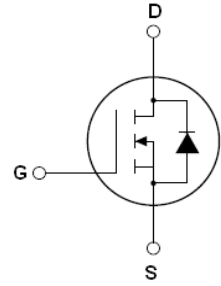


Features:

- Advanced trench process technology
- Special designed for Convertors and power controls
- High density cell design for ultra low Rdson
- Fully characterized Avalanche voltage and current
- Avalanche Energy 100% test

ID=80A
BV=80V
Rdson=6.3mΩ (Typ.)

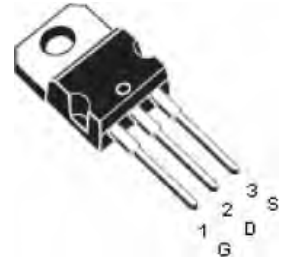


Description:

The FTK7509 is a new generation of middle voltage and high current N-Channel enhancement mode trench power MOSFET. This new technology increases the cell density and reduces the on-resistance; its typical Rdson can reduce to 6.2mohm.

Application:

- Power switching application



FTK7509 TOP View (TO220)

Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D@T_c=25^\circ\text{C}$	Continuous drain current, VGS@10V	80	A
$I_D@T_c=100^\circ\text{C}$	Continuous drain current, VGS@10V	72	
I_{DM}	Pulsed drain current ①	320	
$P_D@T_c=25^\circ\text{C}$	Power dissipation	165	W
	Linear derating factor	2.0	W/°C
V_{GS}	Gate-to-Source voltage	±20	V
dv/dt	Peak diode recovery voltage	31	v/ns
E_{AS}	Single pulse avalanche energy ②	500	mJ
E_{AR}	Repetitive avalanche energy	TBD	
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

Thermal Resistance

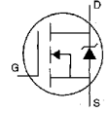
	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case	—	0.75	—	°C/W
$R_{\theta JA}$	Junction-to-ambient	—	—	62	

Electrical Characteristics @TJ=25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-Source breakdown voltage	80	—	—	V	$V_{GS}=0V, I_D=250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	0.0063	0.008	Ω	$V_{GS}=10V, I_D=40A$
$V_{GS(th)}$	Gate threshold voltage	2.0	2.8	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
g_{fs}	Forward transconductance	—	58	—	S	$V_{DS}=5V, I_D=30A$
I_{DSS}	Drain-to-Source leakage current	—	—	2	μA	$V_{DS}=80V, V_{GS}=0V$
		—	—	10		$V_{DS}=80V, V_{GS}=0V, T_J=150^\circ\text{C}$

I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS}=20V$
	Gate-to-Source reverse leakage	—	—	-100		$V_{GS}=-20V$
Q_g	Total gate charge	—	100	—	nC	$I_D=30A$
Q_{gs}	Gate-to-Source charge	—	18	—		$V_{DD}=30V$
Q_{gd}	Gate-to-Drain("Miller") charge	—	28	—		$V_{GS}=10V$
$t_{d(on)}$	Turn-on delay time	—	20	—	nS	$V_{DD}=30V$
t_r	Rise time	—	17.8	—		$I_D=2A, R_L=15\Omega$
$t_{d(off)}$	Turn-Off delay time	—	76.8	—		$R_G=2.5\Omega$
t_f	Fall time	—	15.7	—		$V_{GS}=10V$
C_{iss}	Input capacitance	—	3200	—	pF	$V_{GS}=0V$
C_{oss}	Output capacitance	—	330	—		$V_{DS}=25V$
C_{rss}	Reverse transfer capacitance	—	260	—		$f=1.0MHz$

