

## General Description

The MY50P03D uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

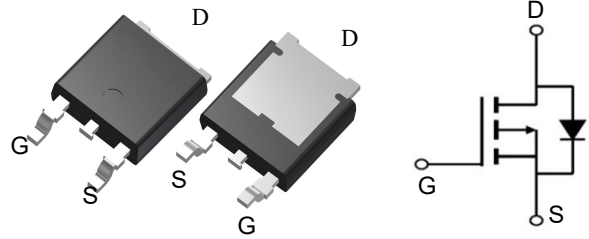


## Features

$V_{DS}$	-30	X
$V_{GS}$	-50	C
$T_{FUT}$	14	o á
$T_{FUT}$	18	o á

## Application

- Battery protection
- Load switch
- Uninterruptible power supply



## Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
MY50P03D	TO-252	MY50P03D	2500

## Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 25$	V
Drain Current-Continuous ( $T_C=25^\circ\text{C}$ )	$I_D$	-50	A
Drain Current-Continuous ( $T_C=100^\circ\text{C}$ )		-32	
Drain Current-Pulsed (Note 1)	$I_{DM}$	-150	A
Maximum Power Dissipation ( $T_C=25^\circ\text{C}$ )	$P_D$	5	W
Maximum Power Dissipation ( $T_C=100^\circ\text{C}$ )		2	
Single pulse avalanche energy (Note 5)	$E_{AS}$	231	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	62	$^\circ\text{C/W}$

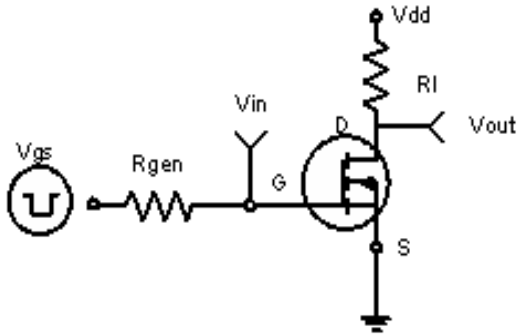
**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V I <sub>D</sub> =-250μA	-30	-	-	V
Zero Gate Voltage Drain Current	IDSS	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V	-	-	-1	μA
Gate-Body Leakage Current	IGSS	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
Gate Threshold Voltage	VGS(th)	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1	-1.6	-2.5	V
Drain-Source On-State Resistance	RDS(ON)	V <sub>GS</sub> =-10V, I <sub>D</sub> =-10A	-	14	18	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A	-	18	28	mΩ
Forward Transconductance	gFS	V <sub>DS</sub> =-10V, I <sub>D</sub> =-10A	-	20	-	S
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, F=1.0MHz	-	1770	-	PF
Output Capacitance	C <sub>oss</sub>		-	233	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	206	-	PF
Turn-on Delay Time	td(on)	V <sub>DD</sub> =-15V, I <sub>D</sub> =-10A, V <sub>GS</sub> =-10V, R <sub>GEN</sub> =1Ω	-	9	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	13	-	nS
Turn-Off Delay Time	td(off)		-	48	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	20	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-10A, V <sub>GS</sub> =-10V	-	24	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	3.5	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	6	-	nC
Diode Forward Current <sup>(Note 2)</sup>	I <sub>S</sub>		-	-	-15	A
Diode Forward Voltage <sup>(Note 3)</sup>	VSD	V <sub>GS</sub> =0V, I <sub>S</sub> =-15A	-	-	-1.2	V

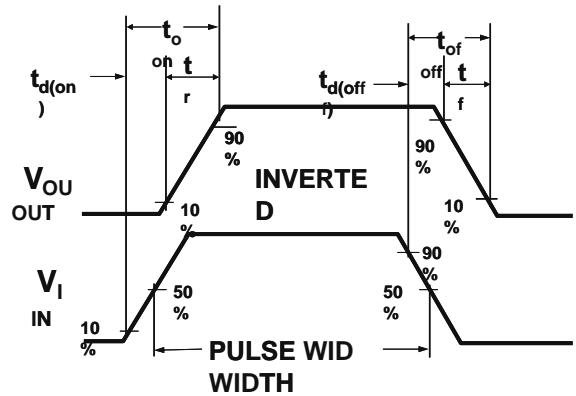
**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E<sub>AS</sub> condition: T<sub>J</sub>=25 °C, V<sub>DD</sub>=-15V, V<sub>G</sub>=10V, L=0.5mH, R<sub>g</sub>=25Ω, I<sub>AS</sub>=-34A

