

FH25P03G6

P-Channel MOSFET

General Description

The FH25P03G6 is the highest performance trench P-ch MOSFETs with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

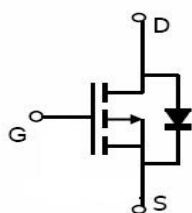
The FH25P03G6 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

General Features

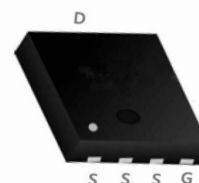
- $V_{DS} = -30V, I_D = -25A$
- $R_{DS(ON)} (Typ) 13 m\Omega @ V_{GS} = -10V$
- $R_{DS(ON)} (Typ) 19 m\Omega @ V_{GS} = -4.5V$
- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available



Schematic diagram



Marking and Pin Assignment



PDFN3.3x3.3-8L top view

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}	± 20	V
Drain Current-Continuous (Note 1)	I_D	-25	A
Drain Current-Continuous ($T_C=100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	-12	A
Drain Current-Pulsed (Note 1/3)	I_{DM}	-67	A
Maximum Power Dissipation	P_D	26	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ\text{C}$

Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta JC}$	3.98	$^\circ\text{C/W}$
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Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =-250μA	-30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-30V, V _{GS} =0V	-	-	-1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-1.1	-1.5	-1.9	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-12A	-	13	18	mΩ
		V _{GS} =-4.5V, I _D =-10A	-	19	27	mΩ
Gate resistance	R _G		-	5.8	-	Ω
Forward Transconductance	g _{FS}	V _{DS} =-5V, I _D =-12A	16	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{ISS}	V _{DS} =-25V, V _{GS} =0V, F=1.0MHz	-	1570	-	PF
Output Capacitance	C _{OSS}		-	209	-	PF
Reverse Transfer Capacitance	C _{ISS}		-	168	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =-15V, I _D =-12A, V _{GS} =-10V, R _{GEN} =1Ω	-	11	-	nS
Turn-on Rise Time	t _r		-	10	-	nS
Turn-Off Delay Time	t _{d(off)}		-	22	-	nS
Turn-Off Fall Time	t _f		-	13	-	nS
Total Gate Charge	Q _g	V _{DS} =-15V, I _D =-15A, V _{GS} =-10V	-	42.6	-	nC
Gate-Source Charge	Q _{gs}		-	4.6	-	nC
Gate-Drain Charge	Q _{gd}		-	11.1	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =-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

