N-Ch 500V Fast Switching MOSFETs

★ 100% EAS Guaranteed
★ Green Device Available
★ Excellent CdV/dt effect decline
★ Advanced VD MOSFETS

Green

Product Summary

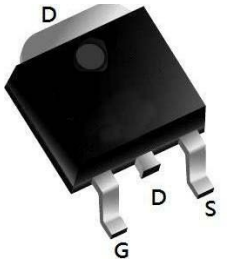
BVDSS	RDSON	ID
500V	2.2Ω	4A

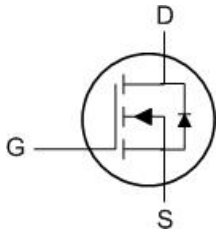
Description

The XXW4N50 is the Advanced VD N-ch MOSFETS, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The XXW4N50 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

TO252 Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	500	V
I_D	Drain Current - Continuous (TC= 25°C)	4	A
	- Continuous (TC= 100°C)	1.8	A
I_{DM}	Drain Current - Pulsed (Note 1)	12	A
V_{GSS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	67	mJ
I_{AR}	Avalanche Current (Note 1)	5	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	115	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	5	V/ns
P_D	Power Dissipation (TC = 25°C)	100	W
	- Derate above 25°C	0.2	W/°C
T_j , T_{stg}	Operating and Storage Temperature Range	-55 to +150	°C
T_L	Maximum lead temperature for soldering purposes,1/8" from case for 5 seconds	300	°C

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.25	°C/W
$R_{\theta JS}$	Thermal Resistance, Case-to-Sink Typ.	--	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	110	°C/W

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	500	550	--	V
IDSS	Zero Gate Voltage Drain Current	V_{DS}= 500V, V_{GS}= 0V, T_J=25ºC	--	--	1	μA
IGSS	Gate-Source Leakage	V_{GS} = ±30V	--	--	±100	nA
VGS(th)	Gate-Source Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	2.0	3.0	4.0	V
RDS(on)	Drain-Source On-Resistance (Note3)	V_{GS} = 10V, I_D = 1.5A	--	2.2	2.6	Ω
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz	--	218	--	pF
C_{oss}	Output Capacitance		--	28	--	
C_{rss}	Reverse Transfer Capacitance		--	4	--	
Q_g	Total Gate Charge	V_{DD}=480V, I_D = 1A, V_{GS} = 10V	--	4.8	--	nC
Q_{gs}	Gate-Source Charge		--	0.7	--	
Q_{gd}	Gate-Drain Charge		--	2.7	--	
td(on)	Turn-on Delay Time	V_{DD}=250V, I_D = 3A, R_G = 25Ω	--	7.8	--	ns
t_r	Turn-on Rise Time		--	33	--	
td(off)	Turn-off Delay Time		--	13	--	
t_f	Turn-off Fall Time		--	59	--	
IS	Continuous Body Diode Current	T_C = 25 ºC	--	--	3	A
ISM	Pulsed Diode Forward Current		--	--	12	A
V_{SD}	Body Diode Voltage	T_J = 25ºC, I_{SD} = 3A, V_{GS} = 0V	--	--	1.4	V
trr	Reverse Recovery Time	V_{GS} = 0V,I_S = 3A, di_F/dt =100A / μs	--	62	--	ns
Q_{rr}	Reverse Recovery Charge		--	0.28	--	μC

Note :

1、The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

2、The EAS data shows Max. rating . IAS = 2.4A, VDD = 50V, RG = 25 Ω, Starting TJ = 25 ºC