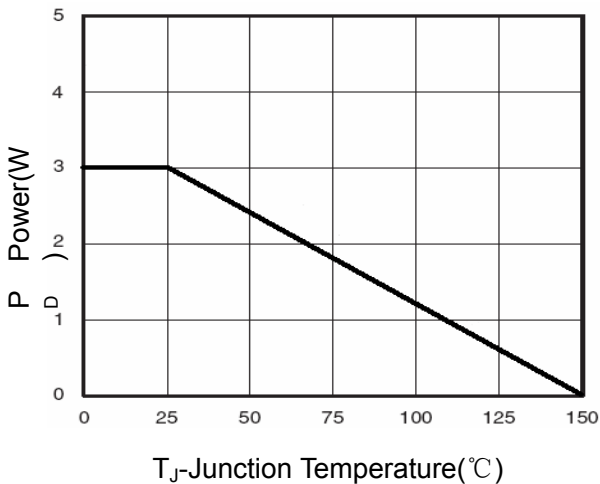
**Typical Characteristics**



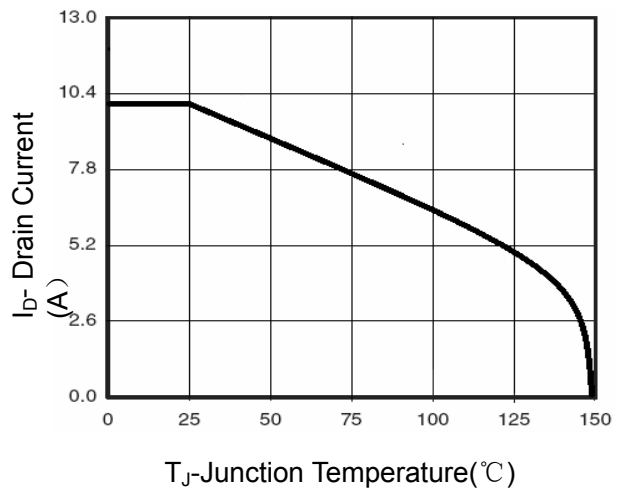
**Figure 1: Switching Test Circuit**



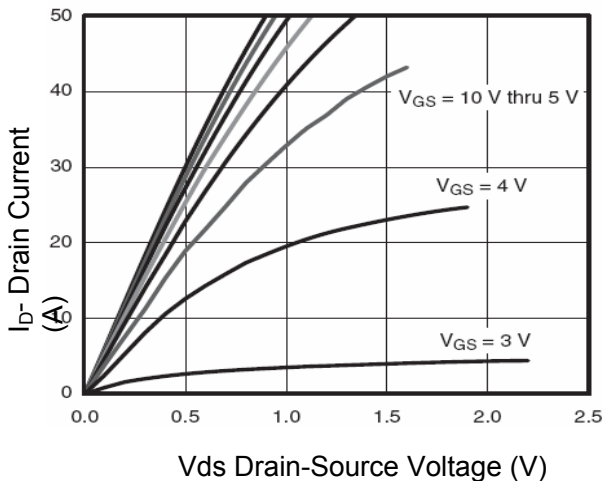
**Figure 2: Switching Waveforms**



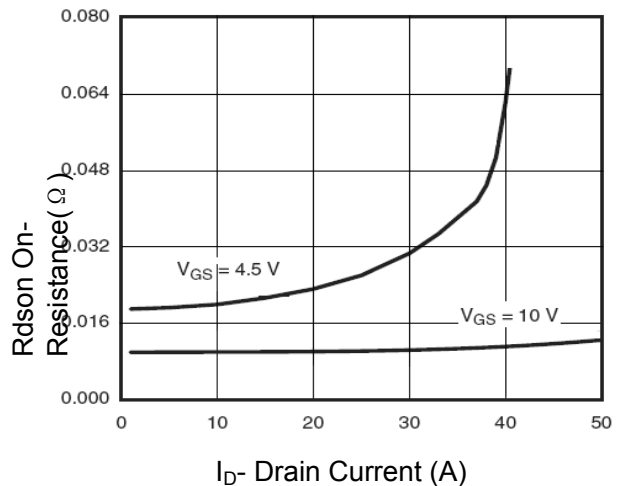
**Figure 3 Power Dissipation**



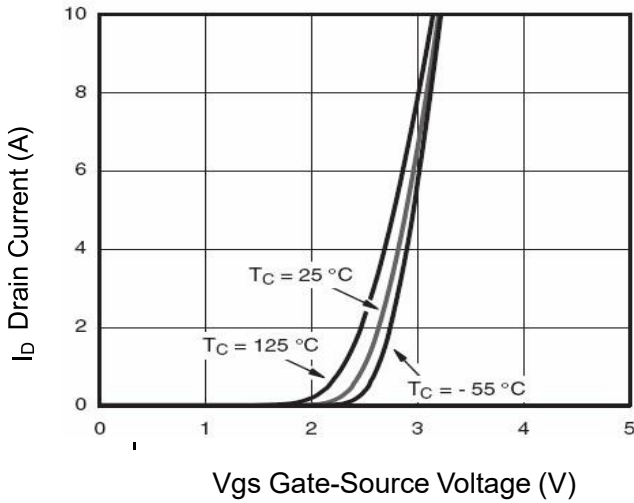
