FH3040G6

N-Channel Enhancement Mode Power MOSFET

Description

The FH3040G6 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

Application

- Motor drivers
- Power switching application
- DC/DC Converters In Computing
- LCD TV appliances

General Features

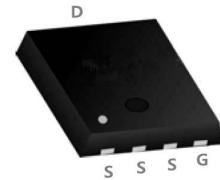| V_{DSS}	I_D	$R_{DS(ON)}$ MAX	
		VGS=10V	VGS=4.5V
30V	40A	8.5 mΩ	11 mΩ

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability
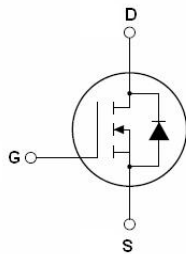
Schematic diagram
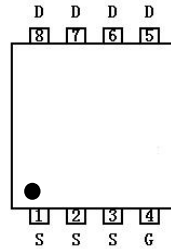
Marking and pin Assignment

PDFN3.3x3.3-8L top and bottom view

Absolute Maximum Ratings (T_C=25℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	40	A
Pulsed Drain Current	I_{DM}	120	A
Maximum Power Dissipation	P_D	35	W
Derating factor		0.28	W/℃
Single pulse avalanche energy [Note 5]	E_{AS}	150	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case[Note 2]	$R_{θJC}$	3.6	℃/W

Electrical Characteristics (TC=25℃unless otherwise noted)

| Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V$ $I_D=250\mu A$	30	33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm20V, V_{DS}=0V$	-	-	±100	nA
On Characteristics [Note 3]						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.6	3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V$, $I_D=12A$	-	6.5	8.5	mΩ
		$V_{GS}=4.5V$, $I_D=10A$	-	8.5	11	
Forward Transconductance	g_{FS}	$V_{DS}=10V, I_D=12A$	30	-	-	S
Dynamic Characteristics [Note4]						
Input Capacitance	C_{Iss}	$V_{DS}=15V, V_{GS}=0V,$ F=1.0MHz	-	2330	-	PF
Output Capacitance	C_{oss}		-	460	-	PF
Reverse Transfer Capacitance	C_{rss}		-	230	-	PF
Switching Characteristics [Note 4]						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, I_D=12A$ $V_{GS}=10V, R_{GEN}=6\Omega$	-	18	-	nS
Turn-on Rise Time	t_r		-	10	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	34	-	nS
Turn-Off Fall Time	t_f		-	10	-	nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=12A,$ $V_{GS}=10V$	-	45	-	nC
Gate-Source Charge	Q_{gs}		-	9.4	-	nC
Gate-Drain Charge	Q_{gd}		-	7.7	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage [Note 3]	V_{SD}	$V_{GS}=0V, I_S=12A$	-	0.85	1.2	V
Diode Forward Current [Note 2]	I_S		-	-	35	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF = 12A di/dt = 100A/μs [Note3]	-	-	47	nS
Reverse Recovery Charge	Q_{rr}		-	-	25	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

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. EAS condition：Tj=25℃,V_{DD}=15V,V_G=10V,L=0.5mH,Rg=25Ω
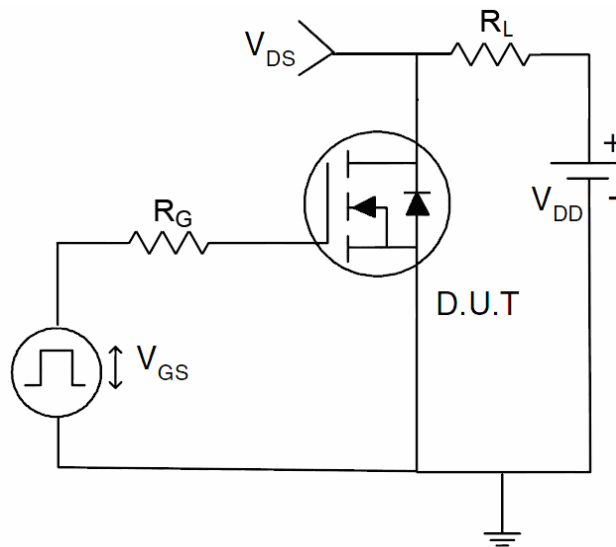
Test Circuit

