



MC10N020

主要参数 MAIN CHARACTERISTICS

I_D	45A
V_{DS}	100V
$R_{ds(on)-typ}$ (@ $V_{GS}=10V$)	17m Ω
Q_g-typ	21nC

用途

- 高功率 DC/DC 转换与功率开关
- 同步整流领域 DC/DC 与 AC/DC 转换
- 直流电机控制

APPLICATIONS

- High power DC/DC Converters and switch mode power supplies
- Synchronous Rectification in DC/DC and AC/DC Converters
- DC Motor Control

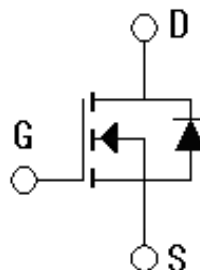
产品特性

- 低栅极电荷
- 低 $R_{ds(on)}$
- 开关速度快
- 产品全部经过雪崩测试
- 高可靠性
- RoHS 产品

FEATURES

- Low gate charge
- Low $R_{ds(on)}$
- Fast switching
- 100% avalanche tested
- Highest reliability
- RoHS product

封装 Package



订货信息 ORDER MESSAGE

订 货 型 号 Order codes				印 记 Marking	封 装 Package
有卤-条管 Halogen-Tube	无卤-条管 Halogen-Free-Tube	有卤-编带 Halogen-Reel	无卤-编带 Halogen-Free-Reel		
MC10N020-C-B	MC10N020-C-BR	N/A	N/A	MC10N020	TO-220C
MC10N020-S-B	MC10N020-S-BR	MC10N020-S-A	MC10N020-S-AR	MC10N020	TO-263



绝对最大额定值 ABSOLUTE RATINGS ($T_c=25^{\circ}\text{C}$)

项 目 Parameter	符 号 Symbol	数 值 Value	单 位 Unit
		MC10N020	
最高漏极-源极直流电压 Drain-Source Voltage	V_{DSS}	100	V
连续漏极电流 Drain Current -continuous	I_D $T=25^{\circ}\text{C}$	45*	A
	I_D $T=100^{\circ}\text{C}$	29*	A
最大脉冲漏极电流 (注1) Drain Current - pulse (note 1)	I_{DM}	180*	A
最高栅源电压 Gate-Source Voltage	V_{GSS}	± 20	V
单脉冲雪崩能量 (注2) Single Pulsed Avalanche Energy (note 2)	E_{AS}	130	mJ
雪崩电流 (注1) Avalanche Current (note 1)	I_{AS}	23	A
耗散功率 Power Dissipation	P_D $T_c=25^{\circ}\text{C}$ -Derate above 25°C	96	W
		0.77	W/ $^{\circ}\text{C}$
最高结温及存储温度 Operating and Storage Temperature Range	T_J, T_{STG}	$-55 \sim +150$	$^{\circ}\text{C}$
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T_L	300	$^{\circ}\text{C}$

*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}	$I_D=250\mu A, V_{GS}=0V$	100	-	-	V
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V,$ $T_C=25^\circ C$	-	-	10	μA
正向栅极体漏电流 Gate-body leakage current, forward	I_{GSSF}	$V_{DS}=0V, V_{GS}=20V$	-	-	100	nA
反向栅极体漏电流 Gate-body leakage current, reverse	I_{GSSR}	$V_{DS}=0V, V_{GS}=-20V$	-	-	-100	nA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D=250\mu A$	2	2.7	4	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	17	20	m Ω
正向跨导 Forward Transconductance	g_{fs}	$V_{DS}=5V, I_D=50A$ (note 4)	-	30	-	S
动态特性 Dynamic Characteristics						
栅电阻 Gate resistance	R_g	$f=1.0MHz, \text{open drain}$	-	1.5	-	Ω
输入电容 Input capacitance	C_{iss}	$V_{DS}=50V,$ $V_{GS}=0V,$ $f=1.0MHz$	-	1400	-	pF
输出电容 Output capacitance	C_{oss}		-	175	-	pF
反向传输电容 Reverse transfer capacitance	C_{rss}		-	7	-	pF