Typical Electrical and Thermal Characteristics



Figure 1: Switching Test Circuit

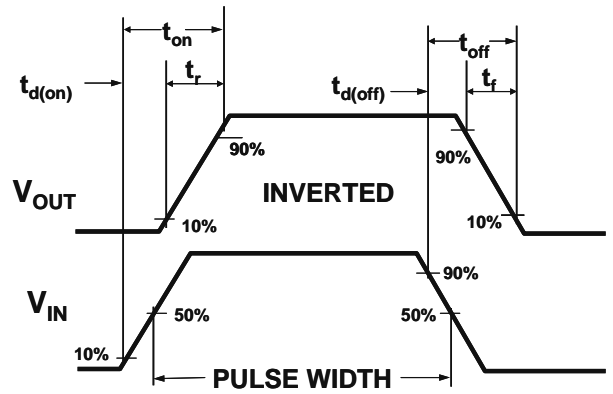


Figure 2: Switching Waveforms

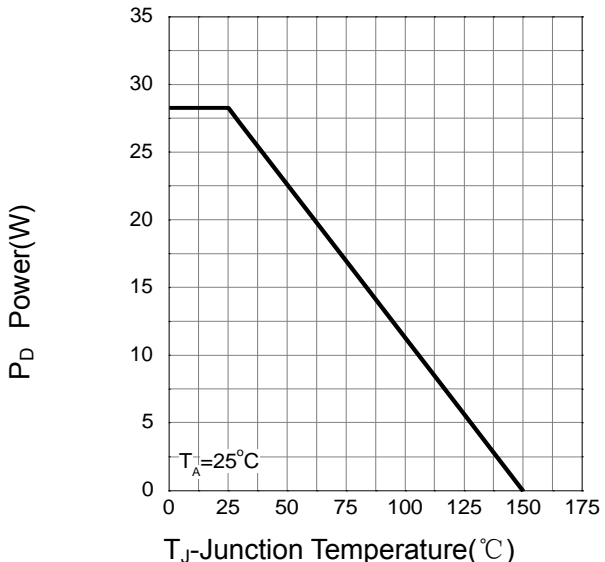


Figure 3 Power Dissipation

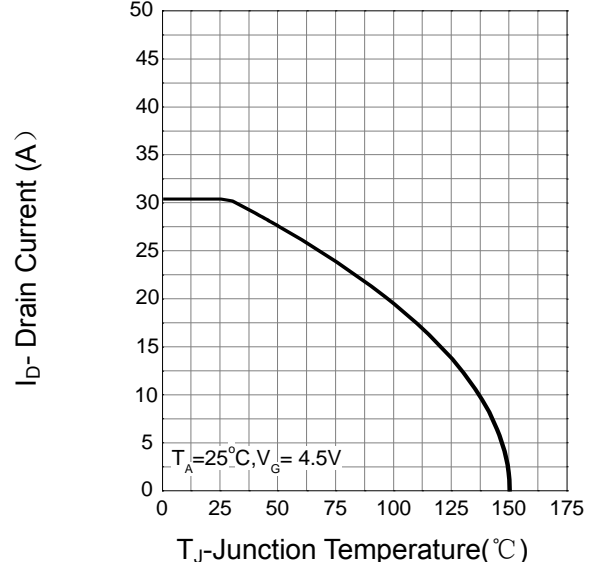


Figure 4 Drain Current