1) E_{AS} Test Circuits
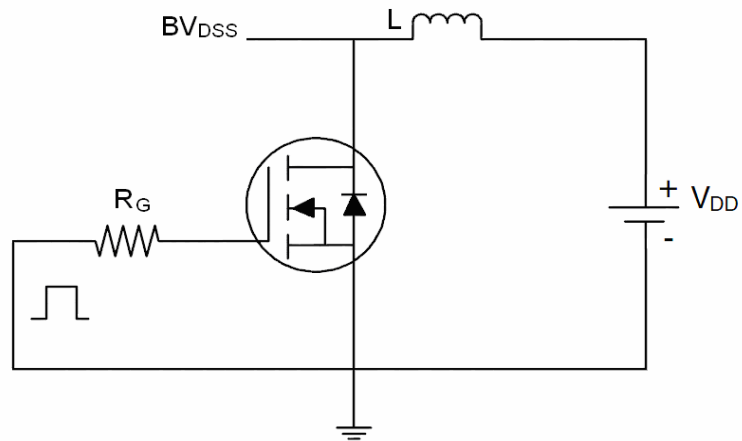
2) Gate Charge Test Circuit
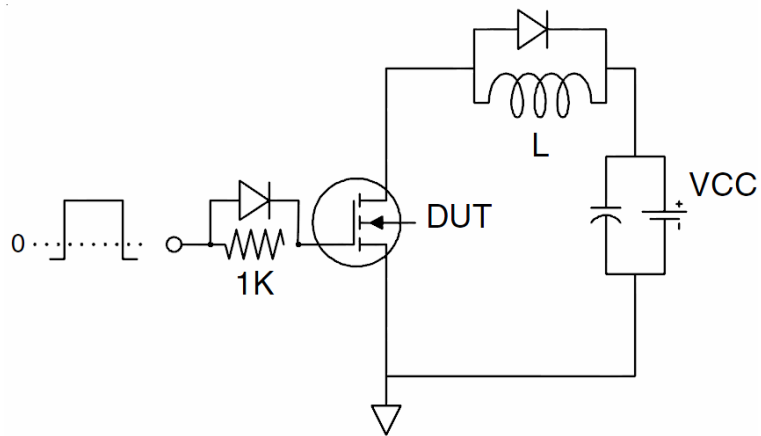
3) Switch Time Test Circuit

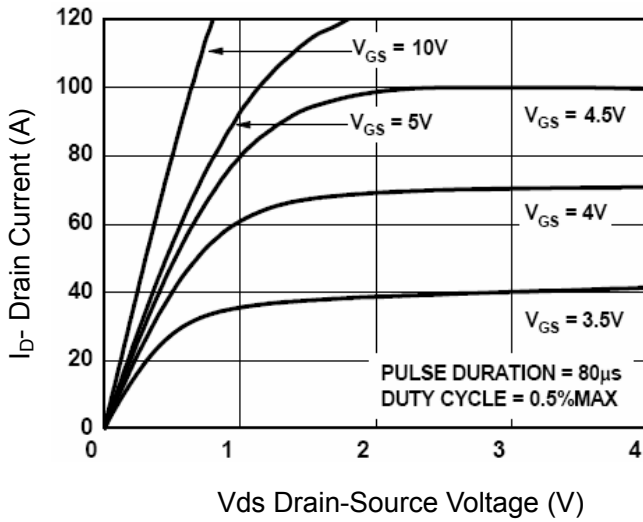## Typical Electrical and Thermal Characteristics (Curves)
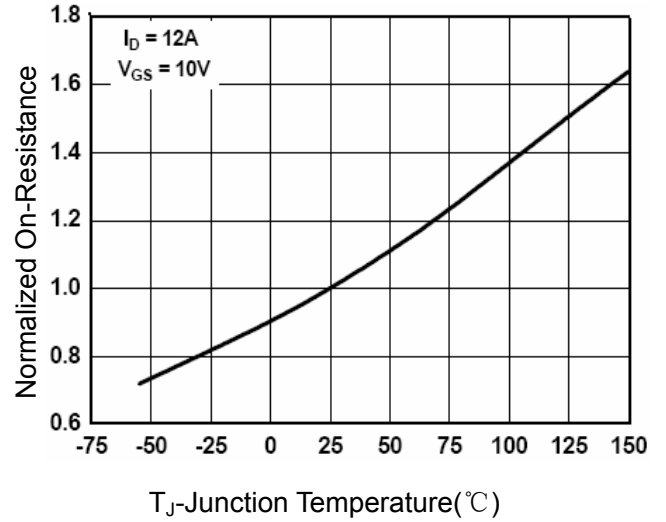