**电特性 ELECTRICAL CHARACTERISTICS**

开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	$t_d(\text{on})$	$V_{DD}=50V, V_{GS}=10V$ $I_D=30A, R_G=5.0\Omega$, (note 3, 4)	-	11	-	ns
上升时间 Turn-On rise time	t_r		-	60	-	ns
延迟时间 Turn-Off delay time	$t_d(\text{off})$		-	17	-	ns
下降时间 Turn-Off Fall time	t_f		-	57	-	ns
栅极电荷总量 Total Gate Charge	Q_g	$V_{DS}=50V, V_{GS}=10V$ $I_D=30A$ (note 3, 4)	-	21	-	nC
栅—源电荷 Gate-Source charge	Q_{gs}		-	10	-	nC
栅—漏电荷 Gate-Drain charge	Q_{gd}		-	3.7	-	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	$T_C=25^{\circ}C$	-	-	45	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	$T_C=25^{\circ}C$	-	-	180	A
正向压降 Drain-Source Diode Forward Voltage	V_{SD}	$T_J=25^{\circ}C, V_{GS}=0V, I_{SD}=20A$	-	0.9	1.3	V
反向恢复时间 Reverse recovery time	T_{rr}	$V_{GS}=0V, I_S=30A$ $dI_F/dt=100A/\mu s$ (note 4)		55		ns
反向恢复电荷 Reverse recovery charge	Q_{rr}			100		nc

热特性 THERMAL CHARACTERISTIC

项 目 Parameter	符 号 Symbol	最大 Max MC10N020	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	$R_{th(j-c)}$	1.50	$^\circ C/W$
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th(j-a)}$	62.5	$^\circ C/W$

注释:

1: 脉冲宽度由最高结温限制

2: $I_{AS}=23A, V_{DD}=50V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$, 起始结温 $T_J=25^\circ C$ 3: 脉冲测试: 脉冲宽度 $\leq 300\mu s$, 占空比 $\leq 2\%$

4: 基本与工作温度无关

Notes:

1: Pulse width limited by maximum junction temperature

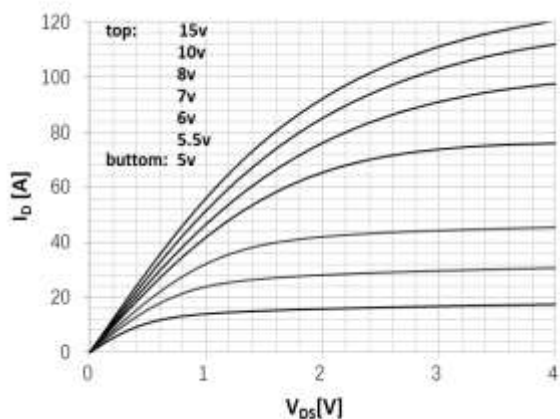
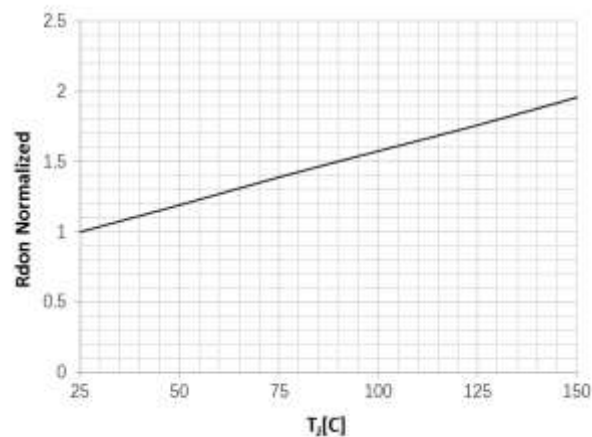
2: $I_{AS}=23A, V_{DD}=50V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$, Starting $T_J=25^\circ C$ 3: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