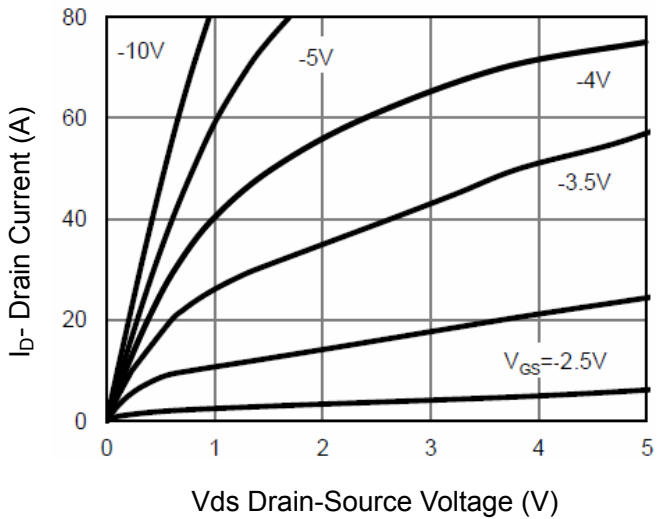


Figure 5 Output Characteristics

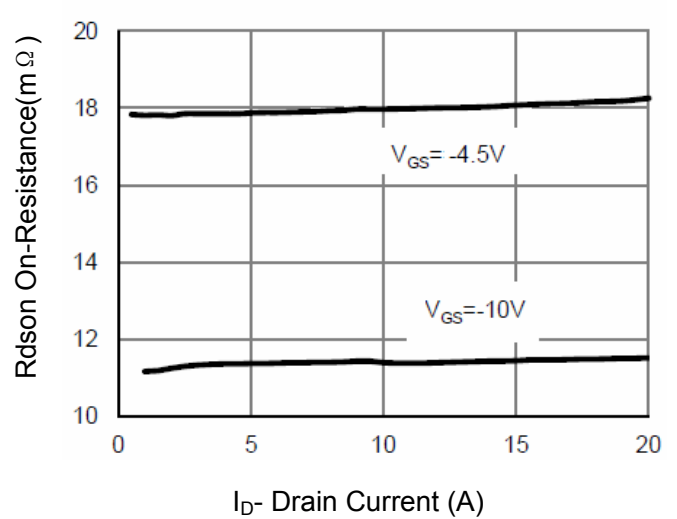


Figure 6 Drain-Source On-Resistance

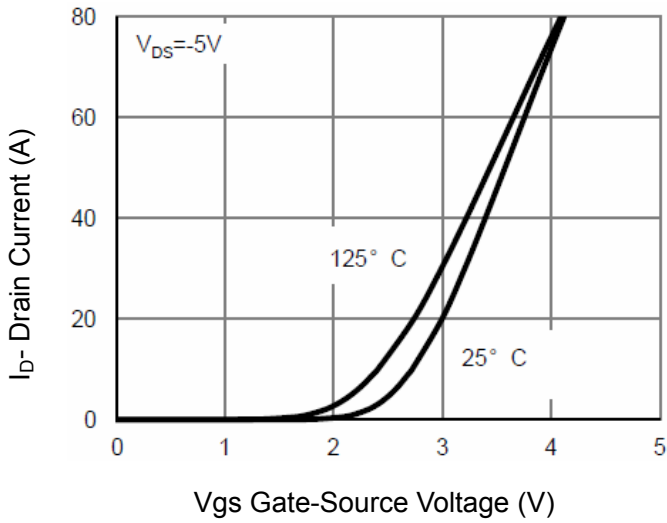


Figure 7 Transfer Characteristics

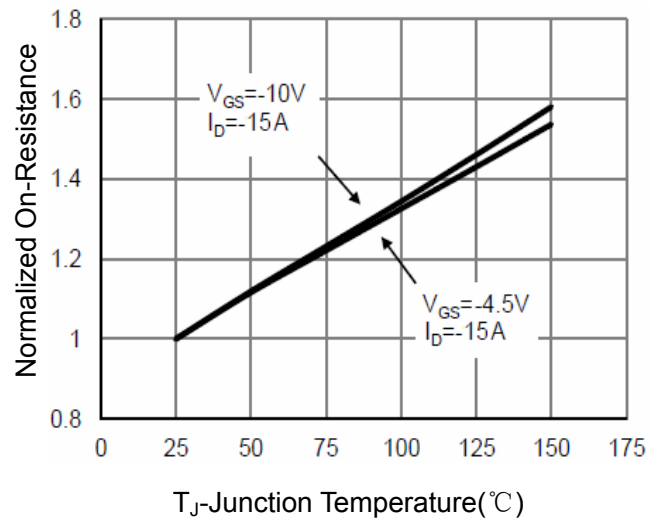


Figure 8 Drain-Source On-Resistance

