XXWS80P06

P-Ch 60V Fast Switching MOSFETs

Green

Features

● Split Gate Trench MOSFET technology
● Excellent package for heat dissipation
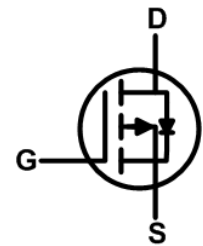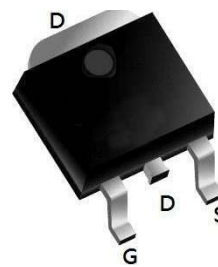● High density cell design for low $R_{DS(ON)}$

Product Summary

BVDSS	RDSON	ID
-60V	9.0mΩ	-80A

Applications

● Battery switching application
● Hard switched and high frequency circuits
● Power management

TO252 Pin Configuration

Absolute Maximum Ratings $(T_j = 25℃$ unless otherwise specified):

Symbol	Parameter		Value	Units
V_{DSS}	Drain-to-Source Voltage		-60	V
I_D	Continuous Drain Current	$T_C = 25 °C$	-80	A
	Continuous Drain Current	$T_C = 100 °C$	-50	A
I_{DM}[a1]	Pulsed Drain Current		-320	A
V_{GS}	Gate-to-Source Voltage		±20	V
P_D	Power Dissipation		110	W
E_{AS} [a2]	Single pulse avalanche energy		450	mJ
T_J，T_{stg}	Operating Junction and Storage Temperature Range		150，−55 to 150	℃
T_L	Maximum Temperature for Soldering		300	℃

Thermal Characteristics:

Symbol	Parameter	Value	Units
$R_{θJC}$	Thermal Resistance, Junction-to-Case	1.1	℃/W
$R_{θJA}$	Thermal Resistance, Junction-to-Ambient	60	℃/W

Static Characteristics

Symbol	Parameter	Test Conditions	Value Min.	Value Typ.	Value Max.	Units
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-60	--	--	V
I_{DSS}	Drain to Source Leakage Current	$V_{DS} = -60V$, $V_{GS}= 0V$	--	--	1	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS} =-20V$	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS} =+20V$	--	--	-100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=-250\mu A$	-1.3	-1.8	-2.3	V
$R_{DS(ON)1}$	Drain-to-Source On-Resistance	$V_{GS}=-10V$, $I_D=-20A$	--	9.0	11.0	$m\Omega$
$R_{DS(ON)2}$	Drain-to-Source On-Resistance	$V_{GS}=-4.5V$, $I_D=-15A$	--	12.0	16.0	$m\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=-5V$, $I_D=-20A$	50	--	--	S

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Value Min.	Value Typ.	Value Max.	Units
C_{iss}	Input Capacitance	$V_{GS}=0V$	--	3060	--	pF
C_{oss}	Output Capacitance	$V_{DS}=-30V$	--	620	--	
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	--	20	--	
R_g	Gate resistance	$V_{GS}=0V$, V_{DS} Open	--	2.0	--	Ω

Resistive Switching Characteristics

Symbol	Parameter	Test Conditions	Value Min.	Value Typ.	Value Max.	Units
$t_{d(ON)}$	Turn-on Delay Time	$I_D=-20A$, $R_L=0.75\Omega$	--	4.5	--	ns
tr	Rise Time	$V_{DS}=-30V$	--	2.5	--	
$t_{d(OFF)}$	Turn-Off Delay Time	$V_{GS}=-10V$	--	14.5	--	
t_f	Fall Time	$R_G= 3\Omega$	--	3.5	--	
Q_g	Total Gate Charge	$V_{GS}=-10V$	--	56	--	nC
Q_{gs}	Gate Source Charge	$V_{DS}=-30V$	--	11	--	
Q_{gd}	Gate Drain Charge	$I_D=-20A$	--	9	--	