3、The test condition is Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 2%

4、The power dissipation is limited by 150℃ junction temperature

5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

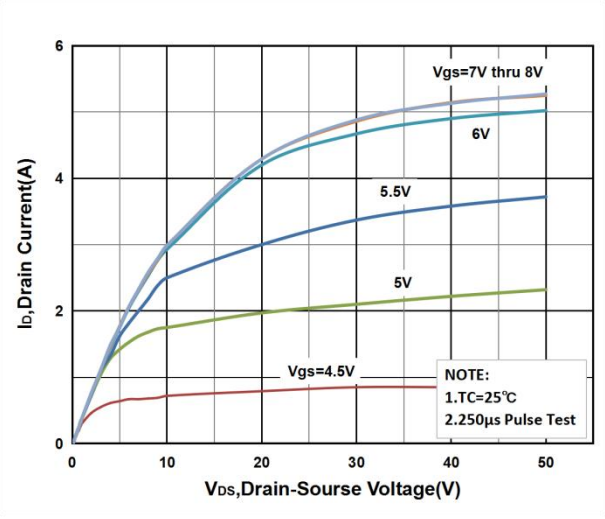


Fig1 Typical Output Characteristics, Tc=25℃

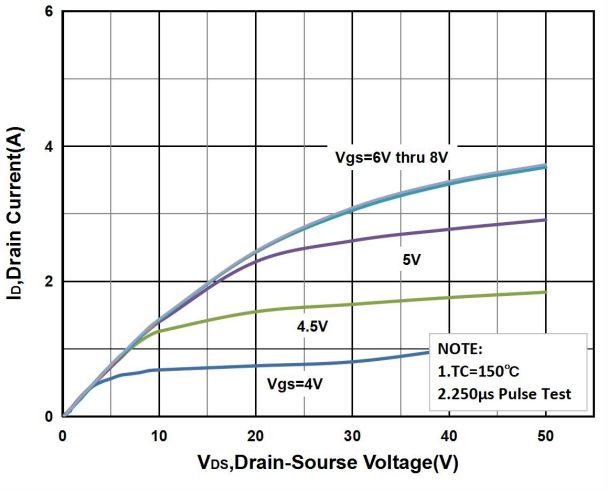


Fig2 Typical Output Characteristics, Tc=150℃

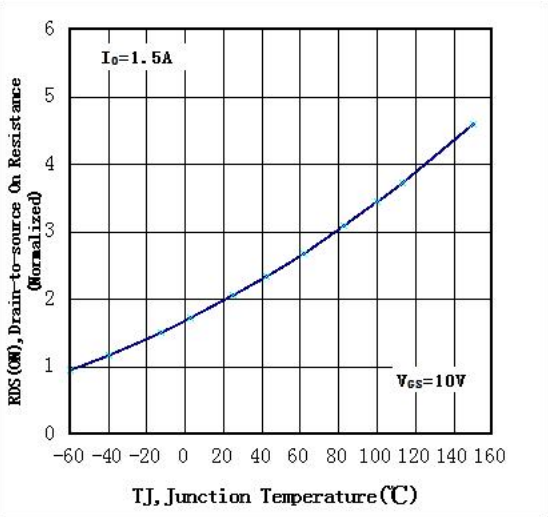


Fig3 On-Resistance Vs.Temperature

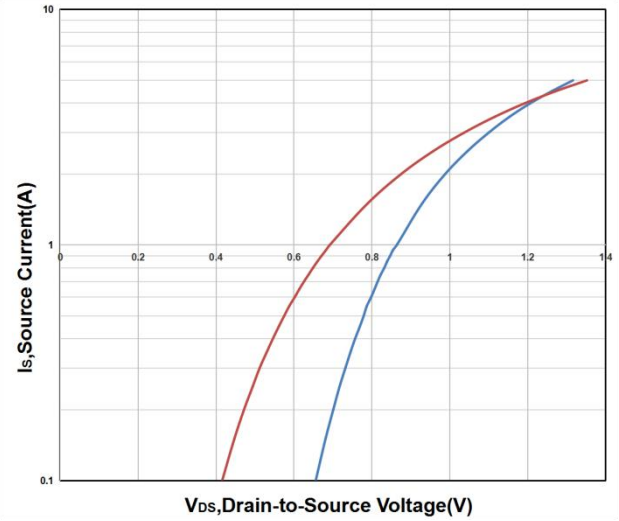


Fig4 Typical Source-Drain Diode Forward Voltage

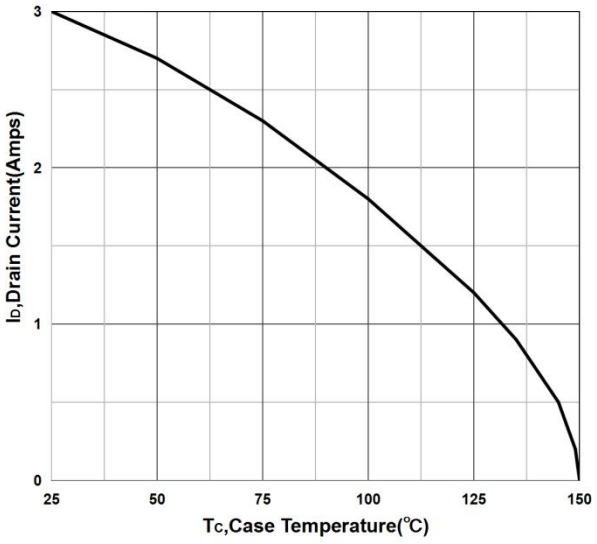


Fig5 Maximum Drain Current Vs.Case Temperature

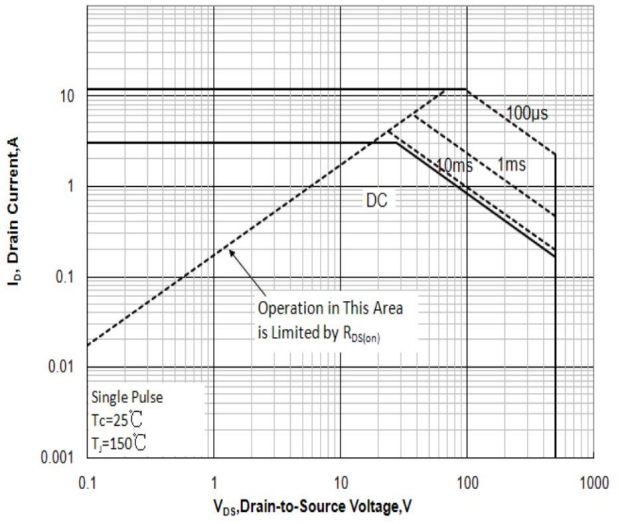


Fig6 Maximum Safe Operating Area

Typical Characteristics (Continued)