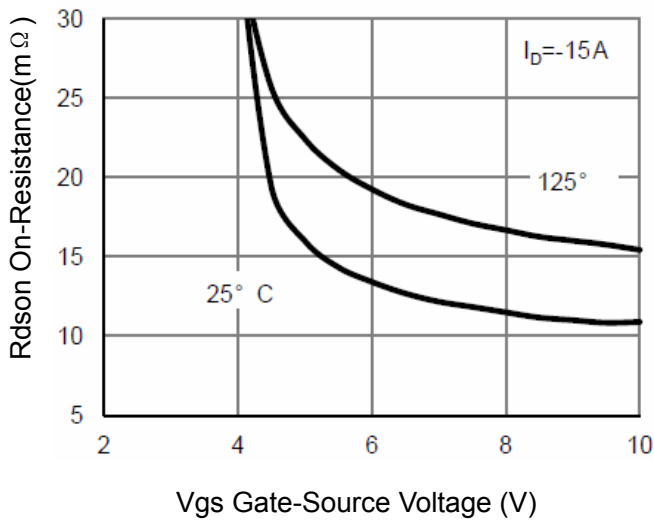


Figure 9 Rdson vs Vgs

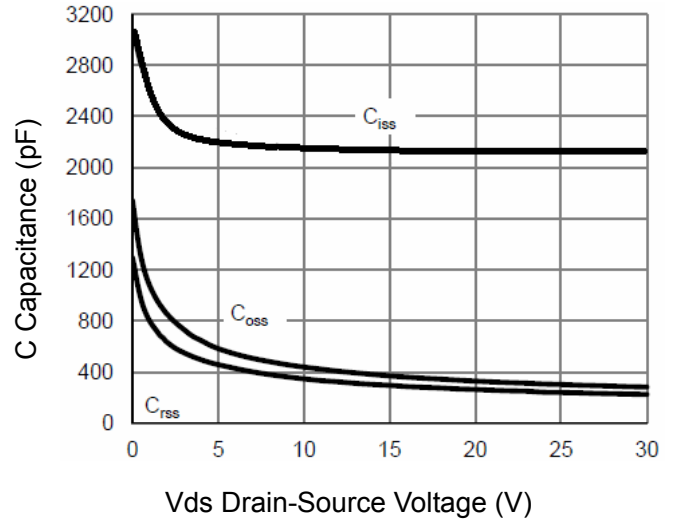


Figure 10 Capacitance vs Vds

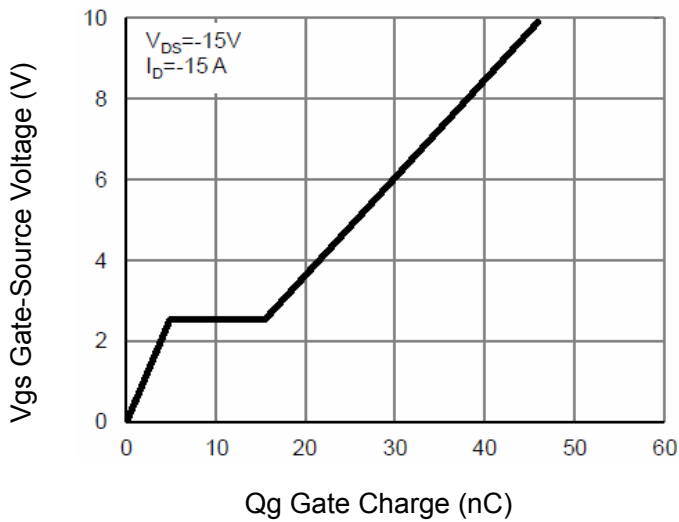


Figure 11 Gate Charge

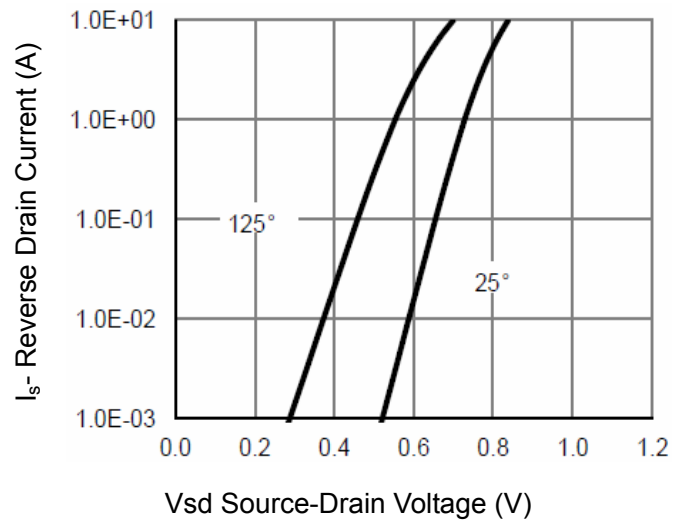
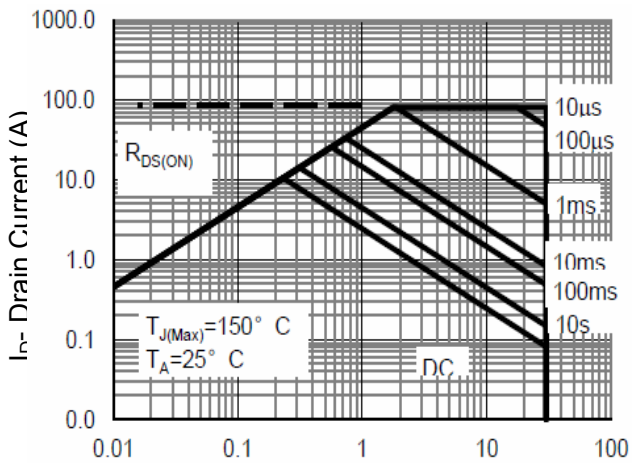
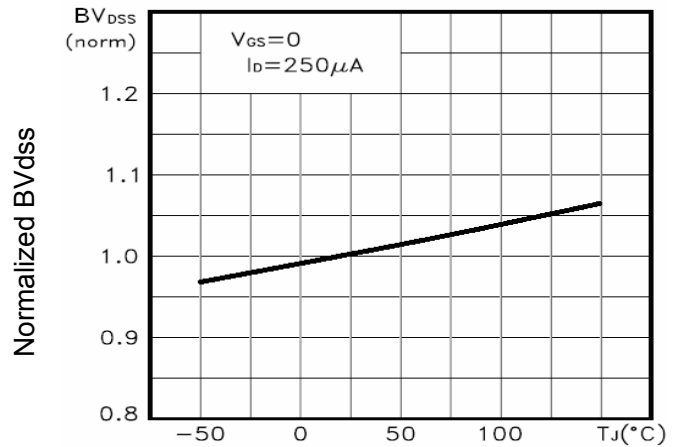