Figure 1 Output Characteristics
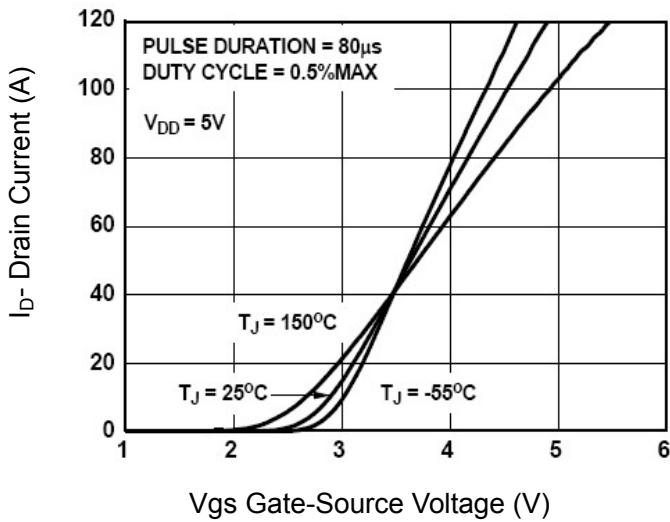

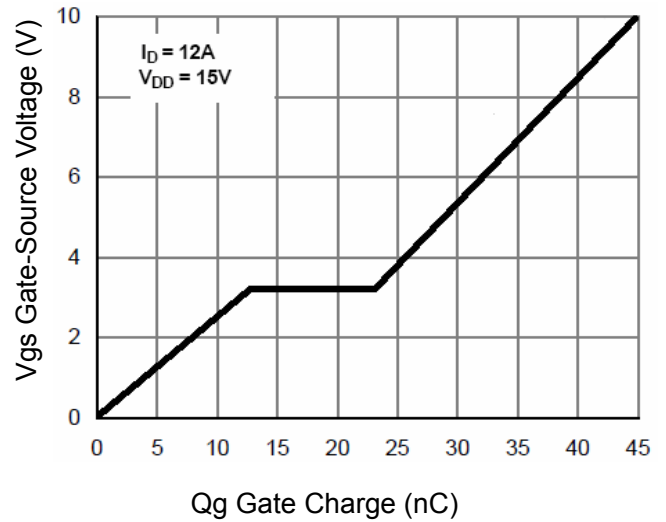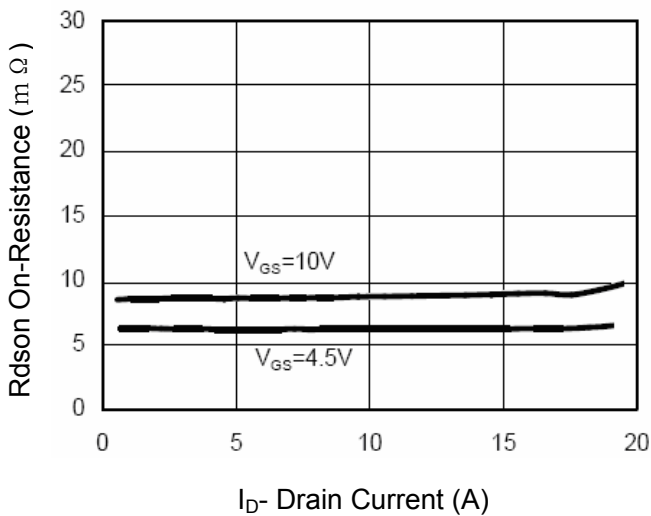**Figure 4 Rdson-Junction Temperature**