4: Essentially independent of operating temperature

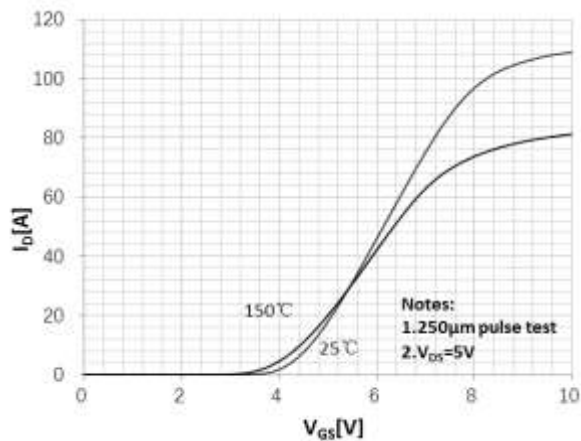




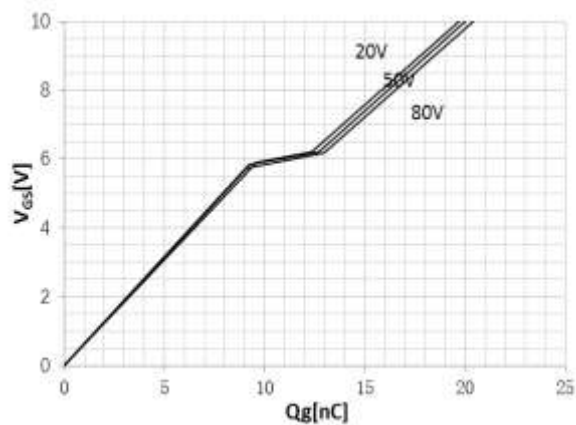
On-Region Characteristics

RDSON vs. T_J 

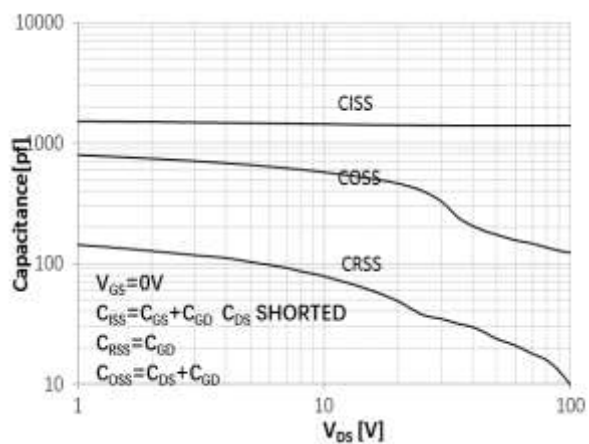
Transfer Characteristics



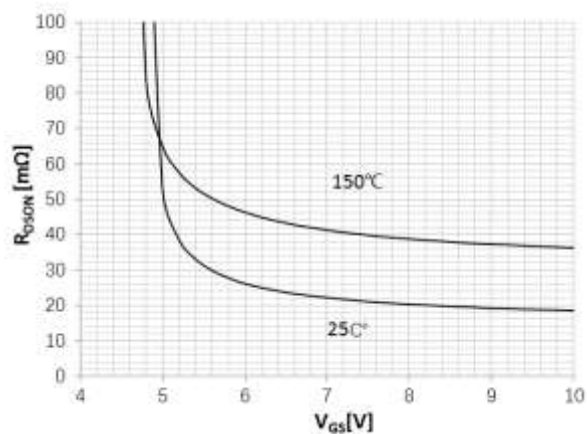
