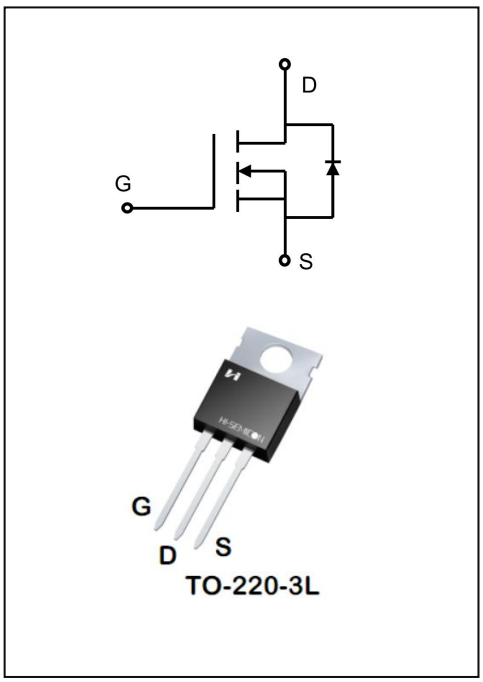
150V, 200A N-CHANNEL POWER MOSFET



GENERAL DESCRIPTION

The SGP154R0Tuses advanced SGT technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety applications.

Features

- ◆V_{DS}=150V, I_D=200A
- ◆$R_{DS(on)}$

  TYP: 4.1mΩ @V_{GS}=10V

Applications

- ◆Load Switch
- ◆PWM Application
- ◆Power Management

ORDERING INFORMATION

Part No.	Package	Marking	Material	Packing
SGP154R0T	TO-220-3L	SGP154R0T	Pb Free	Tube

ABSOLUTE MAXIMUM RATINGS (T_J=25°C unless otherwise noted)

Characteristics		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	150	V
Gate-Source Voltage		V_{GS}	±20	
Drain Current	T_C = 25°C	I_D	200	A
	T_C = 100°C		140	
Drain Current Pulsed(Note 1)		I_{DM}	800	
Power Dissipation(T_C=25°C)		P_D	233	W
Single Pulsed Avalanche Energy (Note 2)		E_{AS}	1332	mJ
Operation Junction Temperature Range		T_J	-55～+150	°C
Storage Temperature Range		T_{stg}	-55～+150	
Maximum lead temperature for soldering purposes,1/8" from case for 5 seconds		TL	300	

THERMAL CHARACTERISTICS

Characteristics	Symbol	MAX	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.54	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	56	°C/W

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain -Source Breakdown Voltage	B_{VDSS}	V_{GS}=0V, I_D=250μA	150	--	--	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=150V, V_{GS}=0V	--	--	1.0	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=20V, V_{DS}=0V	--	--	100	nA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=-20V, V_{DS}=0V	--	--	-100	
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}= V_{DS}, I_D=250μA	2.0	3.0	4.0	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=30A	--	4.1	4.8	mΩ
Dynamic Characteristics						
Gate Resistance	Rg	V_{GS}=0V, f=1.0MHZ	--	5.3	--	Ω
Input Capacitance	C_{iss}	V_{DS}=100V V_{GS}=0V f=1.0MHZ	--	8789	--	pF
Output Capacitance	C_{oss}		--	662	--	
Reverse Transfer Capacitance	C_{rss}		--	18.2	--	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=75V V_{DS}=10V R_G=3Ω	--	32	--	ns
Turn-on Rise Time	t_r		--	61	--	
Turn-off Delay Time	$t_{d(off)}$		--	88	--	
Turn-off Fall Time	t_f		--	49	--	

Total Gate Charge	Q_g	V_{DS}=75V, I_D=20A	--	125	--	nC
Gate-Source Charge	Q_{gs}	V_{GS}=10V	--	45	--	
Gate-Drain Charge	Q_{gd}	(Note 3.4)	--	31	--	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	Integral Reverse P-N Junction Diode in the MOSFET	--	--	200	A
Pulsed Source Current	I_{SM}		--	--	800	
Diode Forward Voltage	V_{SD}	I_S=30A,V_{GS}=0V	--	0.8	1.2	V
Reverse Recovery Time	T_{rr}	I_F=20A,V_R=10V, dIF/dt=100A/μS	--	113	--	ns
Reverse Recovery Charge	Q_{rr}		--	426	--	nC

