N-Ch 80V Fast Switching MOSFETs

Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low RDS(ON)

Product Summary

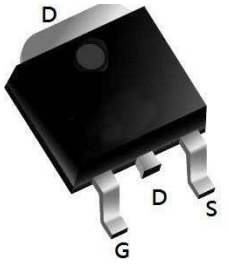
Green

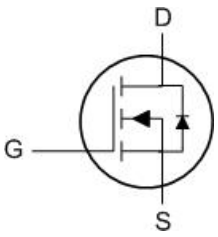
BVDSS	RDSON	ID
85V	4.2 mΩ	130A

Applications

- DC-DC Converters
- Power management functions
- Synchronous-rectification applications

TO252-3L Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	85	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	130	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	79	A
I_{DM}	Pulsed Drain Current[2]	500	A
EAS	Single Pulse Avalanche Energy[3]	273.8	mJ
I_{AS}	Avalanche Current	54	A
P_D@T_C=25℃	Total Power Dissipation[4]	162	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	58	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	0.77	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	85	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	---	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	4.2	5.5	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2	3	4	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=85V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=85V, V_{GS}=0V , T_J=100℃	---	---	100	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=10V , I_D=20A	---	---	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.8	---	Ω
Q_g	Total Gate Charge	V_{DS}=40V , V_{GS}=10V , I_D=20A	---	61.3	---	nC
Q_{gs}	Gate-Source Charge		---	21	---	
Q_{gd}	Gate-Drain Charge		---	11	---	
$T_{d(on)}$	Turn-On Delay Time	V_{GS}=10V, V_{DD}=40V, R_G=3Ω, I_D=20A	---	16.5	---	ns
T_r	Rise Time		---	51.8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	21	---	
T_f	Fall Time		---	11	---	
C_{iss}	Input Capacitance	V_{DS}=40V , V_{GS}=0V , f=1MHz	---	4645	---	pF
C_{oss}	Output Capacitance		---	673	---	
C_{rss}	Reverse Transfer Capacitance		---	41	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	130	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=20A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	IF=20A ,di/dt=100A / μs , T_J= 2 5 ℃	---	69	---	nS
Q_{rr}	Reverse Recovery Charge		---	141	---	nC

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
2. The EAS data shows Max. rating . The test condition is V_{DD}=50V, V_{GS}=10V, L=0.4mH, I_{AS}=54A.
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