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Value Min.	Value Typ.	Value Max.	Units
I_S	Diode Forward Current	$T_C=25 °C$	--	--	-80	A
I_{SM}	Diode Pulse Current		--	--	-320	A
V_{SD}	Diode Forward Voltage	$I_S=-6.0A$, $V_{GS}=0V$	--	--	-1.2	V
t_{rr}	Reverse Recovery time	$I_S=-20A$, $V_{DD}=-30V$	--	60	--	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	--	105	--	nC

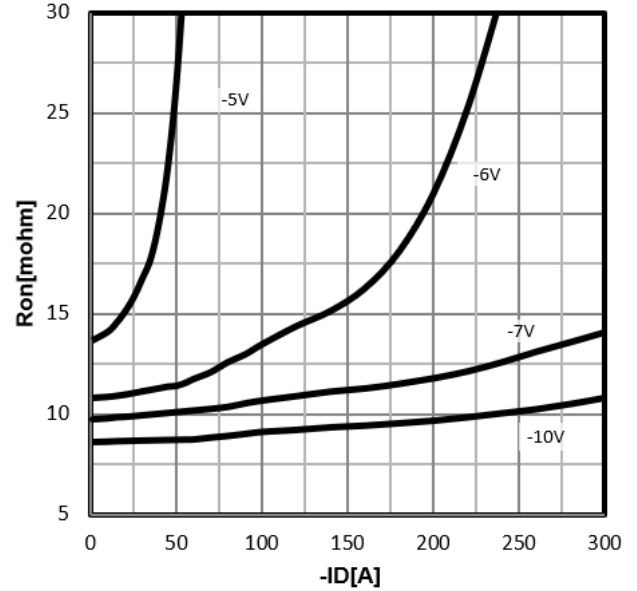[a1]: Repetitive rating; pulse width limited by maximum junction temperature