Gate Charge Characteristics

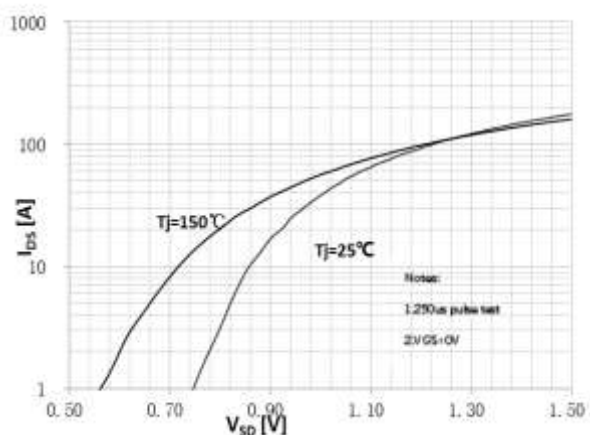
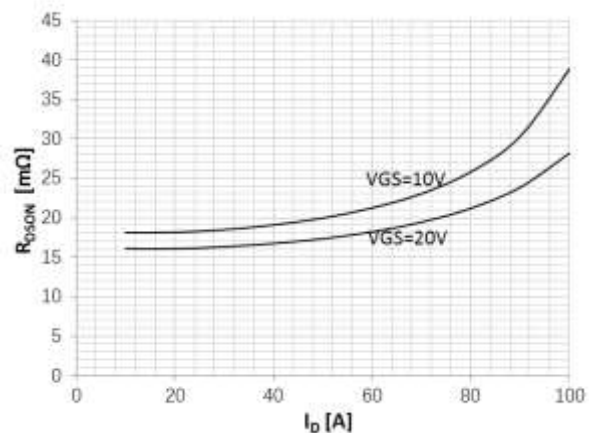
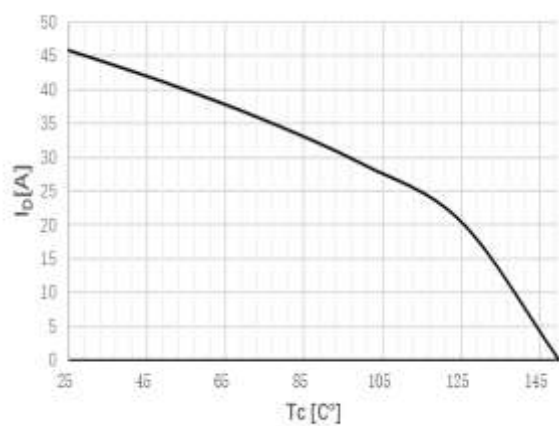
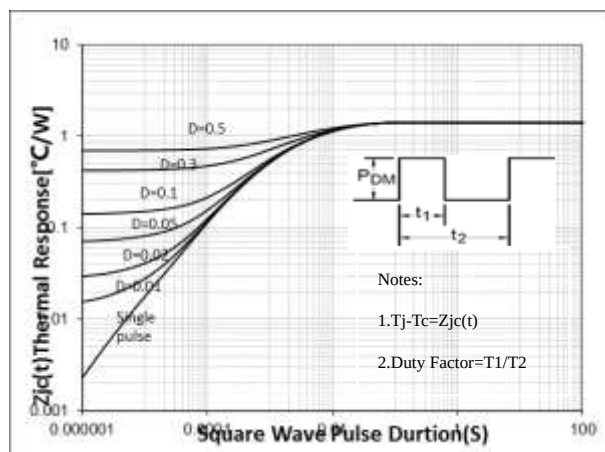
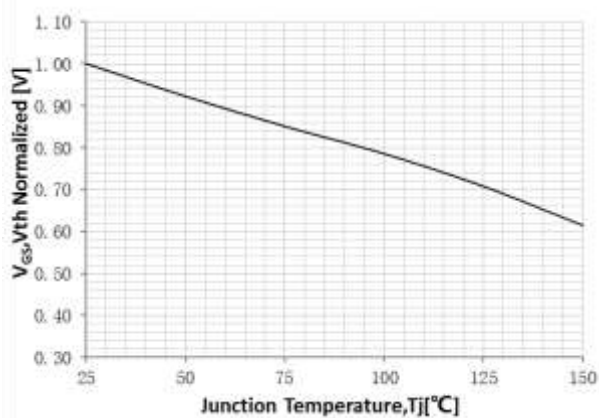
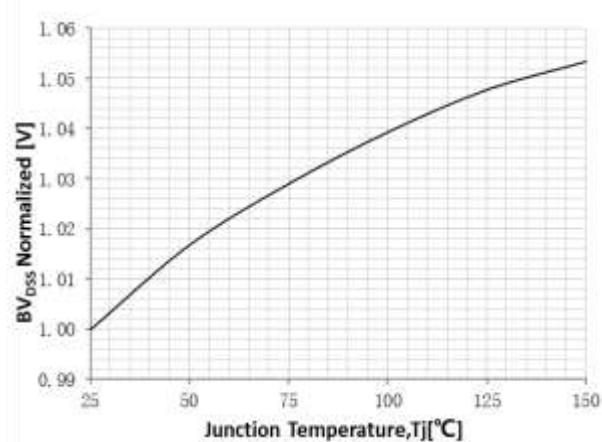