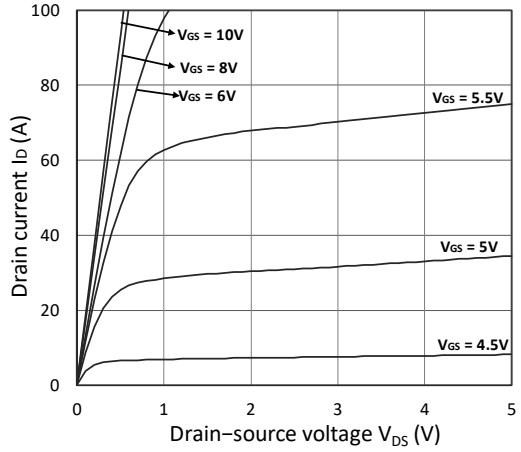


Figure 1. Output Characteristics

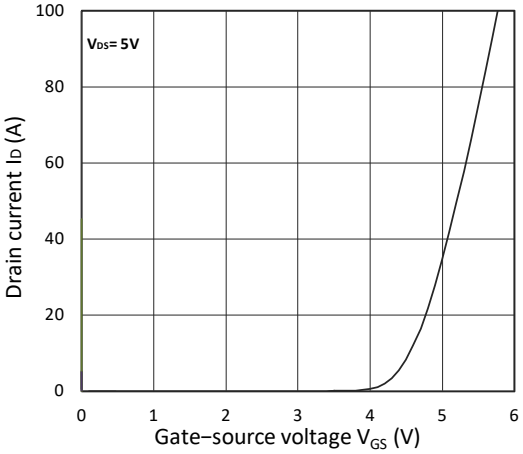


Figure 2. Transfer Characteristics

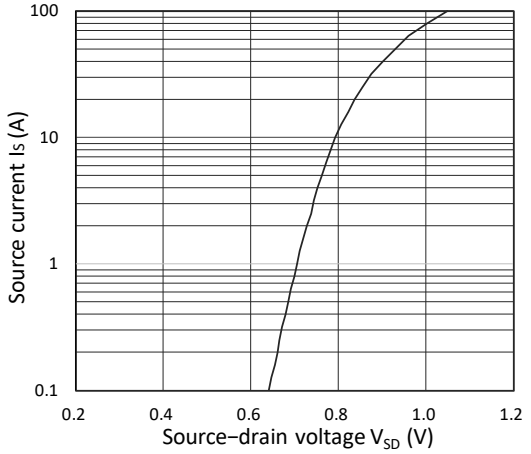


Figure 3. Forward Characteristics of Reverse

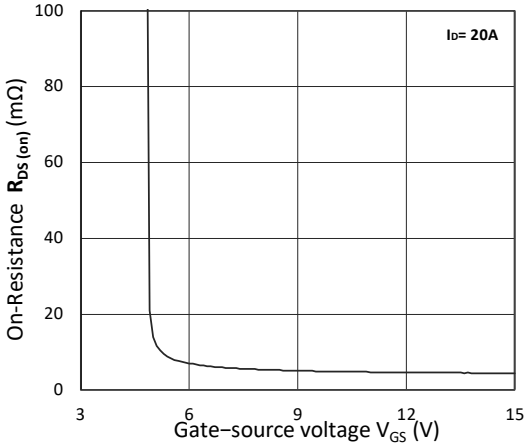


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

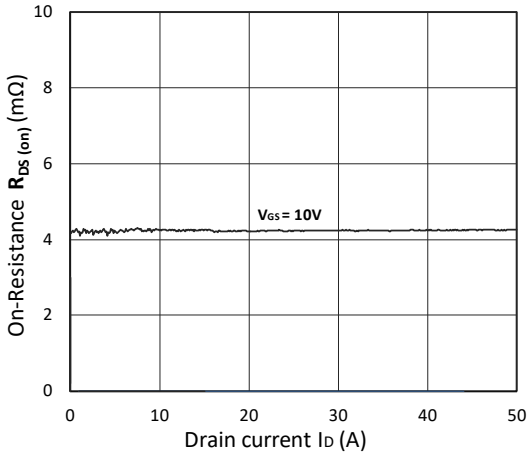