Figure 2 Transfer Characteristics
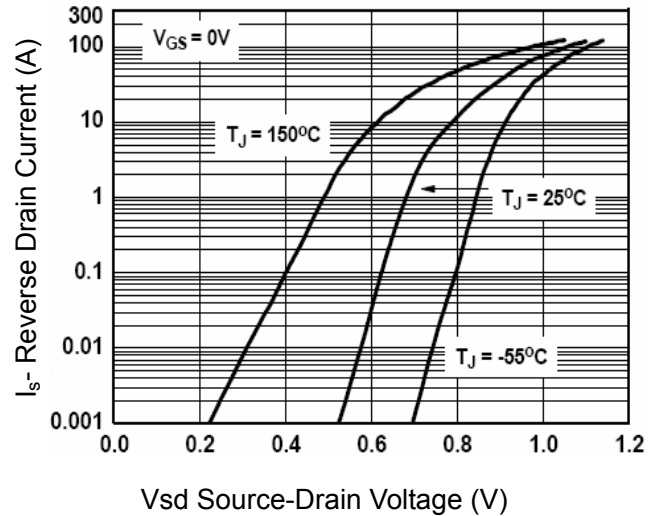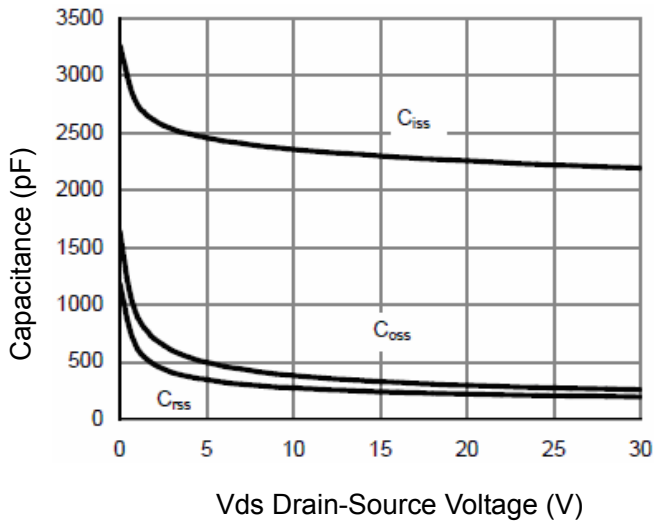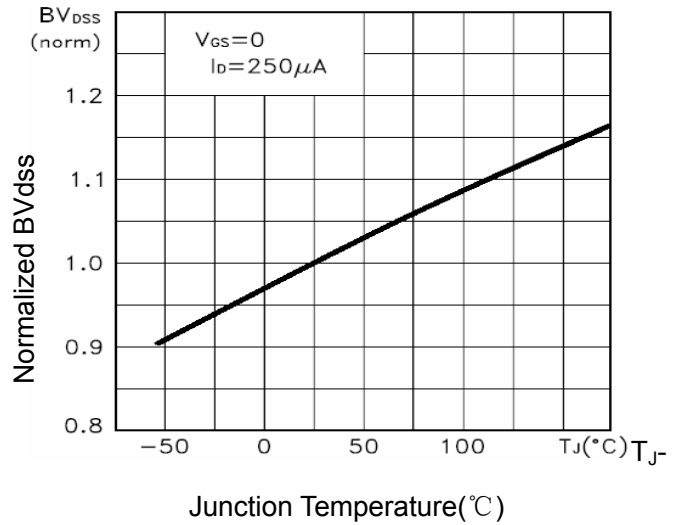