Capacitance Characteristics

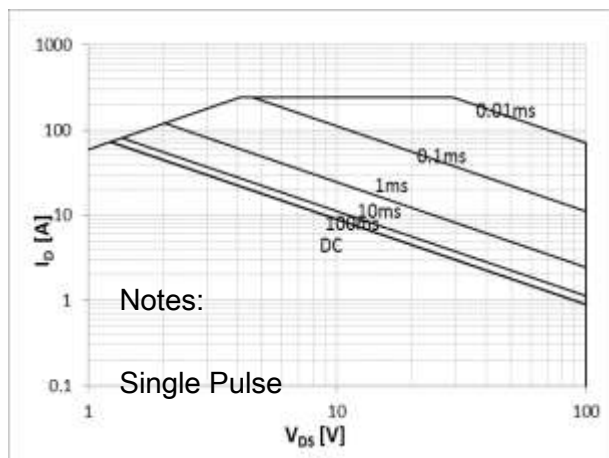


Drain-Source on resistance

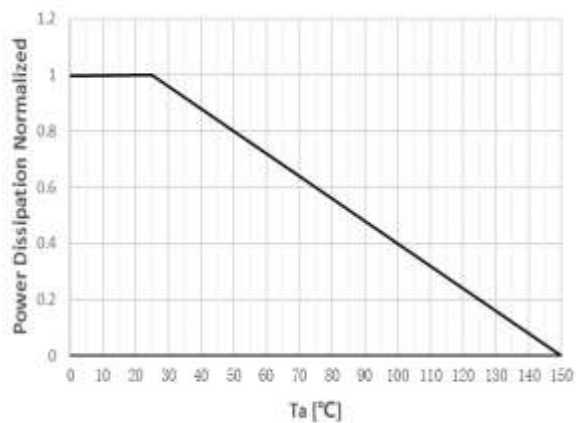


**Body Diode Forward Voltage Variation vs. Source Current and Temperature****On-Resistance Variation vs. Drain Current and Gate Voltage****Drain Current Dissipation vs T_c** **Transient Thermal Impedance****Gate Threshold Voltage Variation vs T_J** **Breakdown Voltage Variation vs T_J** 