Figure 5. $R_{DS(ON)}$ vs. I_D

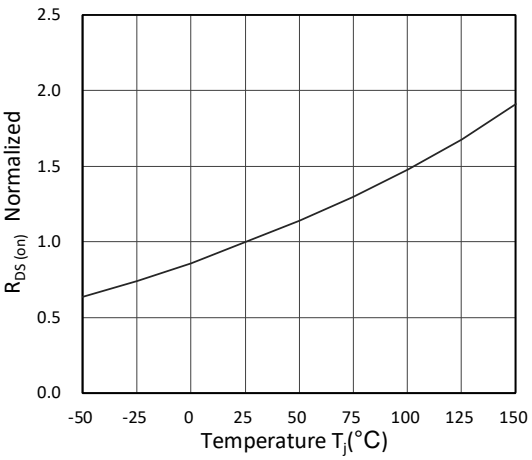


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

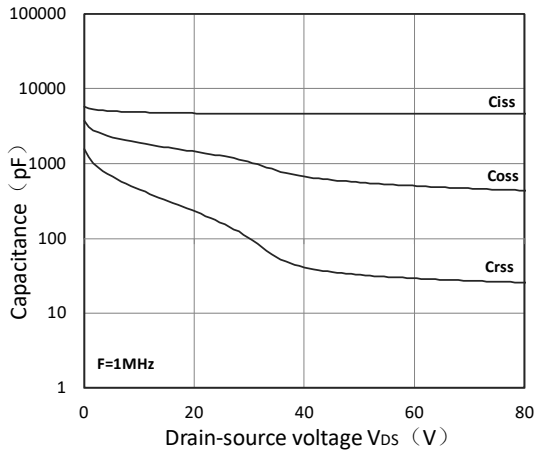


Figure 7. Capacitance Characteristics

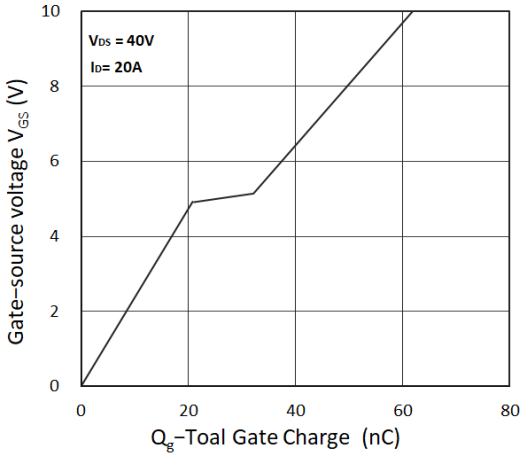


Figure 8. Gate Charge Characteristics

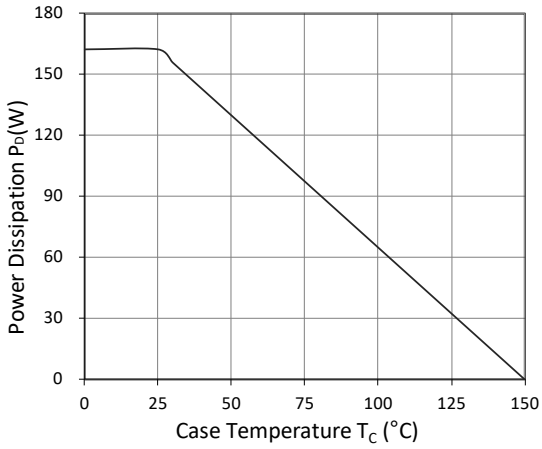