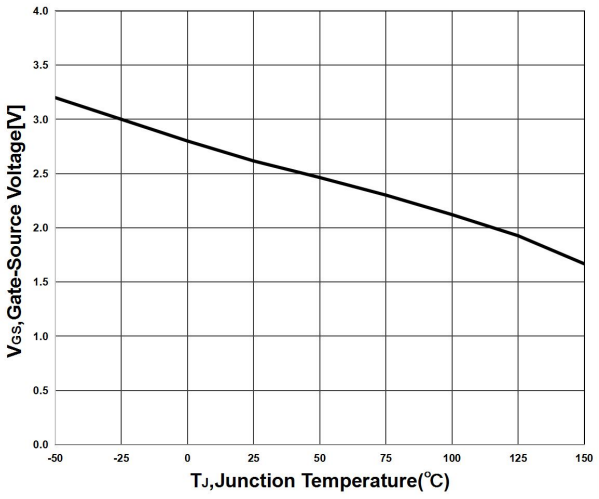


Fig7 Gate Threshold Voltage Variation vs.Temperature

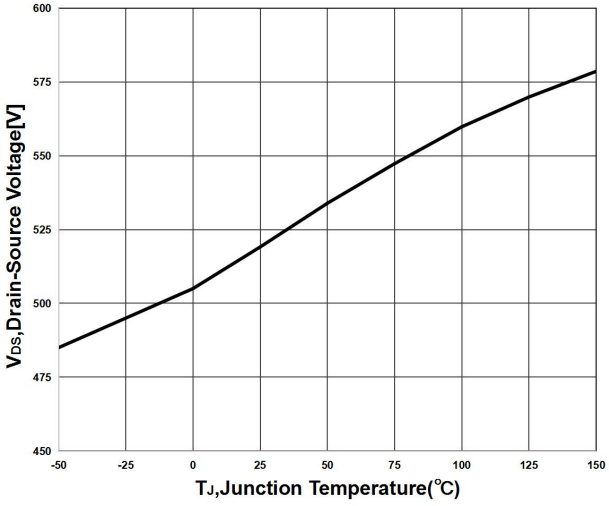


Fig8 Breakdown Voltage Variation vs.Temperature

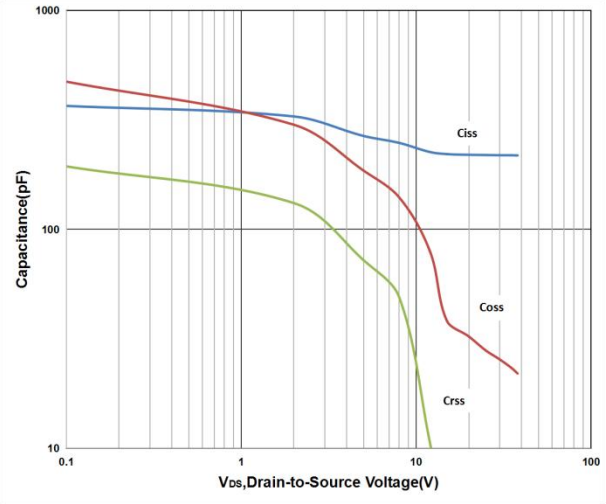


Fig9 Capacitance Characteristics

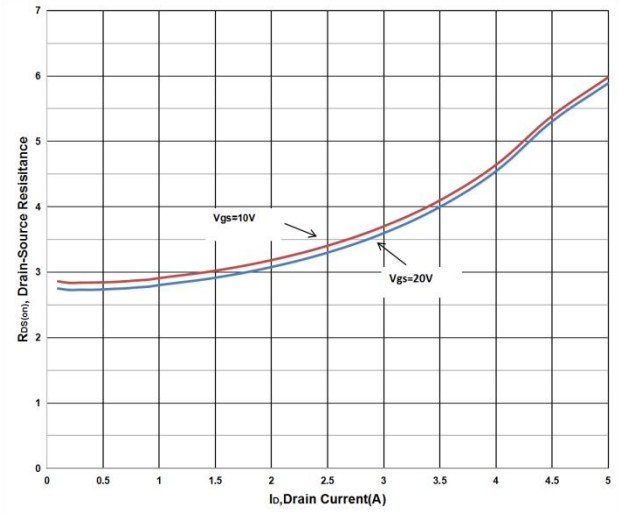