[a2]: V_{DD} =30V, L=0.3mH, R_G =25Ω, Starting T_j=25℃

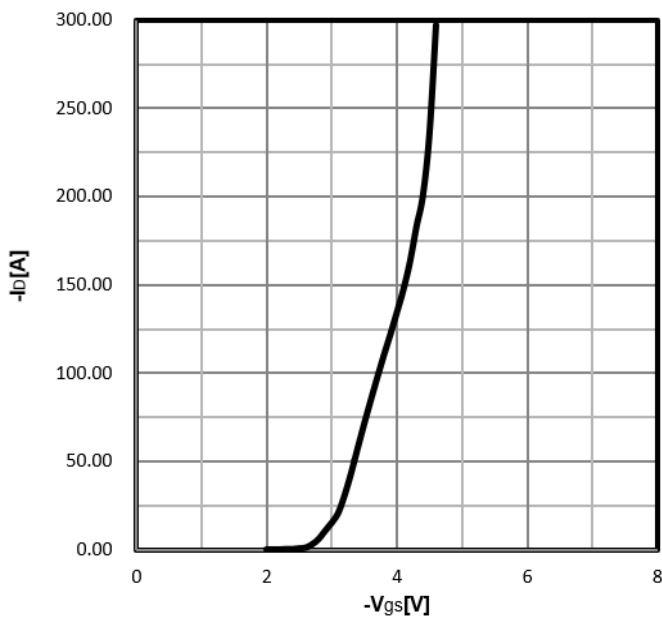**Characteristics Curve：**

Typ. output characteristics
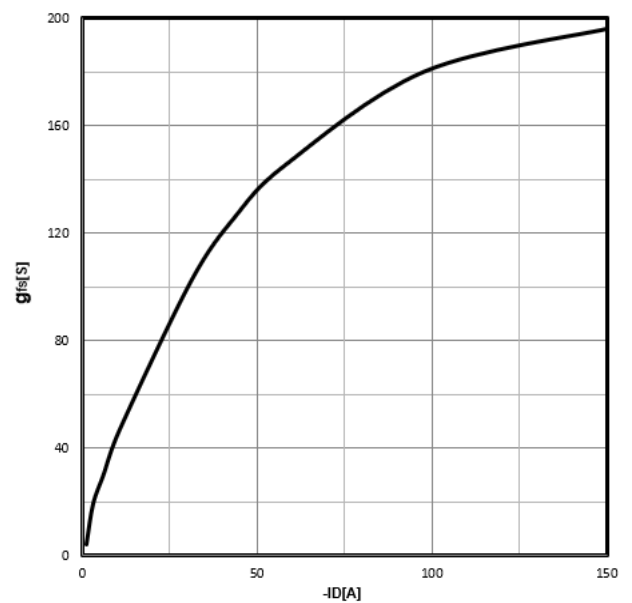$I_D=f(V_{DS})$
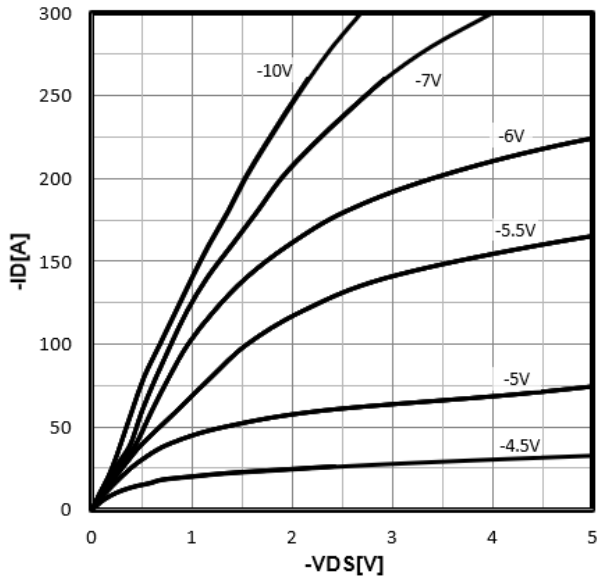
Typ. drain-source on resistance
$R_{DS(on)}=f(I_D)$
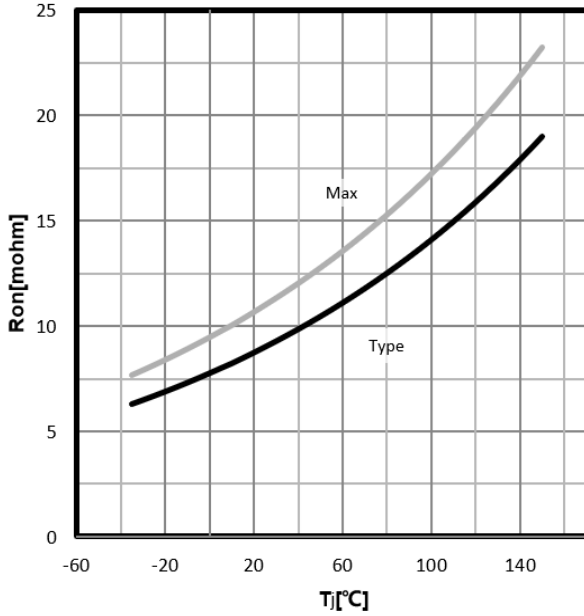

Typ. transfer characteristics
$I_D=f(V_{GS})$
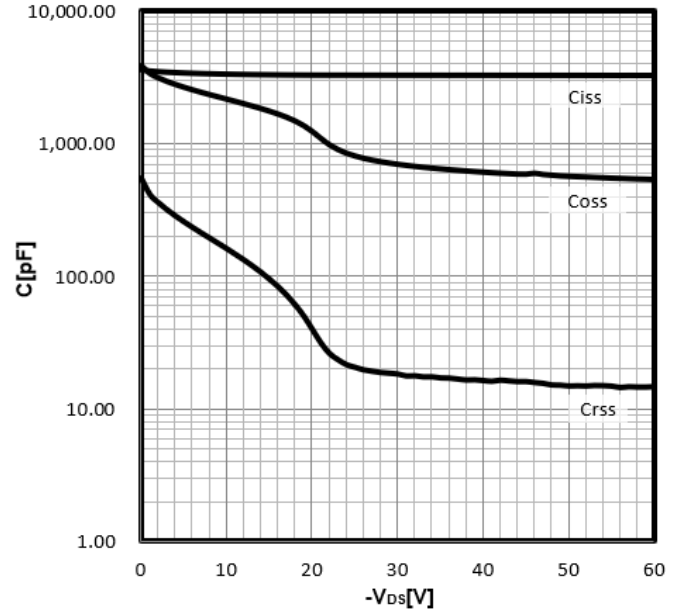