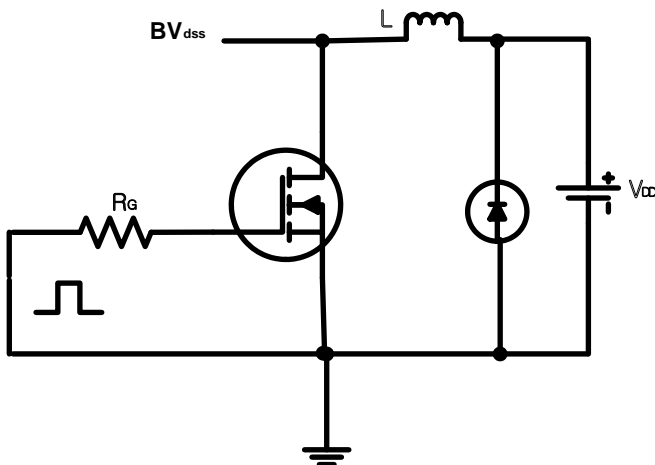
Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current. (Body Diode)	—	—	80	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	320		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$T_J=25^\circ C, I_S=40A, V_{GS}=0V$ ③
t_{rr}	Reverse Recovery Time	—	57	—	nS	$T_J=25^\circ C, I_F=75A$ $di/dt=100A/\mu s$ ③
Q_{rr}	Reverse Recovery Charge	—	108	—	nC	
t_{on}	Forward Turn-on Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$)				

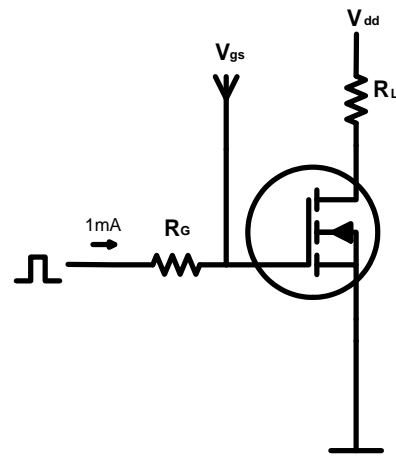
Notes:

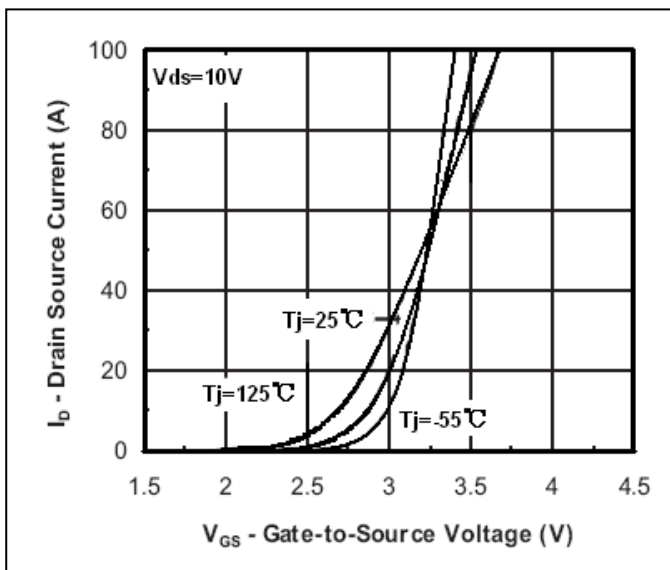
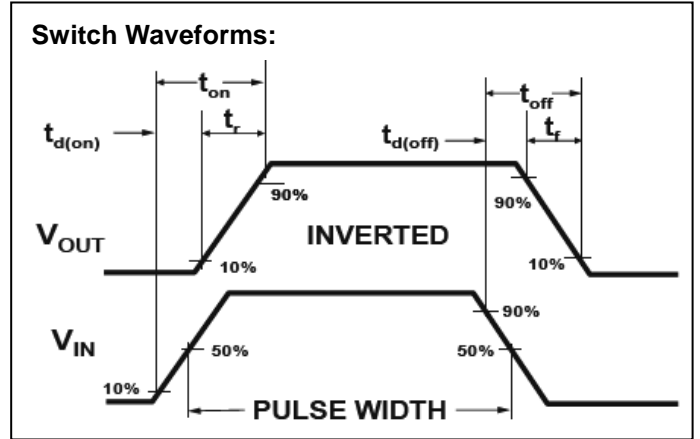
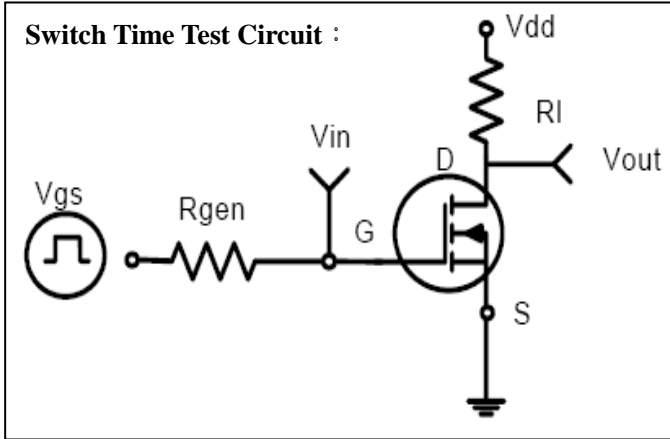
- ① Repetitive rating; pulse width limited by max junction temperature.
- ② Test condition: $L = 0.3mH, I_D = 57A, V_{DD} = 47V$
- ③ Pulse width $\leq 300\mu s$; duty cycle $\leq 1.5\%$ $R_G = 25\Omega$ Starting $T_J = 25^\circ C$