Fig10 On-Resistance Variation VS. Drain Current and Gate Voltage

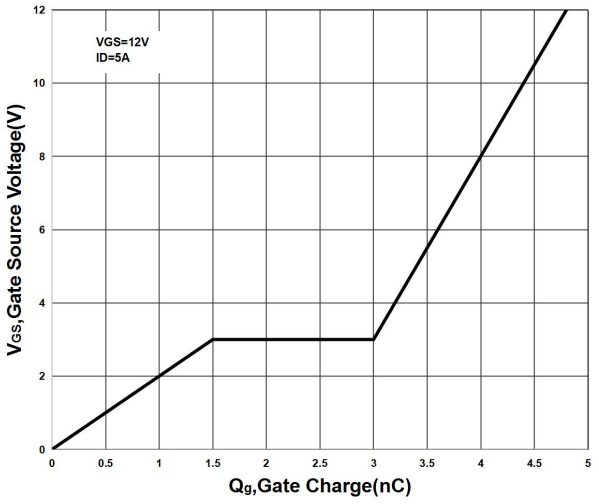
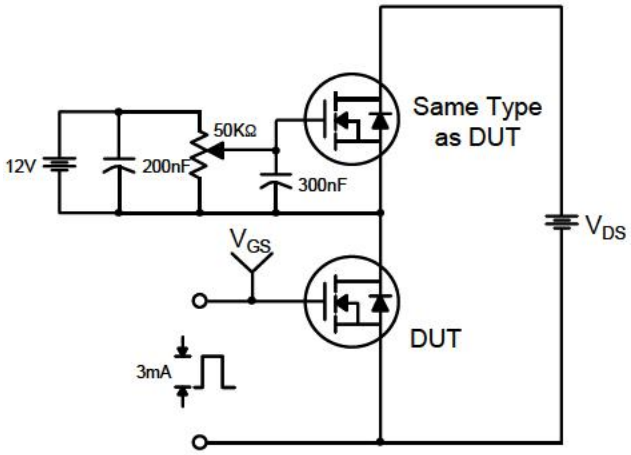
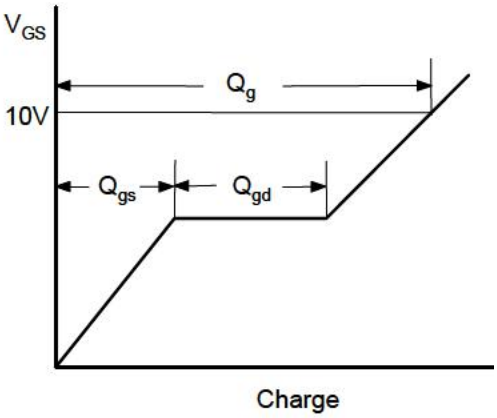


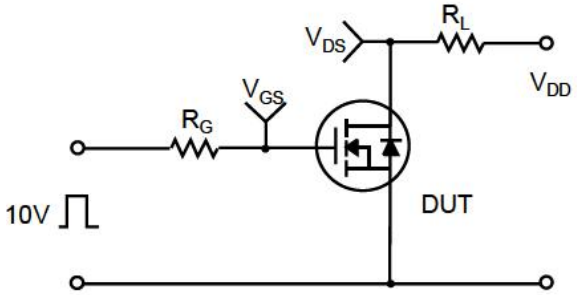
Fig11 Gate Charge VS Gate to Source Volitage