Typ. forward transconductance
$g_{fs}=f(I_D)$

Drain-source on-state resistance
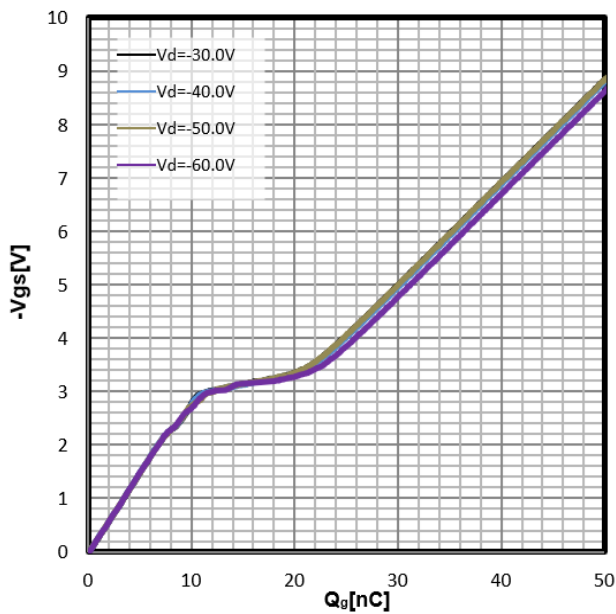$R_{DS(on)}=f(T_j)$; $I_D=-20A$; $V_{GS}=-10V$
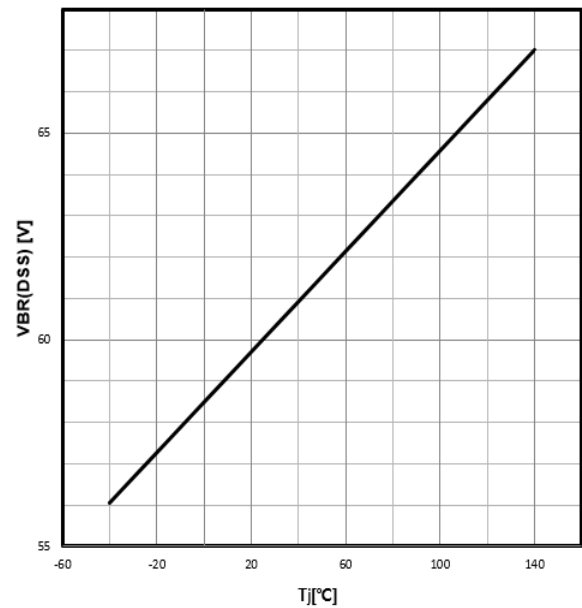