Figure 5 Gate Charge

Figure 3 Rdson- Drain Current

Figure 6 Source- Drain Diode Forward

Figure 7 Capacitance vs Vds

Figure 9 BV$_{DSS}$ vs Junction Temperature
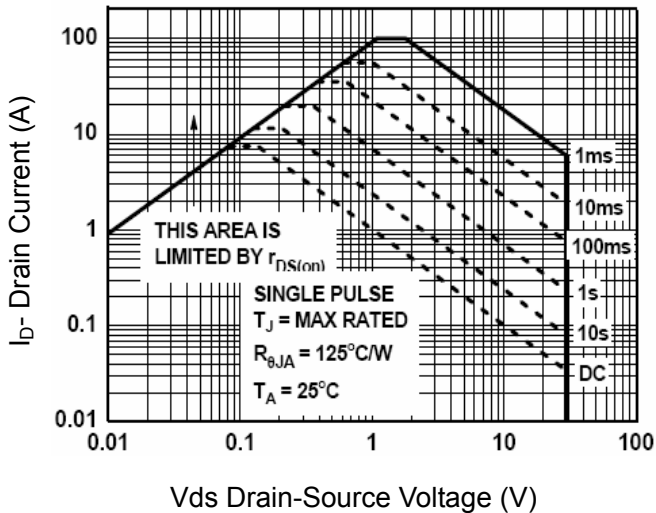
Figure 8 Safe Operation Area
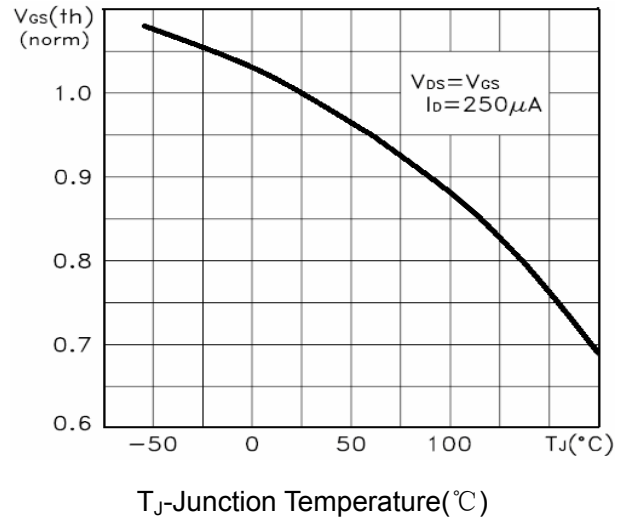
Figure 10 V$_{GS(th)}$ vs Junction Temperature
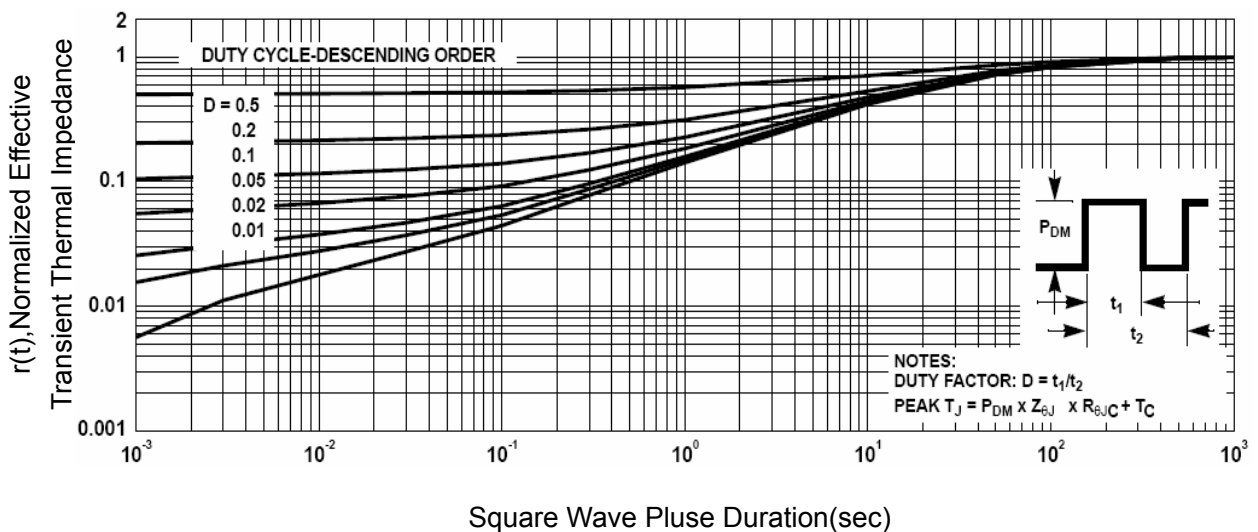
Figure 11 Normalized Maximum Transient Thermal Impedance

