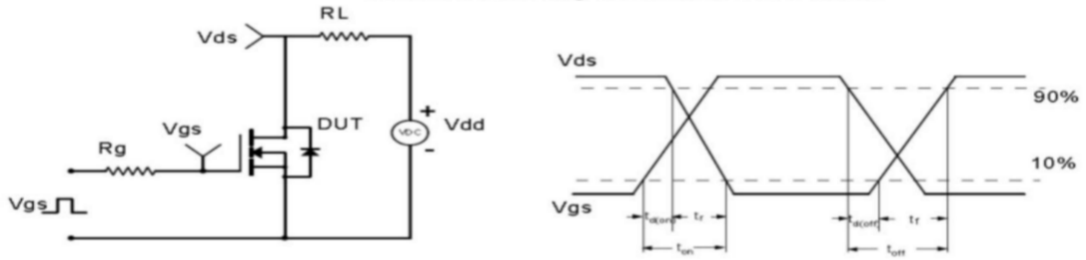


Test Circuit & Waveform

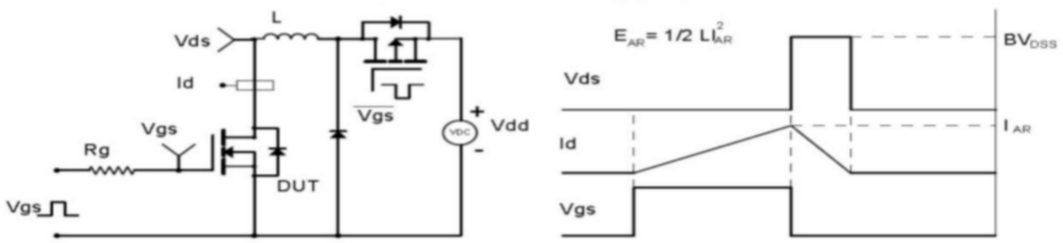
Gate Charge Test Circuit & Waveform



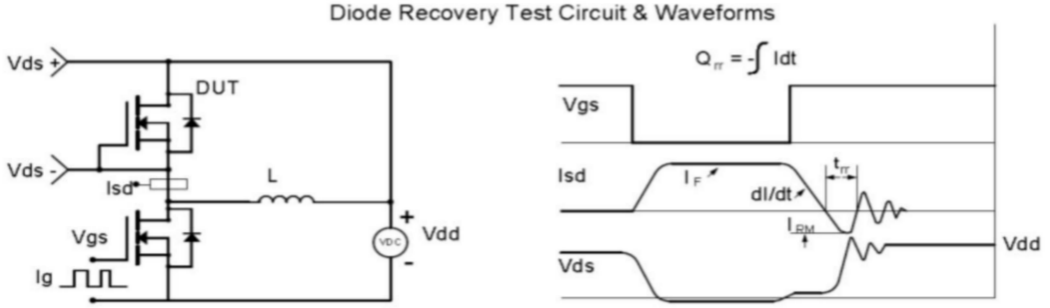
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



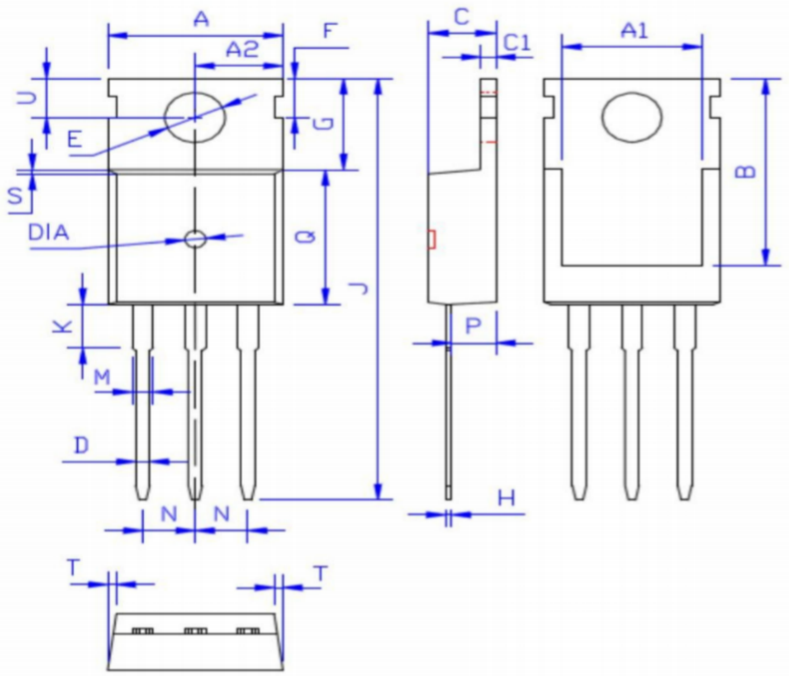
Diode Recovery Test Circuit & Waveforms



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）