

MT10P25P

-100V/-55A P-Channel Advanced Power MOSFET

V_{DS}	-100	V
$R_{DS(on),TYP@ V_{GS}=-10 V}$	25	m Ω
$R_{DS(on),TYP@ V_{GS}=-4.5 V}$	28	m Ω
I_D	-55	A

Features

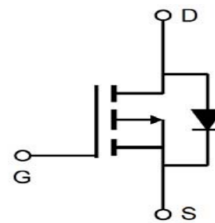
- P-Channel, -5V Logic level Control
- Enhancement mode
- Very low on-resistance $R_{DS(on)}$ @ $V_{GS}=-4.5 V$
- Fast Switching
- 100% Avalanche Tested
- Pb-free lead plating; RoHS compliant



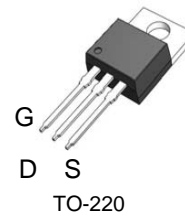
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Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
Common Ratings (T_c=25°C Unless Otherwise Noted)			
V_{GS}	Gate-Source Voltage	±20	V
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	-100	V
T_J	Maximum Junction Temperature	175	°C
T_{STG}	Storage Temperature Range	-55 to 175	°C
I_S	Diode Continuous Forward Current	$T_c = 25^\circ C$ -55	A
Mounted on Large Heat Sink			
I_{DM}	Pulse Drain Current Tested ①	$T_c = 25^\circ C$ -180	A

I_D	Continuous Drain current@ $V_{GS}=10V$	$T_C=25^{\circ}C$	-55	A
		$T_C=100^{\circ}C$	-35	A
P_D	Maximum Power Dissipation	$T_C=25^{\circ}C$	150	W
$R_{\theta JC}$	Thermal Resistance-Junction to Case		1.0	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient($t_s<10s$)		40	$^{\circ}C/W$
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed ②		56	mJ

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-100	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current(Tc=25°C)	V _{DS} =-100V, V _{GS} =0V	--	--	-1	μA
	Zero Gate Voltage Drain Current(Tc=125°C)	V _{DS} =-100V, V _{GS} =0V	--	--	-10	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1.0	-1.6	-2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance ^③	V _{GS} =-10V, I _D =-25A	--	25	30	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance ^③	V _{GS} =-4.5V, I _D =-10A	--	28	35	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =-30V, V _{GS} =0V, f=1MHz	--	7270	--	pF
C _{oss}	Output Capacitance		--	315	--	pF
C _{rss}	Reverse Transfer Capacitance		--	205	--	pF
Q _g	Gate Resistance	f=1MHz		13.5		Ω
Q _g	Total Gate Charge	V _{DS} =-50V, I _D =-20A, V _{GS} =-4.5V	--	83	--	nC
Q _{gs}	Gate-Source Charge		--	15	--	nC
Q _{gd}	Gate-Drain Charge		--	36	--	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =-50V, I _D =-20A, R _G =6.8Ω, V _{GS} =-10V	--	18	--	nS
t _r	Turn-on Rise Time		--	60	--	nS
t _{d(off)}	Turn-Off Delay Time		--	160	--	nS
t _f	Turn-Off Fall Time		--	105	--	nS
Source- Drain Diode Characteristics @ T_J = 25°C (unless otherwise stated)						
I _{SD}	Source-drain current(Body Diode)	T _c =25°C	--	--	-55	A
V _{SD}	Forward on voltage	I _{SD} =-25A, V _{GS} =0V	--	0.86	-1.3	V
t _{rr}	Reverse Recovery Time	T _J =25°C, I _{sd} =-10A, V _{GS} =0V	--	65	--	nS
Q _{rr}	Reverse Recovery Charge	di/dt=-100A/μs		125		nC

NOTE:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH, R_G = 25Ω, I_{AS} = -15A, V_{GS} = -10V. Part not recommended for use above this value
- ③ Pulse width ≤ 300μs; duty cycle ≤ 2%.