Typ. capacitances
$C=f(V_{DS})$; $V_{GS}=0V$; $f=1MHz$

Typ. gate charge
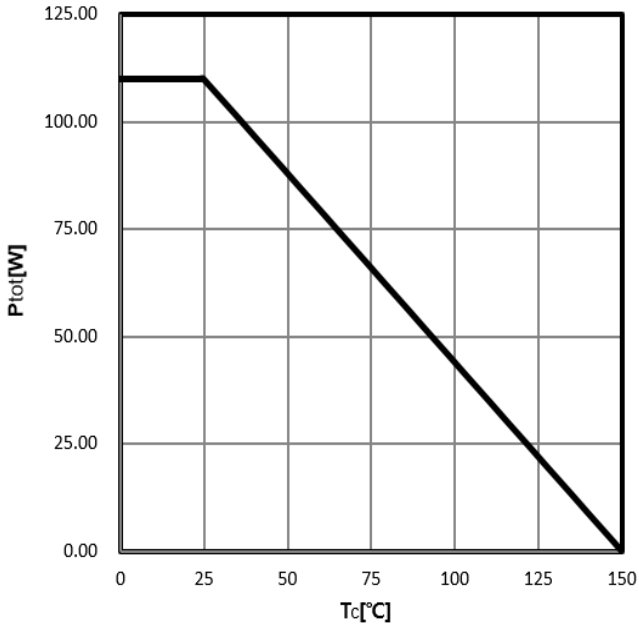$V_{GS}=f(Q_{gate})$; $I_D=-20A$

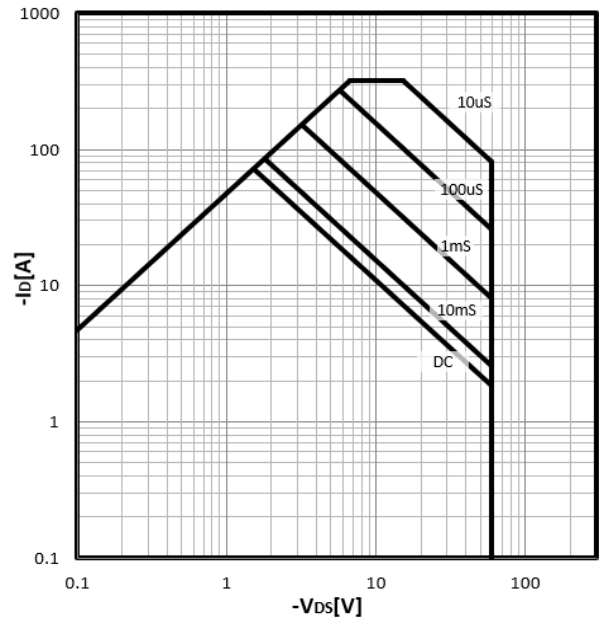**Drain-source breakdown voltage**
$V_{BR(DSS)}=f(T_j)$; $I_D=-250uA$

