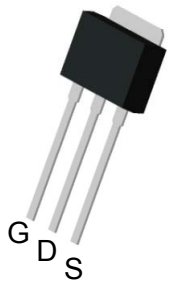
Features

- 60V/50A,
  $R_{DS\ (ON)}$ =10mΩ(Typ.)@V_{GS}=10V
  $R_{DS\ (ON)}$ =12mΩ(Typ.)@V_{GS}=4.5V
- Super High Dense Cell Design
- Ultra Low On-Resistance
- 100% avalanche tested
- Lead Free and Green Devices Available (RoHS Compliant)

Applications

- DC-DC Converters and Off-line UPS

Pin Description



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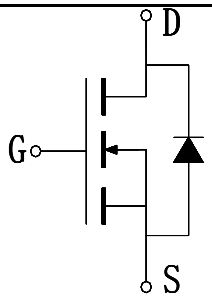


N-Channel MOSFET

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		60	V
V_{GSS}	Gate-Source Voltage		±20	
T_J	Maximum Junction Temperature		175	°C
T_{STG}	Storage Temperature Range		-55 to 175	°C
I_S	Diode Continuous Forward Current	T_C=25°C	50	A
Mounted on Large Heat Sink				
I_{DP} ①	300μs Pulse Drain Current Tested	T_C=25°C	200	A
I_D ②	Continuous Drain Current(V_{GS}=10V)	T_C=25°C	50	A
		T_C=100°C	36	
P_D	Maximum Power Dissipation	T_C=25°C	71	W
		T_C=100°C	36	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		2.1	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		100	°C/W
Drain-Source Avalanche Ratings				
E_{AS} ③	Avalanche Energy, Single Pulsed		100	mJ

Electrical Characteristics (T_C=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Condition	RU6051K			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	60			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V, V_{GS}=0V			1	μA
		T_J=125°C			30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1	2	3	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V			±100	nA
$R_{DS(ON)}$④	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=50A		10	14	mΩ
		V_{GS}=4.5V, I_{DS}=35A		12	18	mΩ
Diode Characteristics						
V_{SD}④	Diode Forward Voltage	I_{SD}=50A, V_{GS}=0V			1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=50A, dI_{SD}/dt=100A/μs		32		ns
Q_{rr}	Reverse Recovery Charge			39		nC
Dynamic Characteristics⑤						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz		1.6		Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=30V, Frequency=1.0MHz		1670		pF
C_{oss}	Output Capacitance			340		
C_{rss}	Reverse Transfer Capacitance			145		
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=30V,I_{DS}=50A, V_{GEN}=10V,R_G=4.7Ω		10		ns
t_r	Turn-on Rise Time			86		
$t_{d(OFF)}$	Turn-off Delay Time			34		
t_f	Turn-off Fall Time			26		
Gate Charge Characteristics⑤						
Q_g	Total Gate Charge	V_{DS}=48V, V_{GS}=10V, I_{DS}=50A		25		nC
Q_{gs}	Gate-Source Charge			9		
Q_{gd}	Gate-Drain Charge			8		

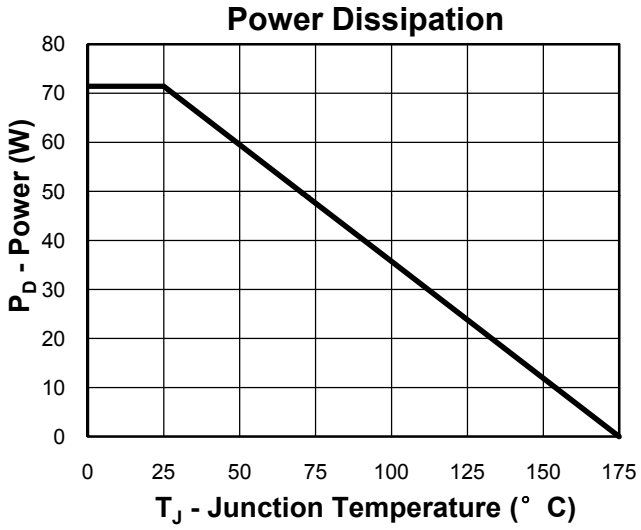
Notes:

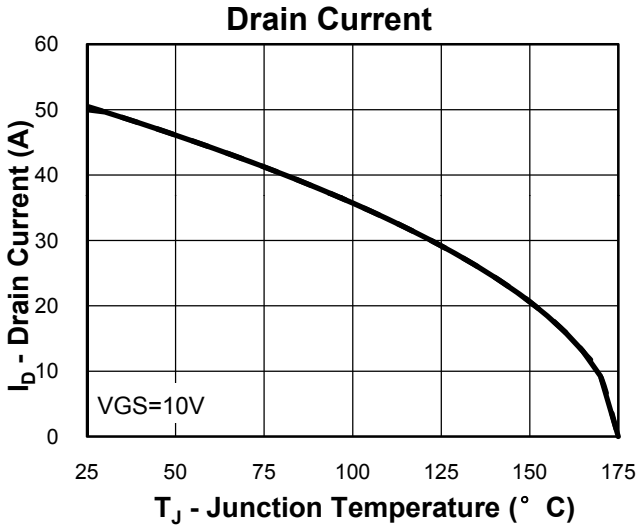
①Pulse width limited by safe operating area.
②Calculated continuous current based on maximum allowable junction temperature.
③Limited by T_{Jmax}, I_{AS} =20A, V_{DD} = 48V, R_G = 50Ω , Starting T_J = 25°C.
④Pulse test;Pulse width≤300μs, duty cycle≤2%.
⑤Guaranteed by design, not subject to production testing.