Figure 12 Source- Drain Diode Forward



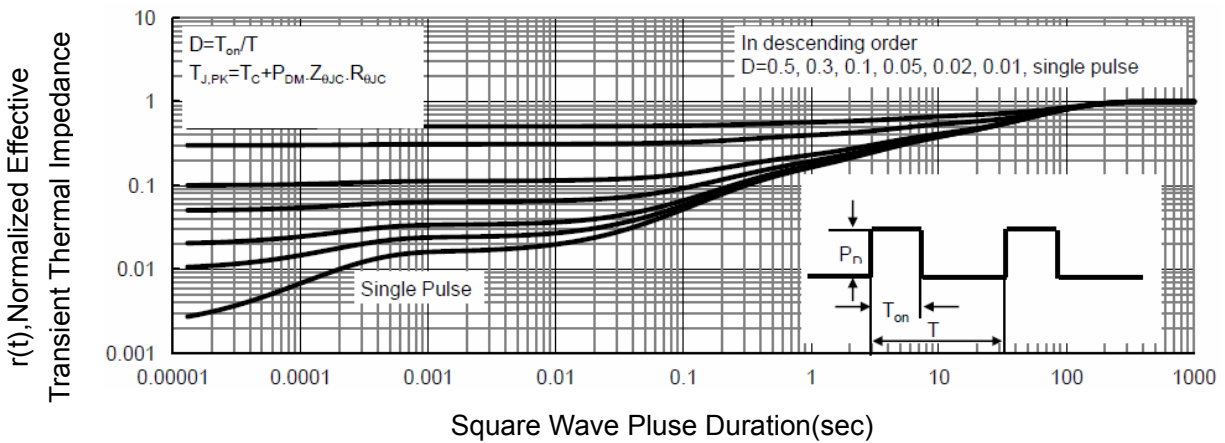
Vds Drain-Source Voltage (V)

Figure 13 Safe Operation Area



T_J-Junction Temperature(°C)

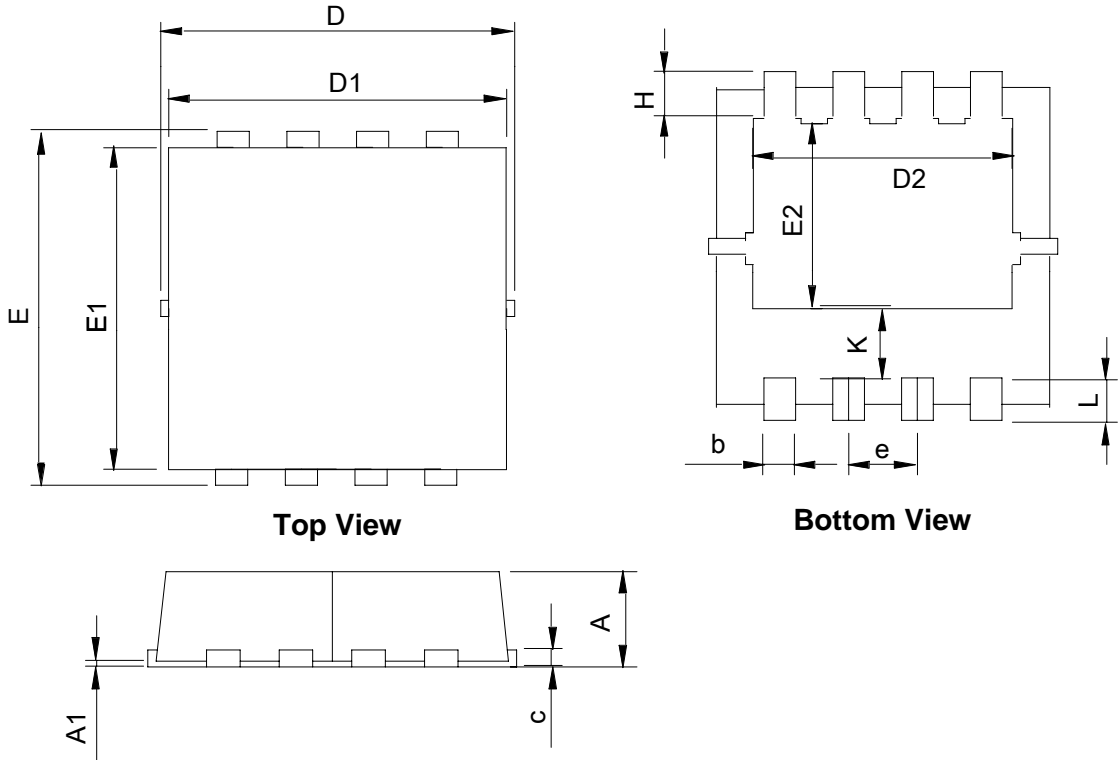
Figure 14 BV_{DSS} vs Junction Temperature



Square Wave Pulse Duration(sec)

Figure 15 Normalized Maximum Transient Thermal Impedance

Package Information : PDFN3.3x3.3-8L



SYMBOL	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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