1.Pluse width limited by maximum junction temperature

2.L=0.5mH, V_{DD}=50V, R_G=25Ω, starting T_J=25°C

3.Pulse Test: Pulse width ≤300μs, Duty cycle≤2%

4.Essentially independent of operating temperature

Figure 1: Output Characteristics

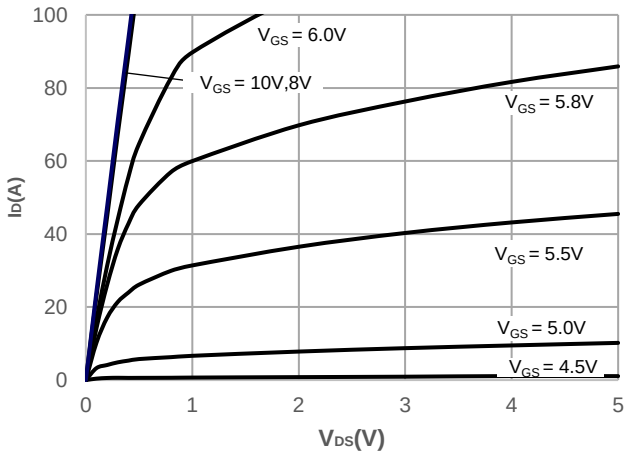


Figure 2: Typical Transfer Characteristics