Maximum Safe Operation



Power Dissipation vs Ta

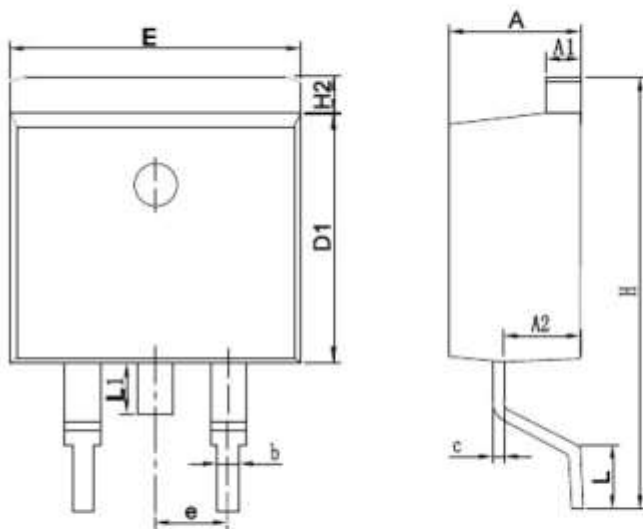




外形尺寸 PACKAGE MECHANICAL DATA

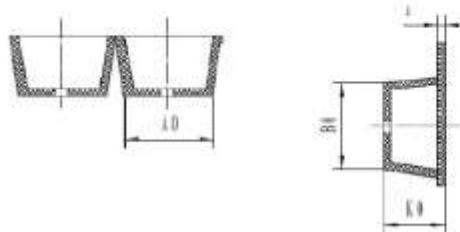
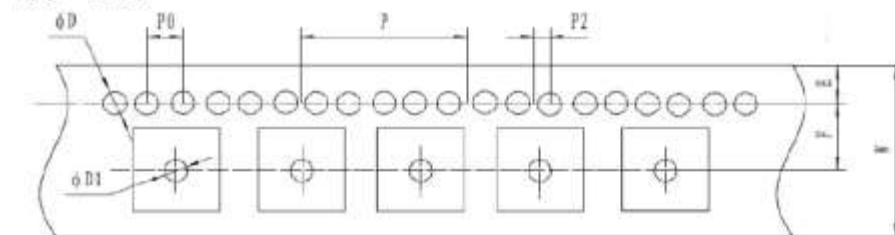
TO-263

单位 Unit: mm



SYMBOL	MM	
	MIN	MAX
A	4.30	4.80
A1	1.12	1.42
A2	2.54	2.84
b	0.67	1.00
c	0.29	0.52
D1	8.40	9.00
E	9.80	10.46
e	2.54BSC	
H	14.00	16.00
H2	1.12	1.45
L	1.50	3.10
L1	1.45	1.70

编带 REEL

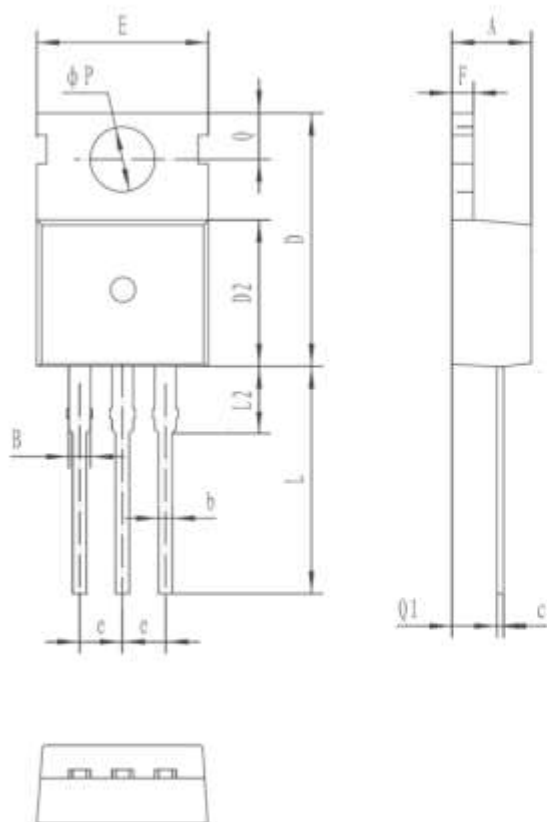


产品尺寸规格 (UNIT:mm)				
规格 W	AB	E	F	D
尺寸 24 ± 0.5	16.9 ± 0.1	1.75 ± 0.1	11.5 ± 0.1	$1.5 \pm 0.1/-0$
规格 D1	P0	P1	P	T
尺寸 $3.1 \pm 0.1/-0$	4 ± 0.1	3 ± 0.1	16 ± 0.1	0.31 ± 0.01
规格 K0	B0			
尺寸 4.9 ± 0.1	16.4 ± 0.1			



外形尺寸 PACKAGE MECHANICAL DATA

TO-220C



符号 symbol	MIN	MAX
A	4.30	4.70
B	1.10	1.40
b	0.70	0.95
c	0.40	0.65
D	15.20	16.20
D2	9.00	9.40
E	9.70	10.10
e	2.39	2.69
F	1.25	1.40
L	12.60	13.60
L2	2.80	3.20
Q	2.60	3.00
Q1	2.20	2.60
P	3.50	3.80



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