EAS test circuits:

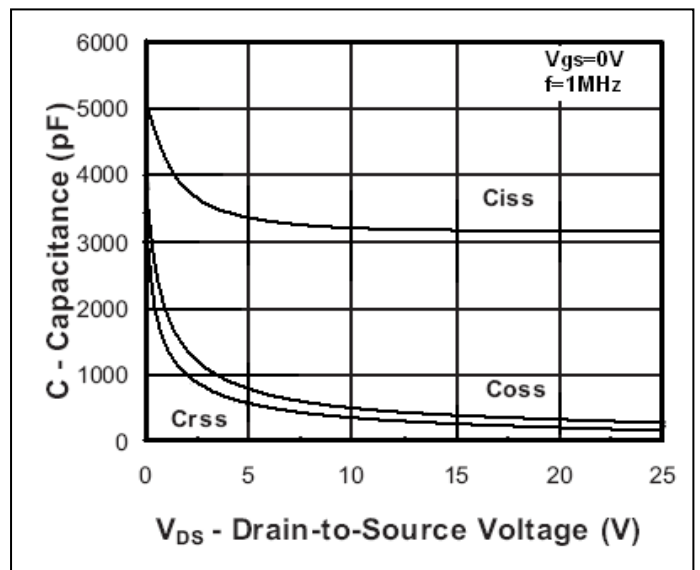


Gate charge test circuit:

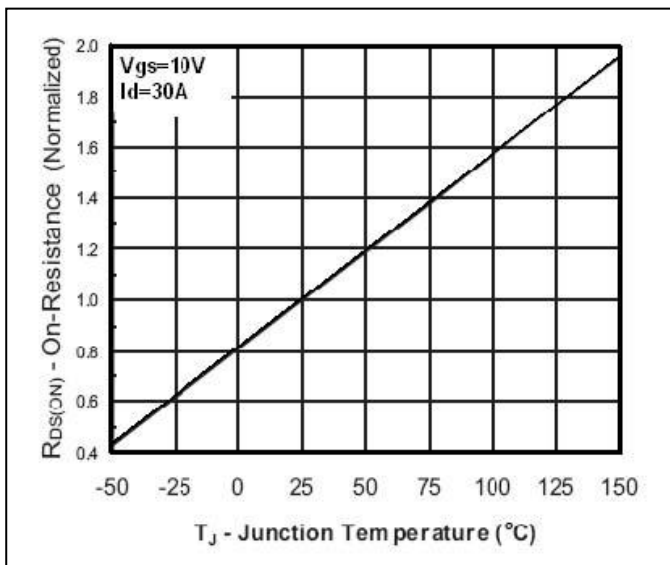




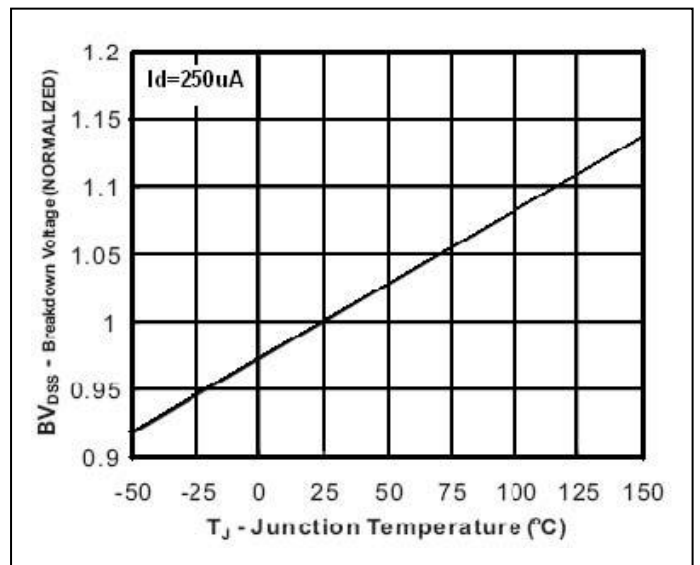
Transfer Characteristic



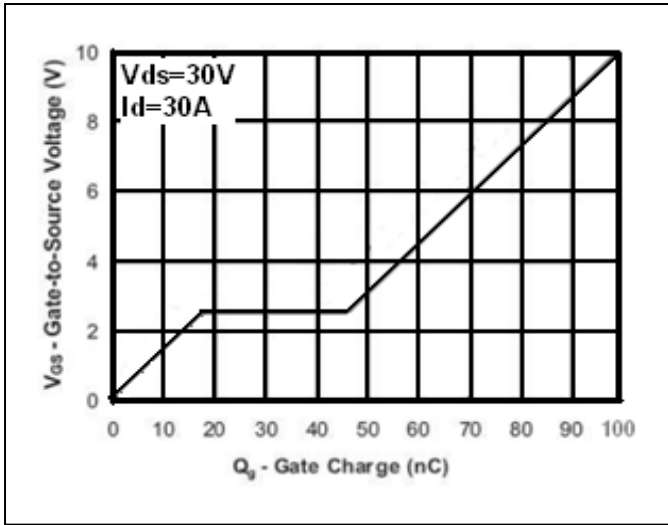
Capacitance



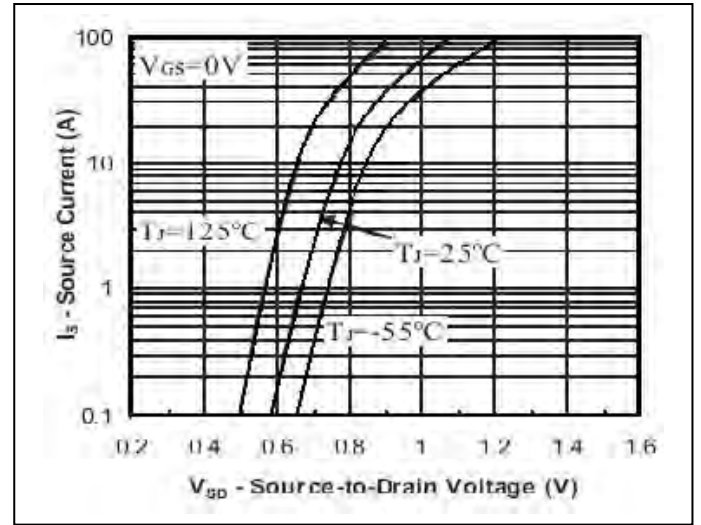
On Resistance vs. Junction Temperature



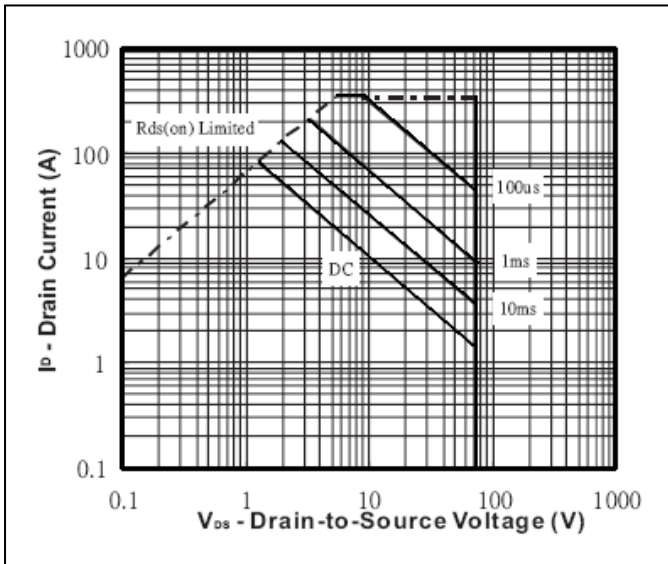
Breakdown Voltage vs. Junction Temperature