Figure 9. Power Dissipation

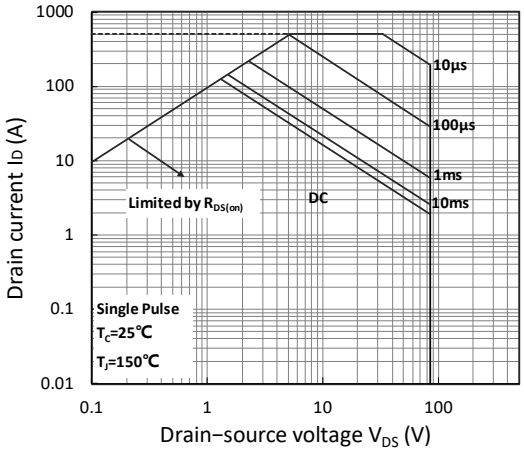


Figure10. Safe Operating Area

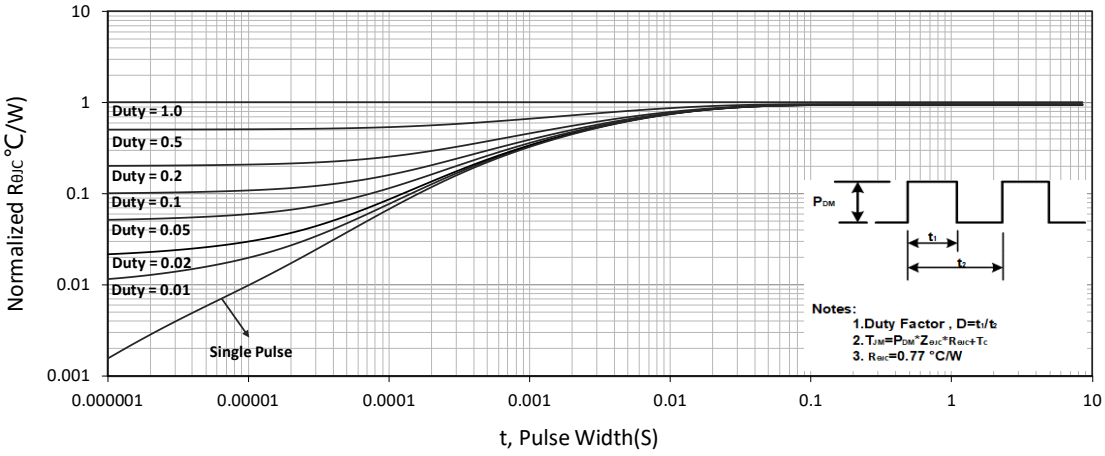


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

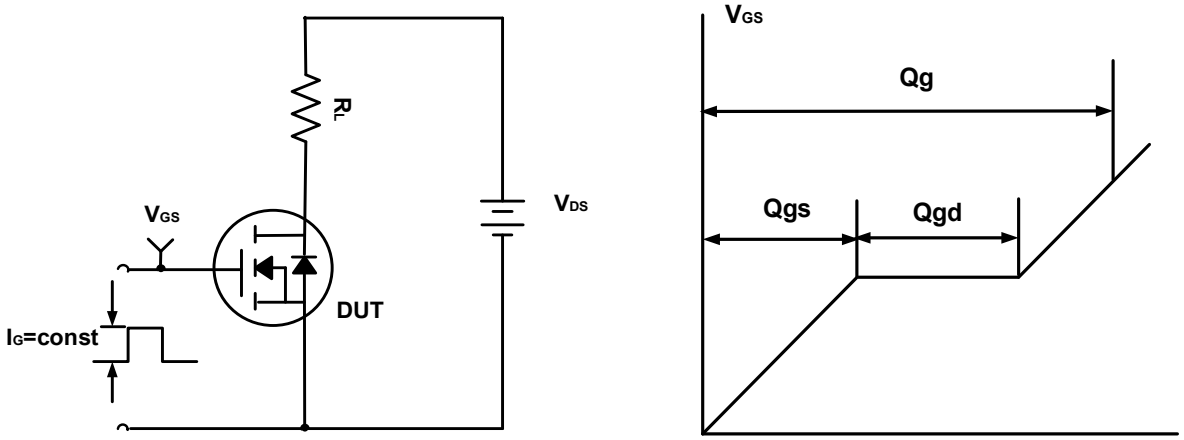


Figure A. Gate Charge Test Circuit & Waveforms

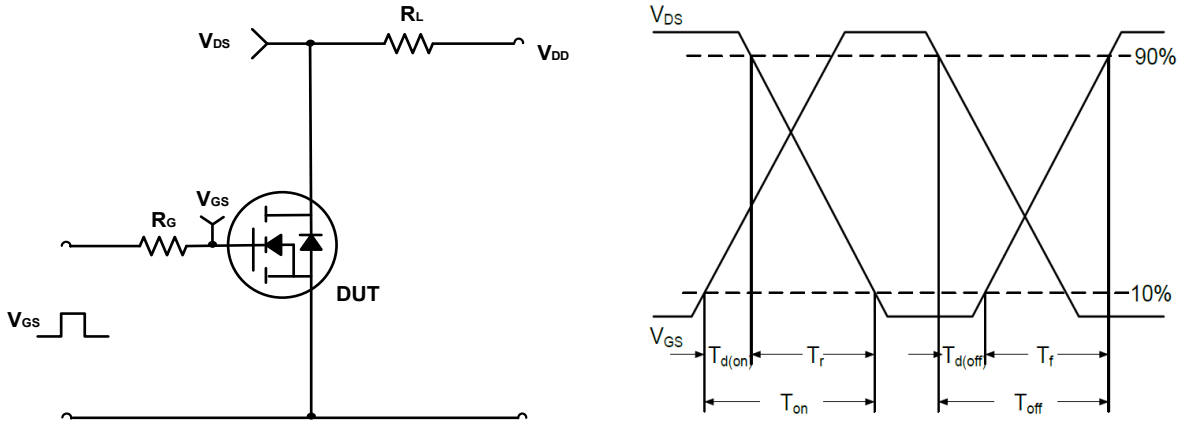


Figure B. Switching Test Circuit & Waveforms