Package Information : PDFN3.3x3.3-8L
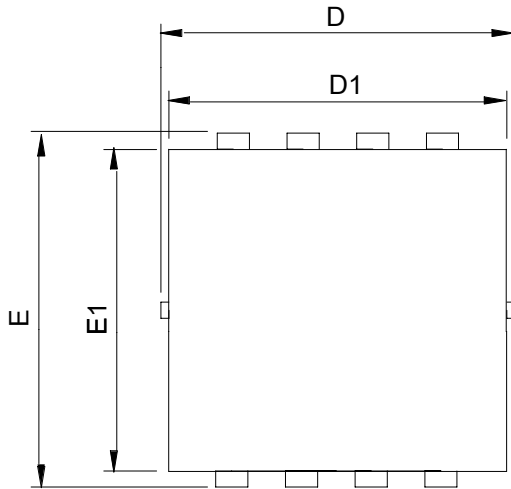
Top View
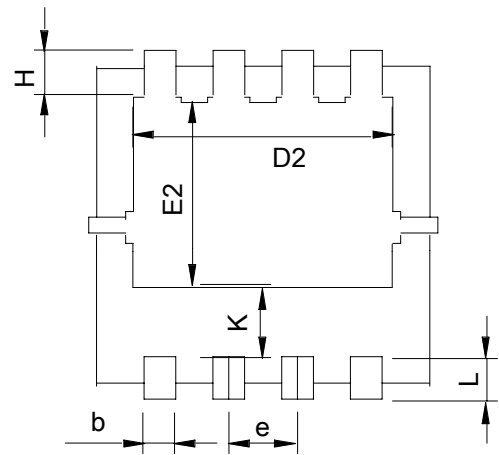
Bottom View
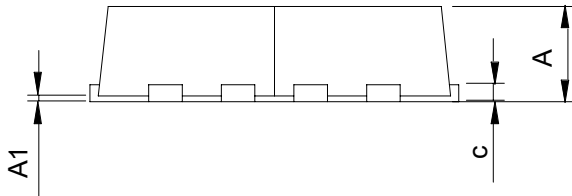
S Y M B O L	PDFN3.3x3.3-8L			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.70	1.00	0.028	0.039
A1	0.00	0.05	0.000	0.002
b	0.25	0.35	0.010	0.014
c	0.14	0.20	0.006	0.008
D	3.10	3.50	0.122	0.138
D1	3.05	3.25	0.120	0.128
D2	2.35	2.55	0.093	0.100
E	3.10	3.50	0.122	0.138
E1	2.90	3.10	0.114	0.122
E2	1.64	1.84	0.065	0.072
e	0.65 BSC		0.026 BSC	
H	0.32	0.52	0.013	0.020
K	0.59	0.79	0.023	0.031
L	0.25	0.55	0.010	0.022

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