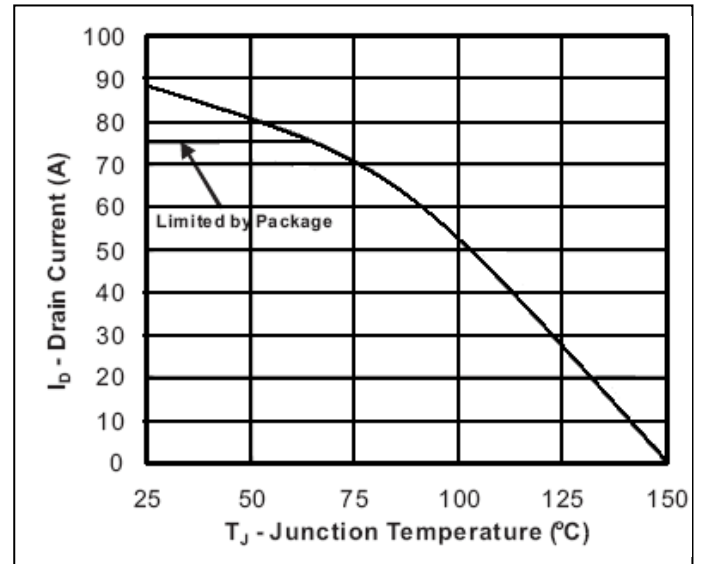
Gate Charge



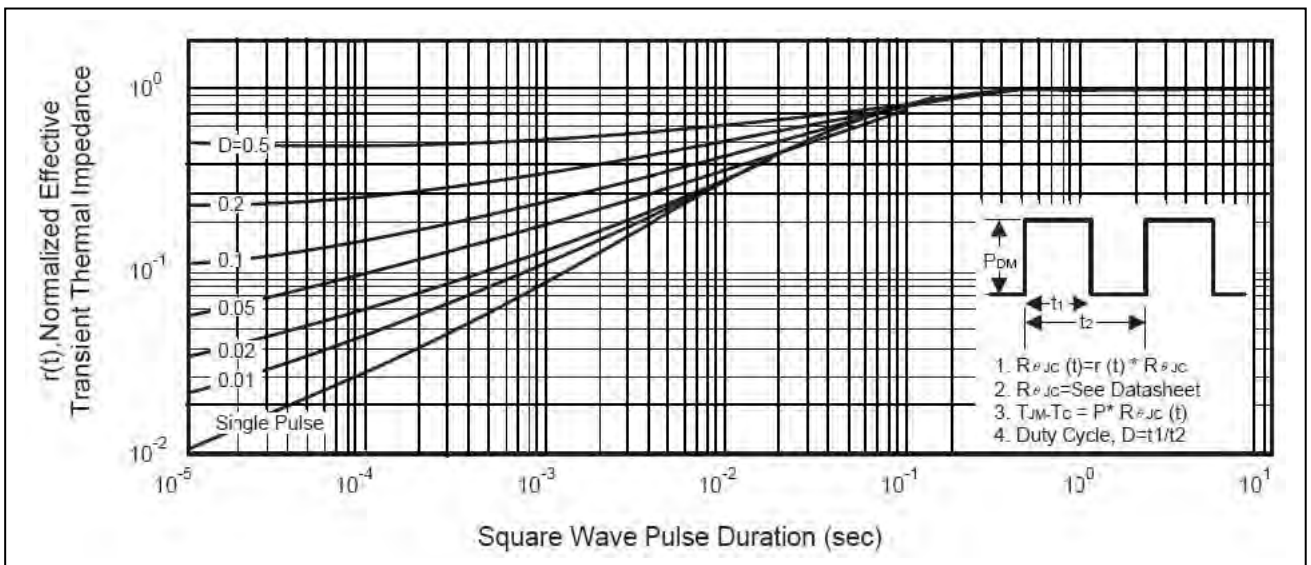
Source-Drain Diode Forward Voltage



Safe Operation Area

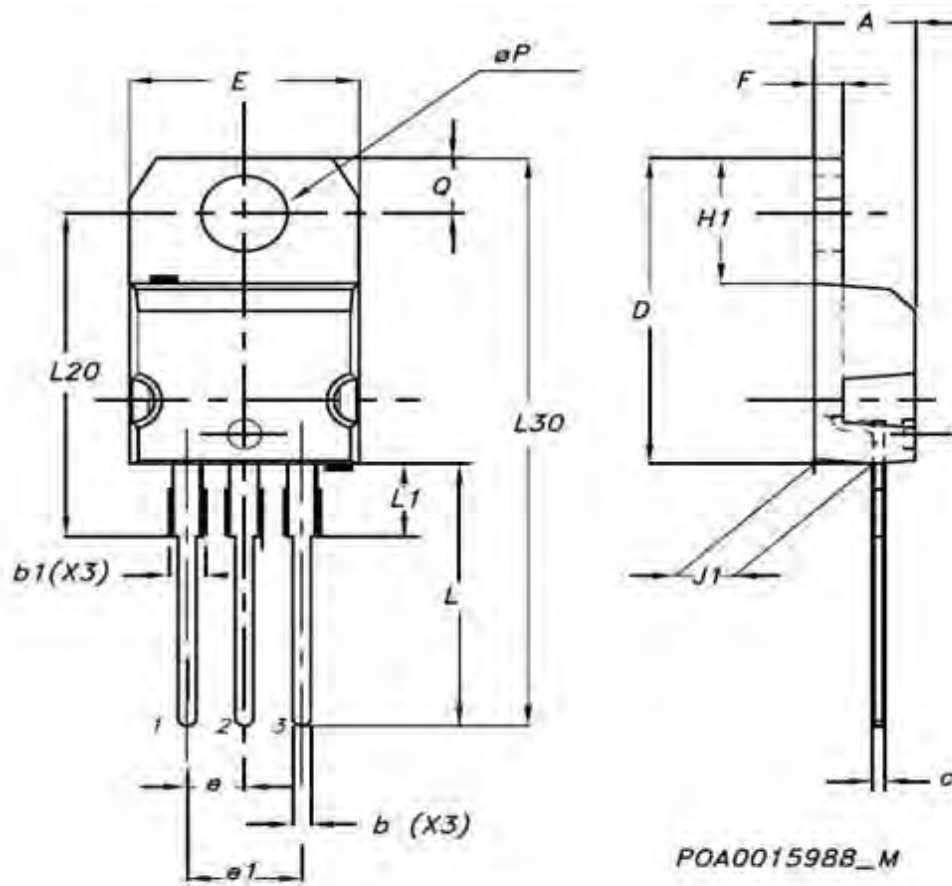


Max Drain Current vs. Junction Temperature



Transient Thermal Impedance Curve

TO220 MECHANICAL DATA:



Dim	mm			inch		
	Min	Typ	Max	Min	Typ	Max
A	4.40		4.60	0.173		0.181
b	0.61		0.88	0.024		0.034
b1	1.14		1.70	0.044		0.066
c	0.49		0.70	0.019		0.027
D	15.25		15.75	0.6		0.62
D1		1.27			0.050	
E	10		10.40	0.393		0.409
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.194		0.202
F	1.23		1.32	0.048		0.051
H1	6.20		6.60	0.244		0.256
J1	2.40		2.72	0.094		0.107
L	13		14	0.511		0.551
L1	3.50		3.93	0.137		0.154
L20		16.40			0.645	
L30		28.90			1.137	
∅P	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116