Typical Characteristics

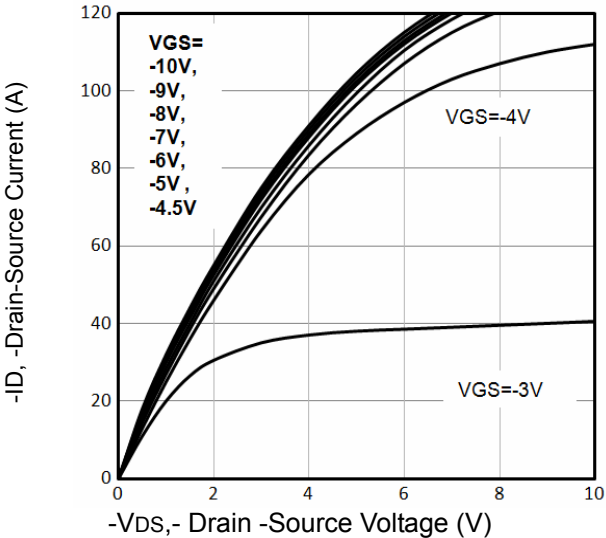


Fig1. Typical Output Characteristics

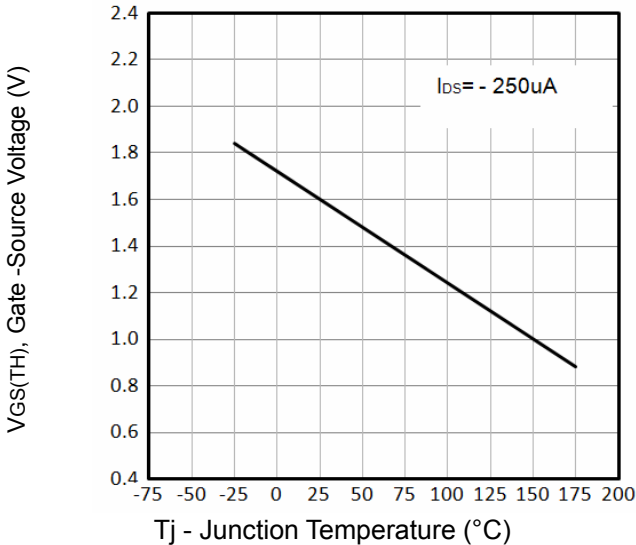


Fig2. Threshold Voltage Vs. Temperature

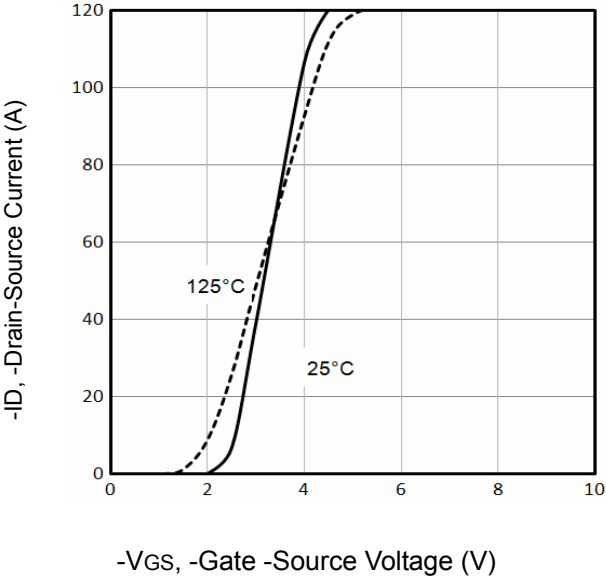


Fig3. Typical Transfer Characteristics

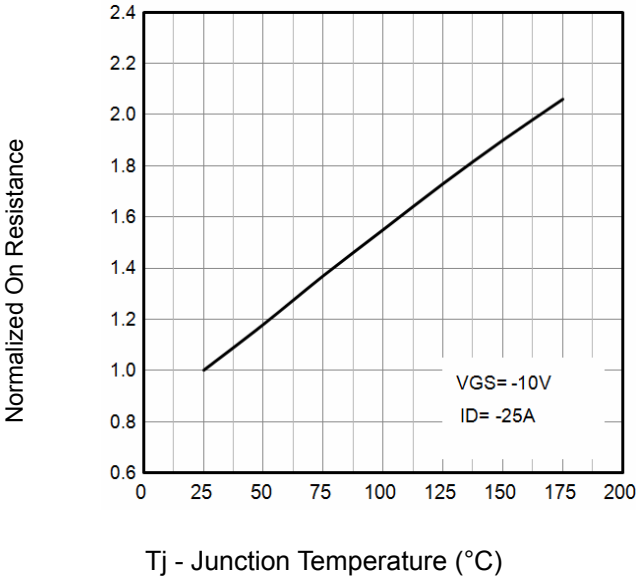


Fig4. Normalized On-Resistance Vs. Temperature

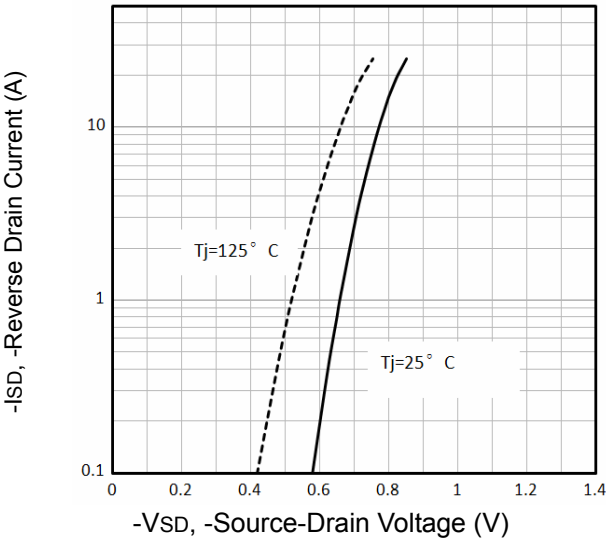


Fig5. Typical Source-Drain Diode Forward Voltage

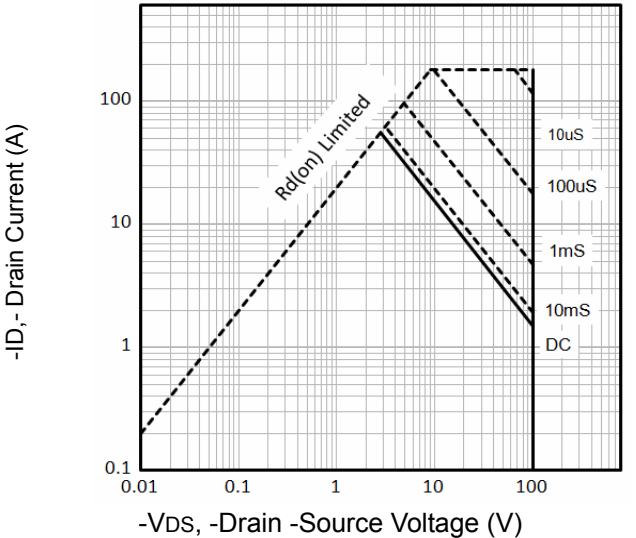


Fig6. Maximum Safe Operating Area

Typical Characteristics