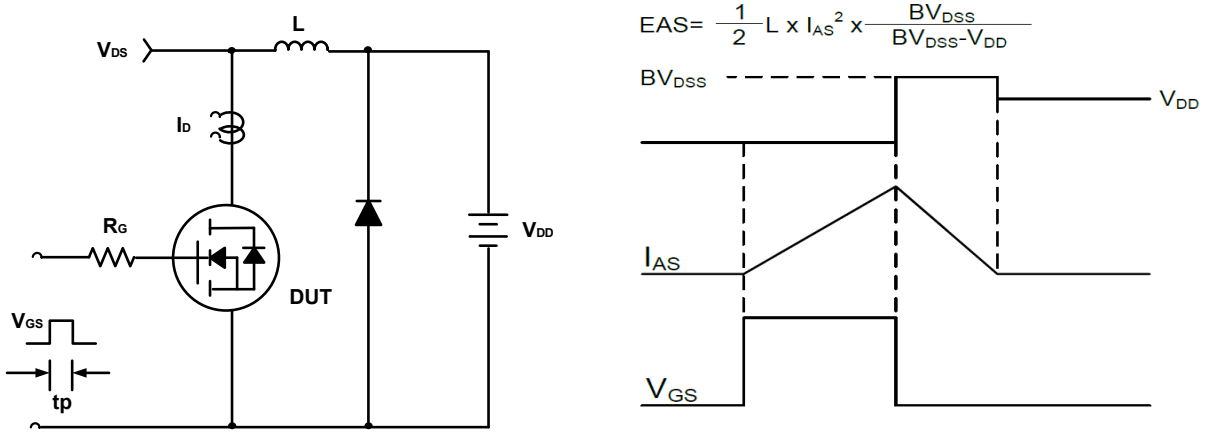
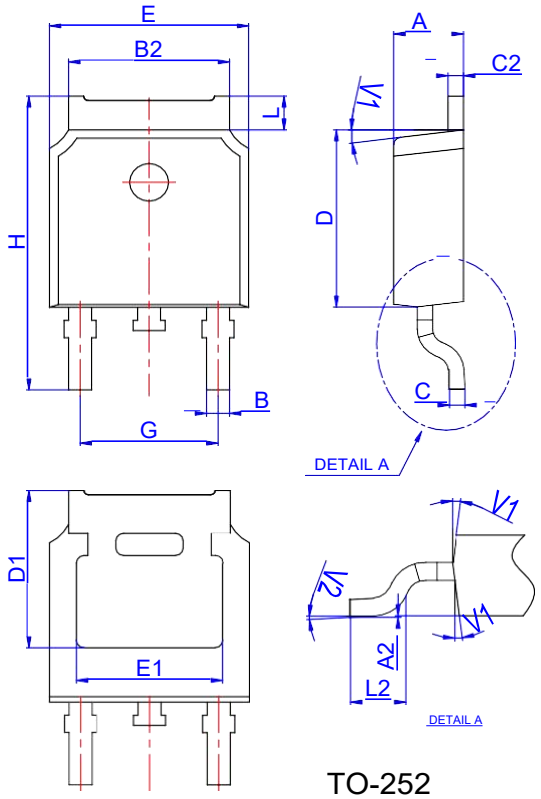


Figure C. Unclamped Inductive Switching Circuit & Waveforms

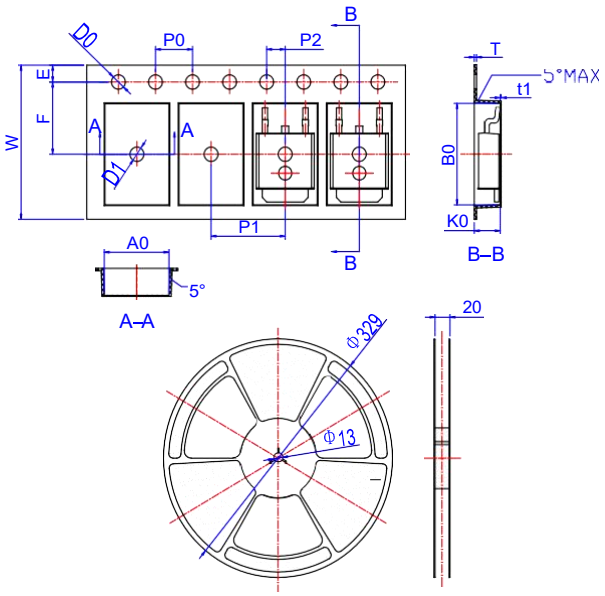
Package Mechanical Data TO252-3L



TO-252

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Specification-TO252-3R



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583