**Figure 4 Drain Current**



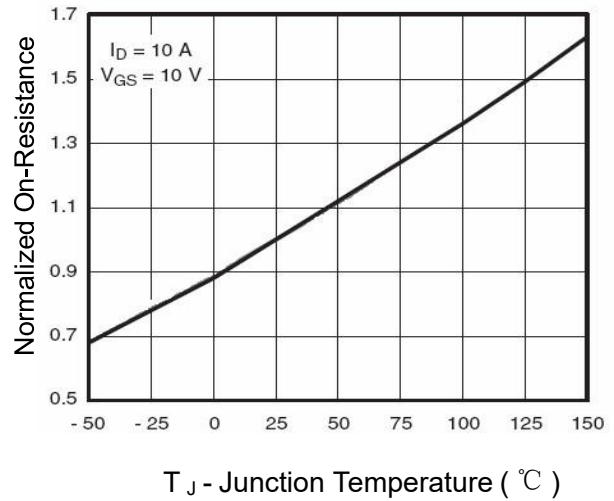
**Figure 5 Output Characteristics**



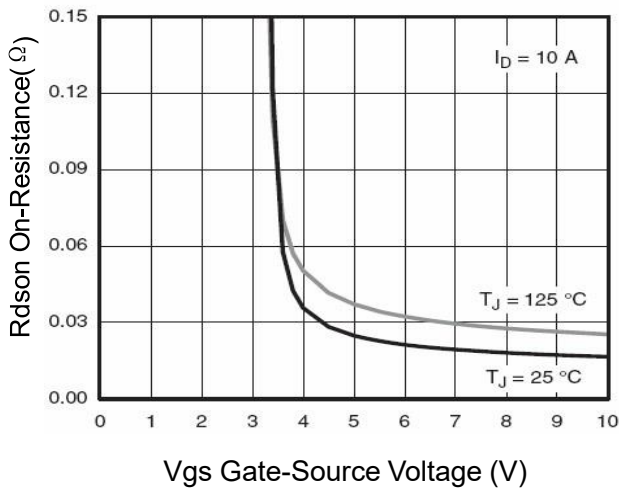
**Figure 6 Drain-Source On-Resistance**



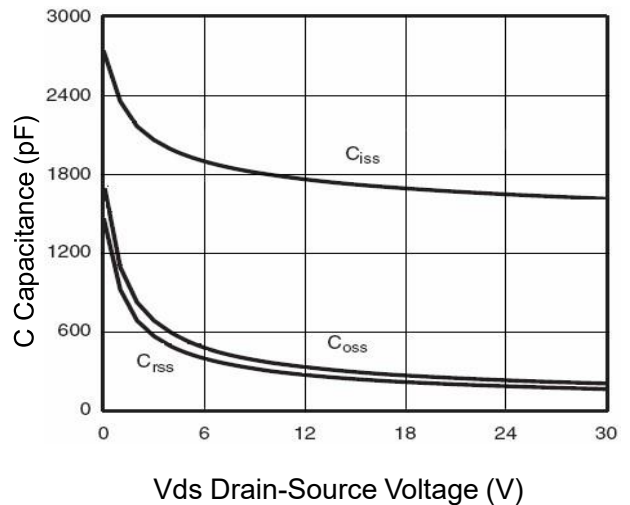
**Figure 7 Transfer Characteristics**



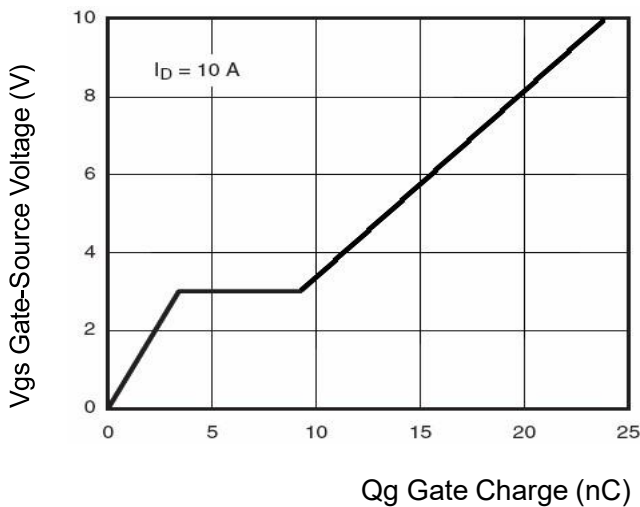