Power Dissipation

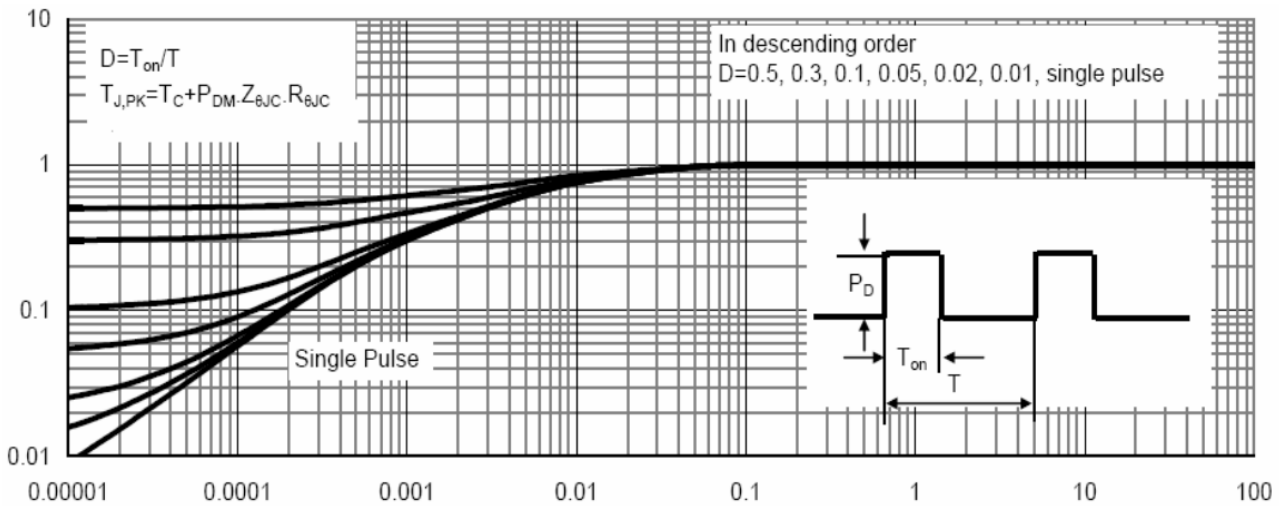$P_{tot}=f(T_C)$

$I_D=f(V_{DS})$

**Max. transient thermal impedance**

$Z_{thJC}=f(t_p)$

$D=T_{on}/T$

$T_{J,PK}=T_C+P_{DM}\cdot Z_{\theta JC}\cdot R_{\theta JC}$

In descending order
D=0.5, 0.3, 0.1, 0.05, 0.02, 0.01, single pulse

Single Pulse

Package Mechanical Data-TO-252

TO-252
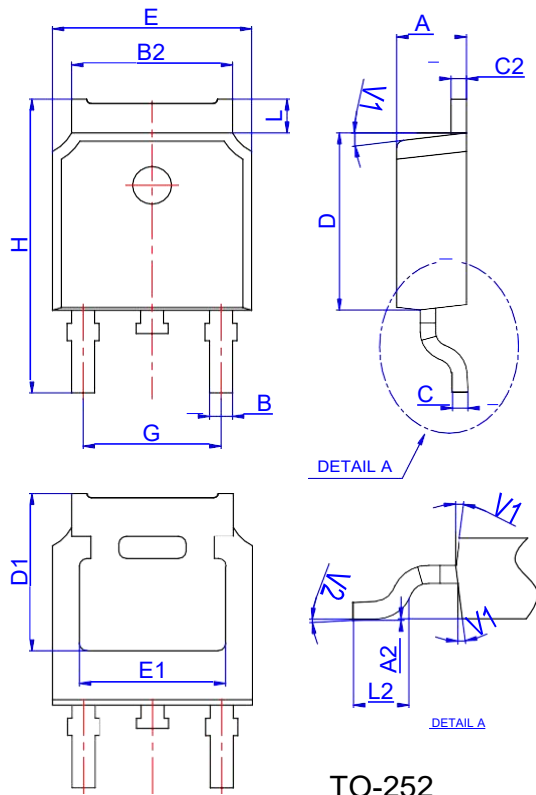
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
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 Spectification-TO-252-4R
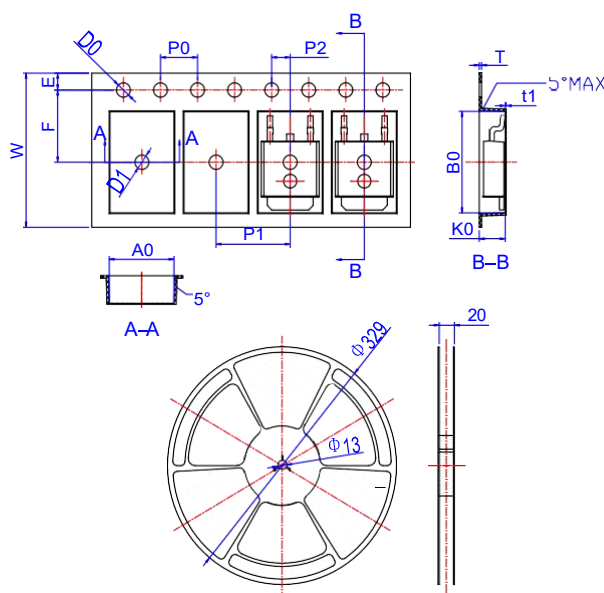
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	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