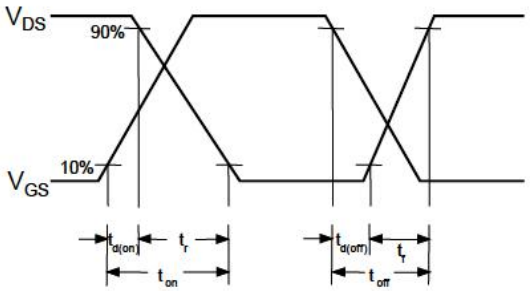
Gate Charge Test Circuit & Waveform



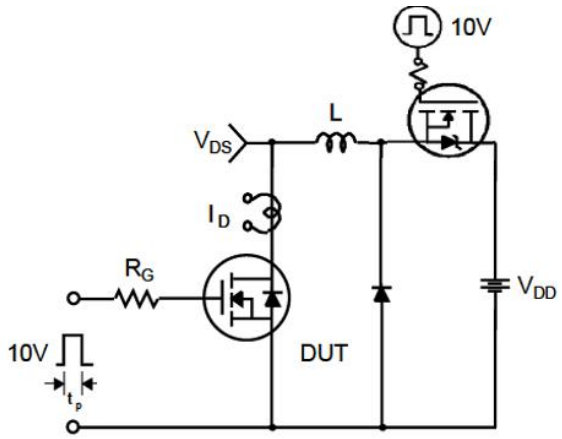


Resistive Switching Test Circuit & Waveforms

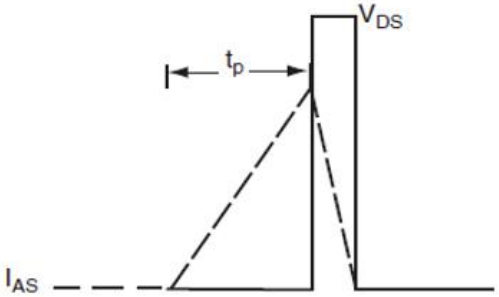




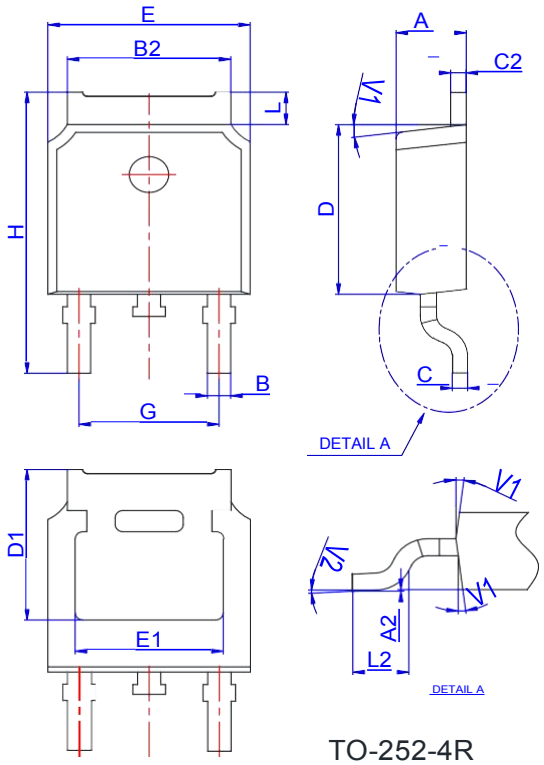
Unclamped Inductive Switching Test Circuit & Waveforms



$$E_{AS} = \frac{1}{2} L I_{AS}^2$$



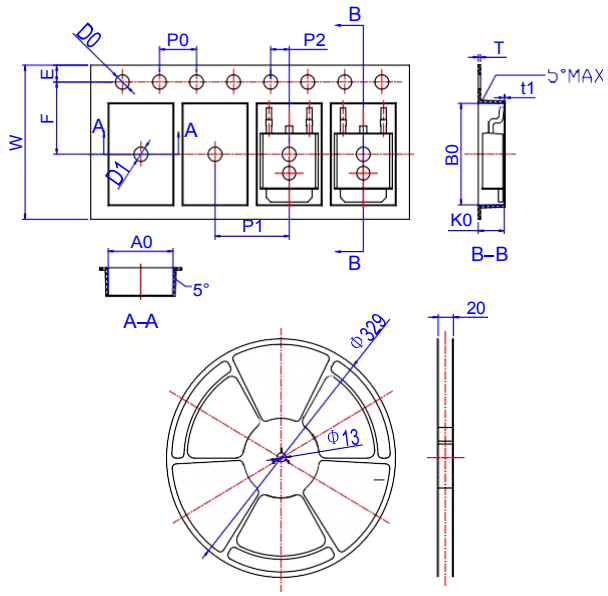
Package Mechanical Data-TO-252



TO-252-4R

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-TO-252



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