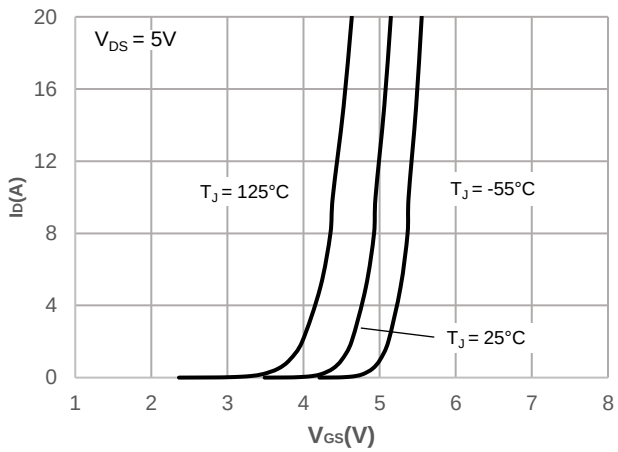


Figure 3: On-resistance vs. Drain Current

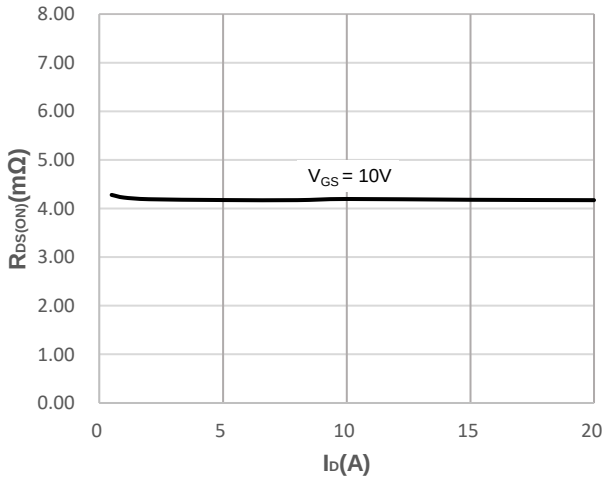


Figure 4: Body Diode Characteristics

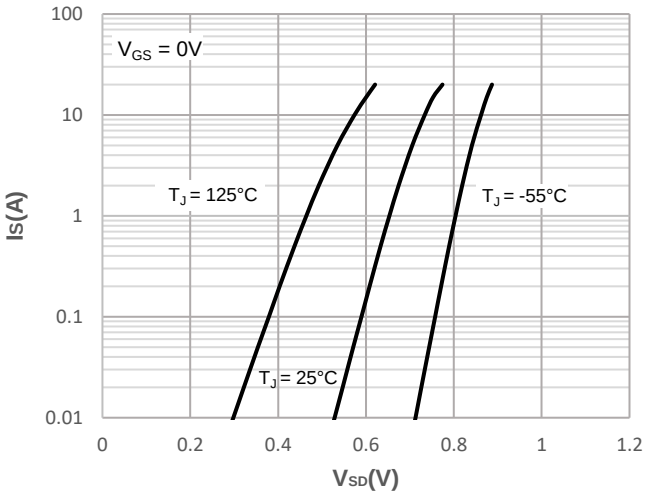


Figure 5: Gate Charge Characteristics

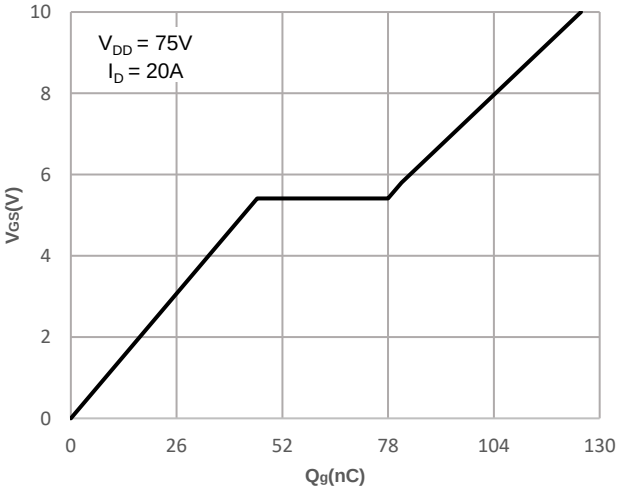
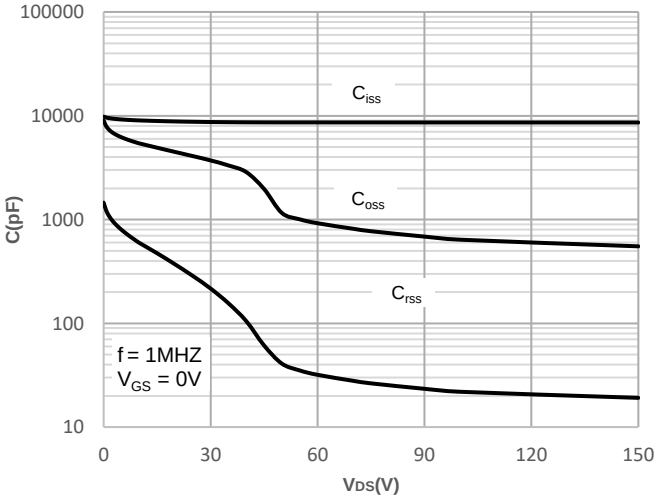