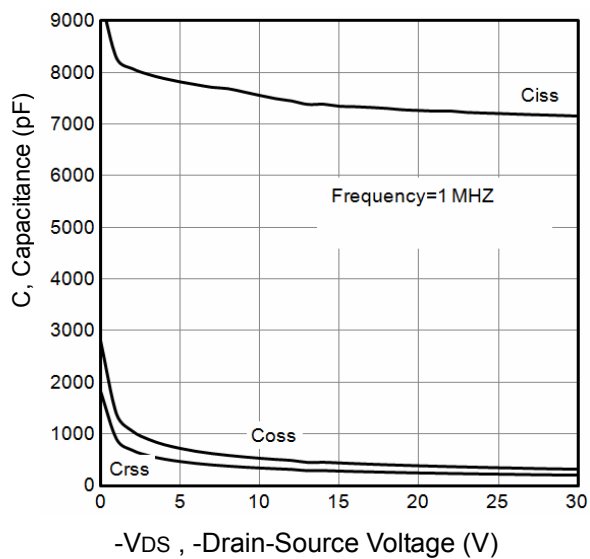


Fig7. Typical Capacitance Vs.Drain-Source Voltage

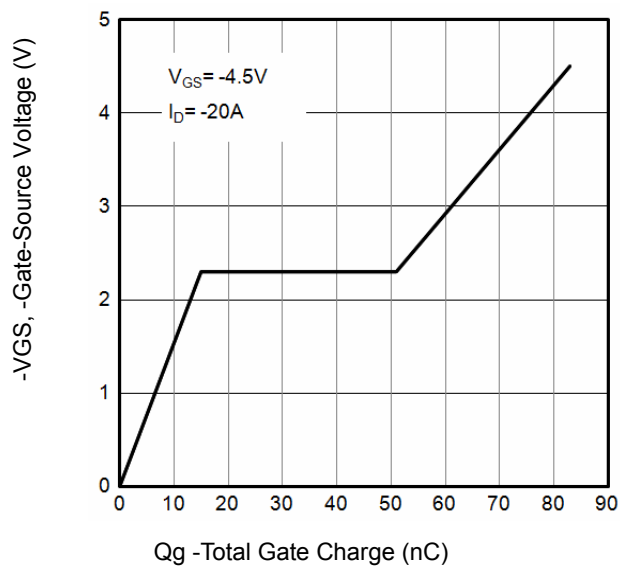


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

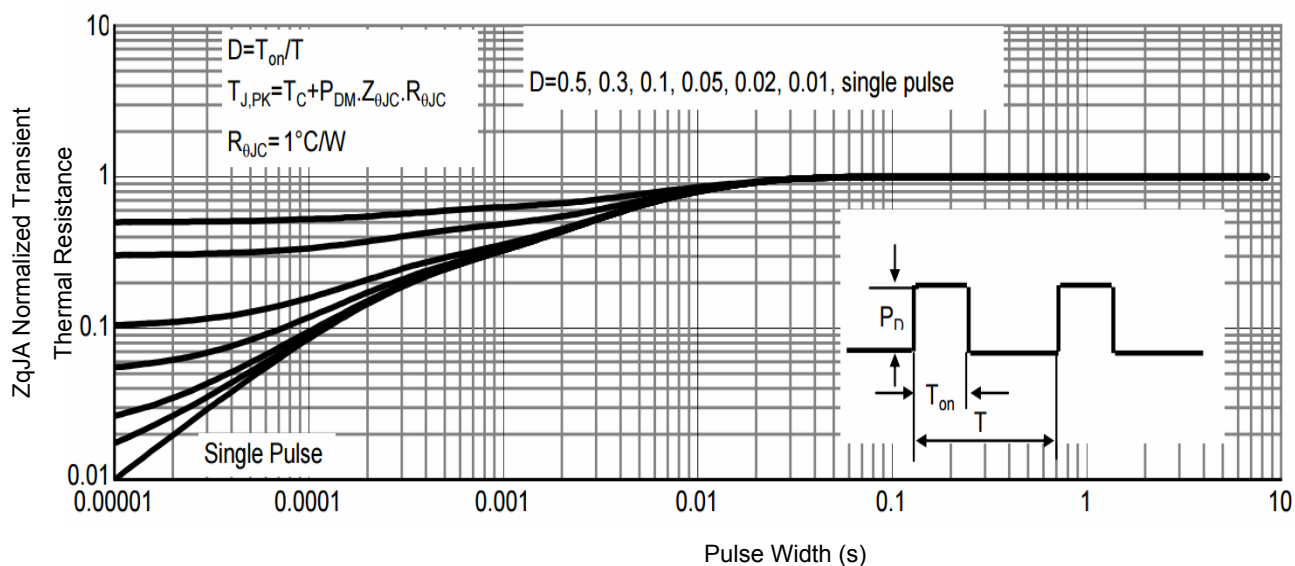


Fig9. Normalized Maximum Transient Thermal Impedance

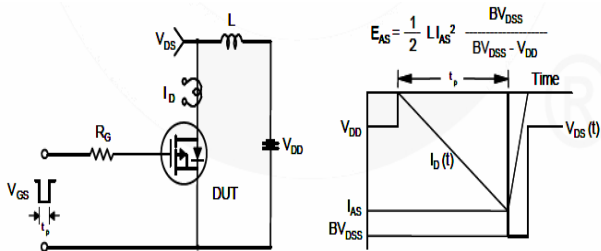


Fig10. Unclamped Inductive Test Circuit and Waveforms

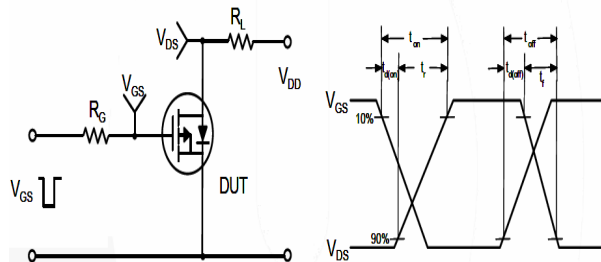
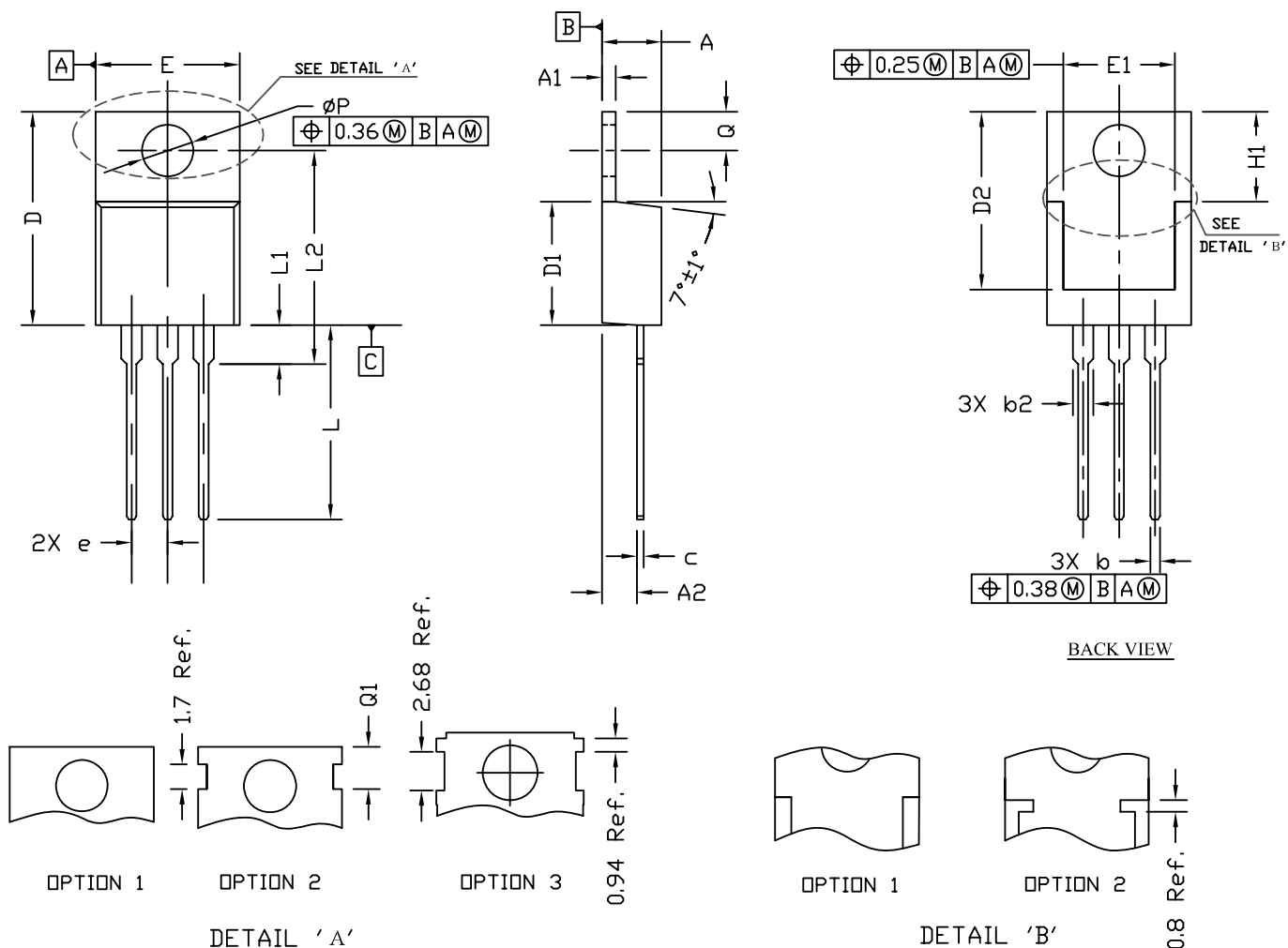


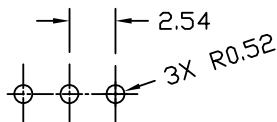
Fig11. Switching Time Test Circuit and waveforms