**Figure 8 Drain-Source On-Resistance**



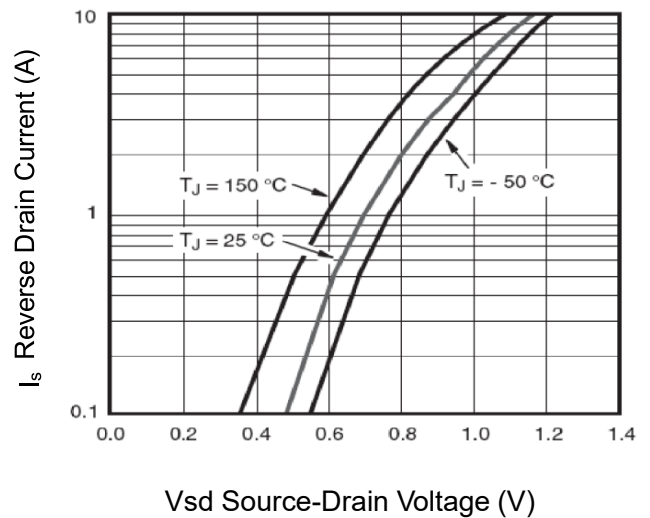
**Figure 9 Rdson vs Vgs**



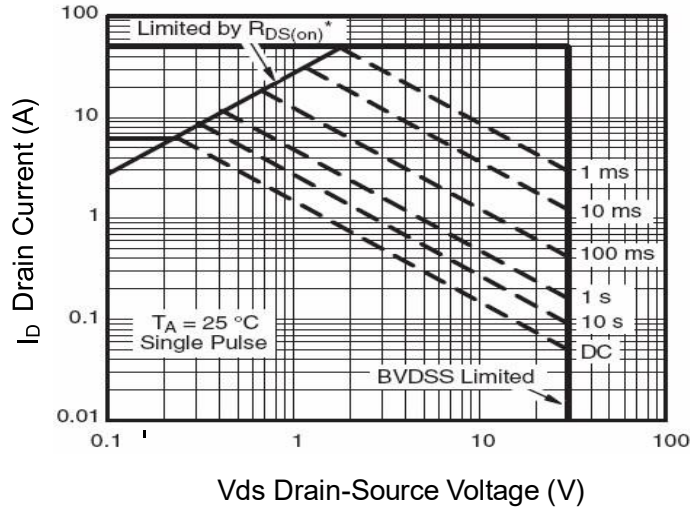
**Figure 10 Capacitance vs Vds**



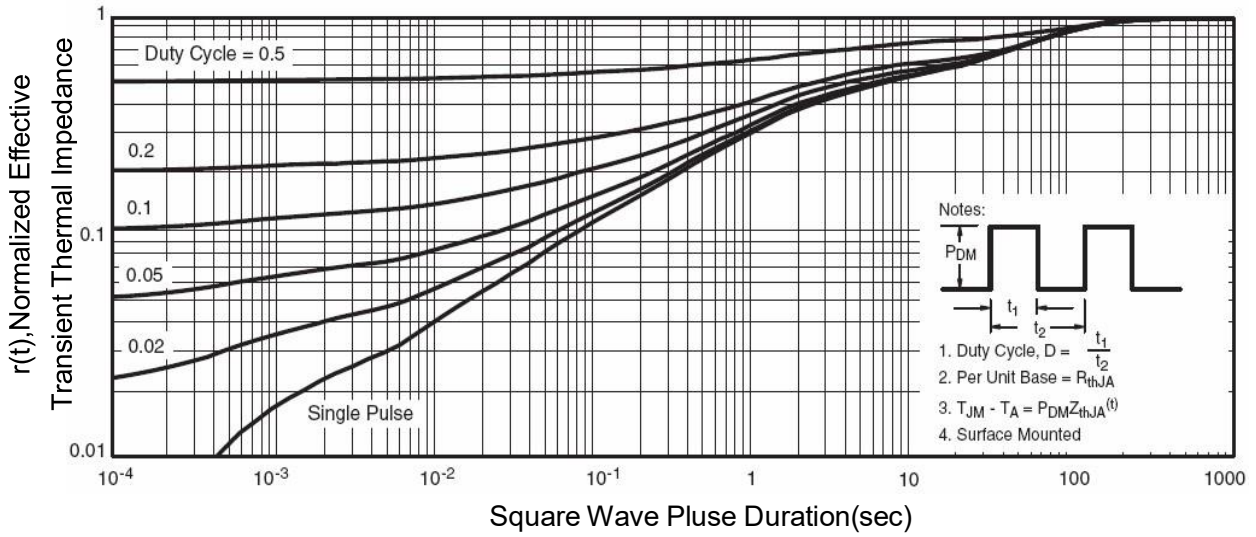