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

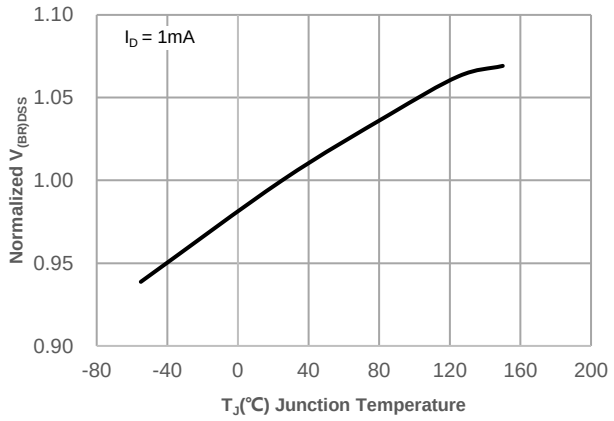


Figure 8: Normalized on Resistance vs. Junction Temperature

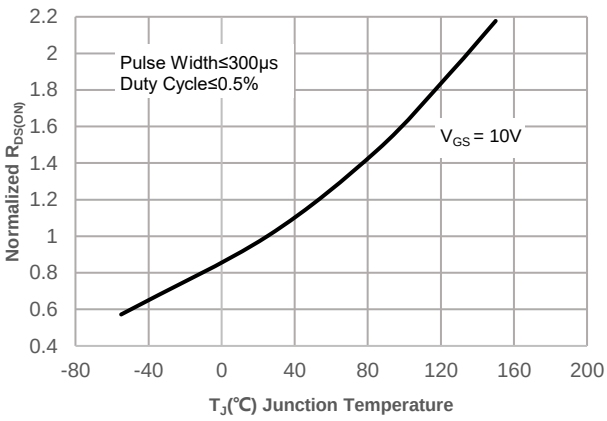


Figure 9: Normalized Threshold Voltage vs. Junction Temperature

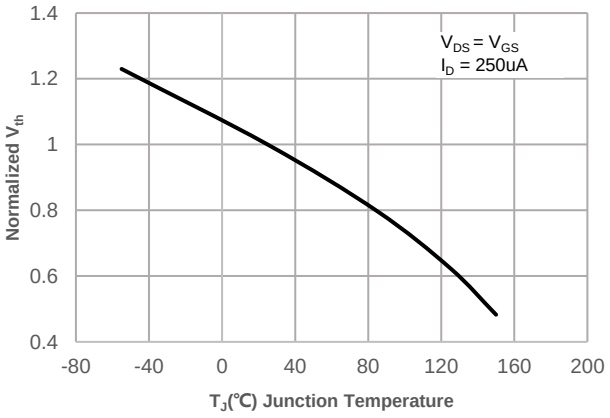


Figure 10: $R_{DS(ON)}$ vs. V_{GS}

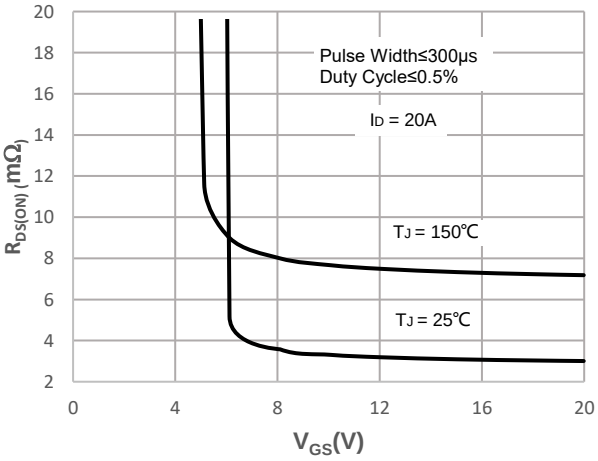
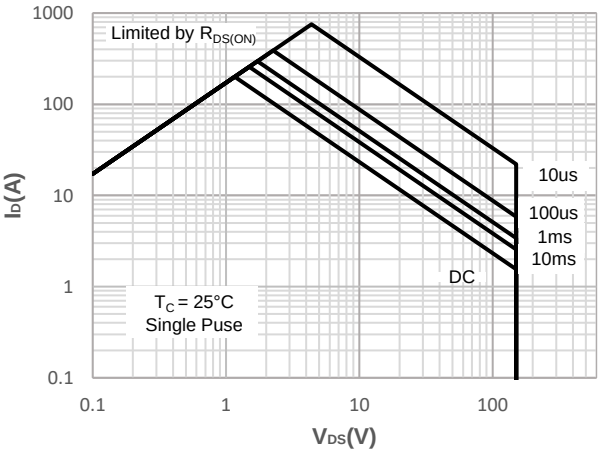
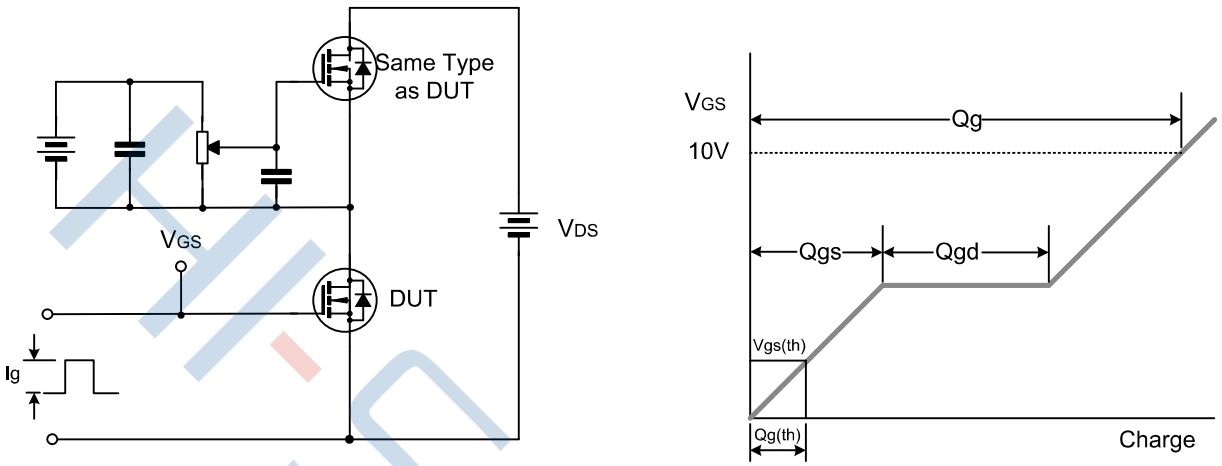