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Version	L

TO220 PACKAGE OUTLINE



RECOMMENDATION OF HOLE PATTERN



UNIT: mm

- NOTE
1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS. MOLD FLASH SHOULD BE LESS THAN 6 MIL.
 2. TOLERANCE 0.100 MILLIMETERS UNLESS OTHERWISE SPECIFIED.
 3. CONTROLLING DIMENSION IS MILLIMETER. CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.30	4.45	4.72	0.169	0.175	0.186
A1	1.15	1.27	1.40	0.045	0.050	0.055
A2	2.20	2.67	2.90	0.087	0.105	0.114
b	0.69	0.81	0.95	0.027	0.032	0.037
b2	1.17	1.37	1.45	0.046	0.050	0.068
c	0.36	0.38	0.60	0.014	0.015	0.024
D	14.50	15.44	15.80	0.571	0.608	0.622
D1	8.59	9.14	9.65	0.338	0.360	0.380
D2	11.43	11.73	12.48	0.450	0.462	0.491
e	2.54 BSC			0.100 BSC.		
E	9.66	10.03	10.54	0.380	0.395	0.415
E1	6.22	---	---	0.245	---	---
H1	6.10	6.30	6.50	0.240	0.248	0.256
L	12.27	12.82	14.27	0.483	0.505	0.562
L1	2.47	---	3.90	0.097	---	0.154
L2	---	---	16.70	---	---	0.657
Q	2.59	2.74	2.89	0.102	0.108	0.114
ϕP	3.50	3.84	3.89	0.138	0.151	0.153
Q1	2.70	---	2.90	0.106	---	0.114

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