**Figure 11 Gate Charge**



**Figure 12 Source- Drain Diode Forward**

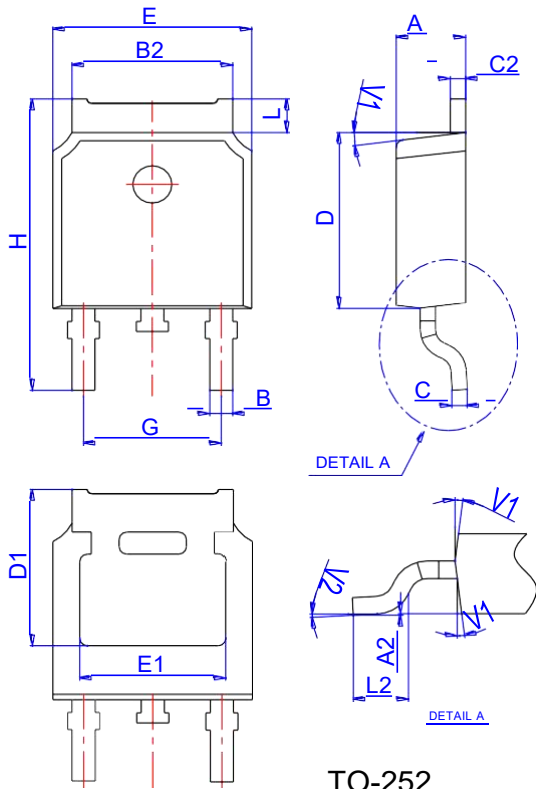


**Figure 13 Safe Operation Area**



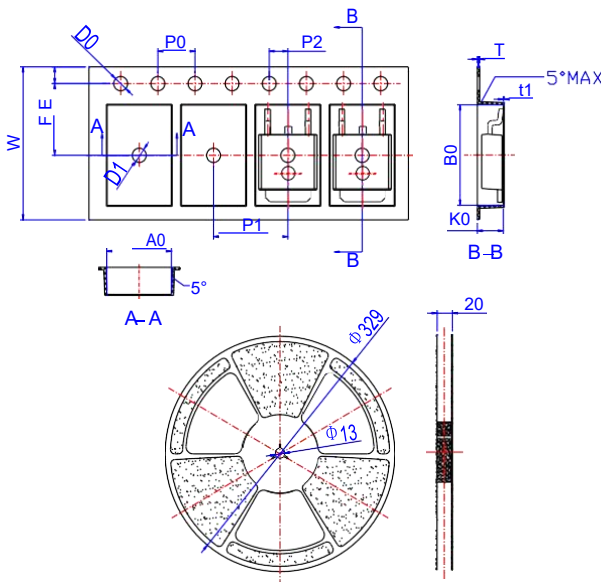
**Figure 14 Normalized Maximum Transient Thermal Impedance**

**Package Mechanical Data-TO-252-JQ Single**



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