Figure 11: Maximum Safe Operating Area

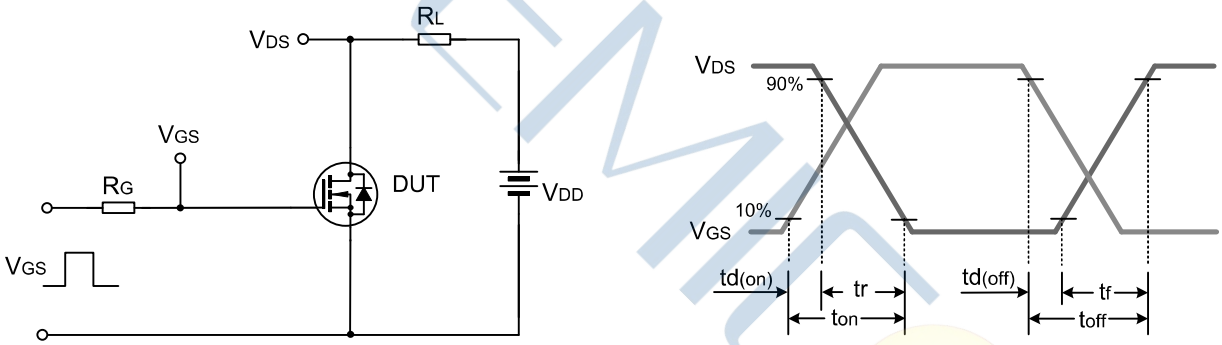


Test Circuit

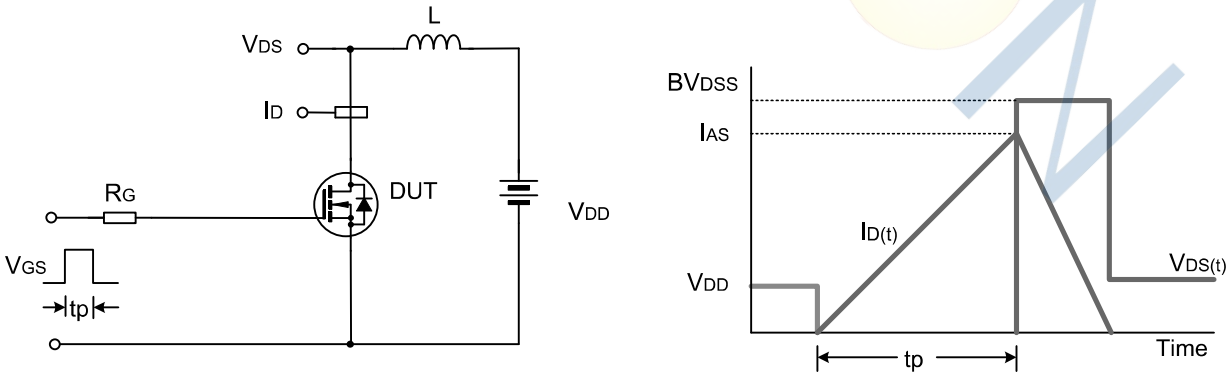
Gate Charge Test Circuit & Waveform



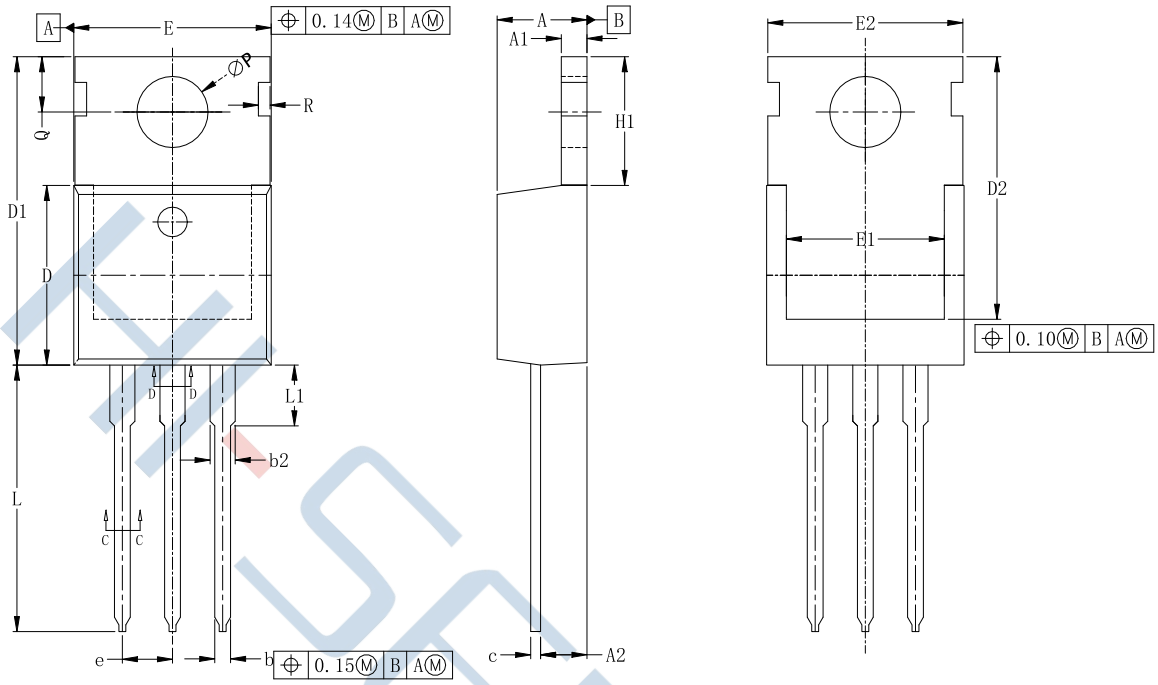
Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



Package Dimensions of TO-220-3L



TOP VIEW SIDE VIEW(Right) BOTTOM VIEW

SYMBOL \ DIM	MIN.	NOM.	MAX.
A	4.450	4.550	4.650
A1	1.240	1.340	1.440
A2	2.250	2.350	2.450
b	0.740	0.840	0.940
b1	0.700	0.800	0.900
b2	1.210	1.310	1.410
b3	1.170	1.270	1.370
c	0.440	0.540	0.640
c1	0.400	0.500	0.600
D	9.000	9.100	9.200
D1	15.420	15.620	15.820
D2	13.100	13.300	13.500
E	9.900	10.000	10.100
E1	7.800	8.000	8.200
E2	9.680	9.880	10.080
e	2.540 BSC.		
H1	6.420	6.520	6.620
L	13.300	13.500	13.700
L1	2.880	3.080	3.280
□P	3.500	3.600	3.700
Q	2.600	2.800	3.000
R	0.590 REF.		

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