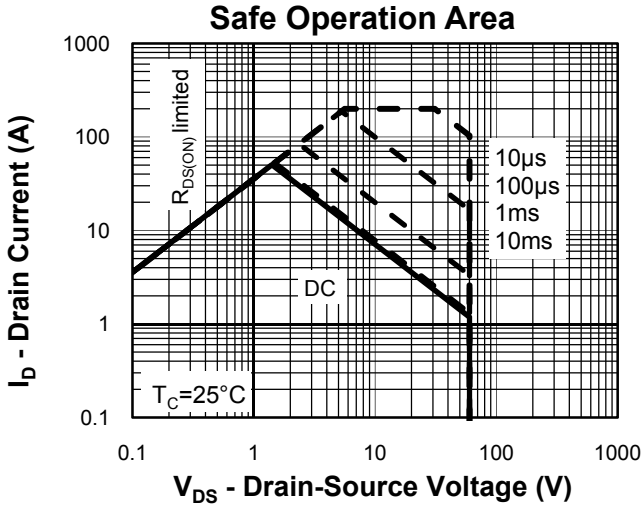
Ordering and Marking Information

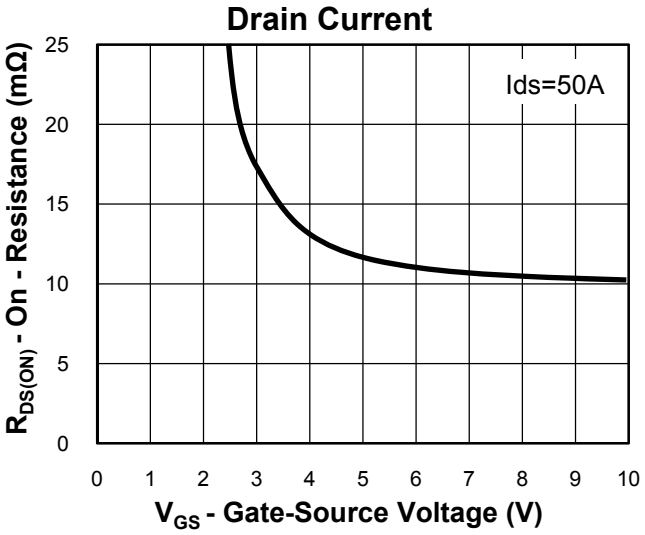
Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU6051K	RU6051K	TO251	Tube	75	-	-

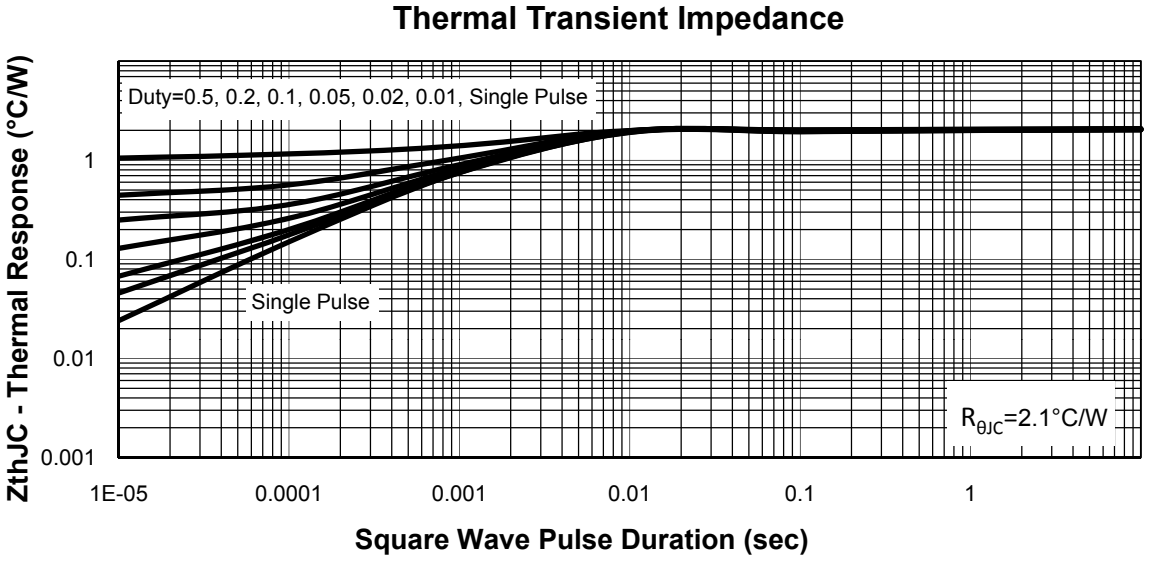
Typical Characteristics



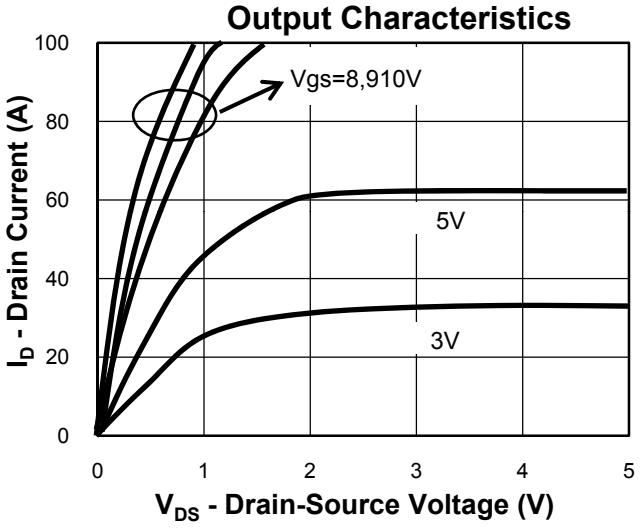


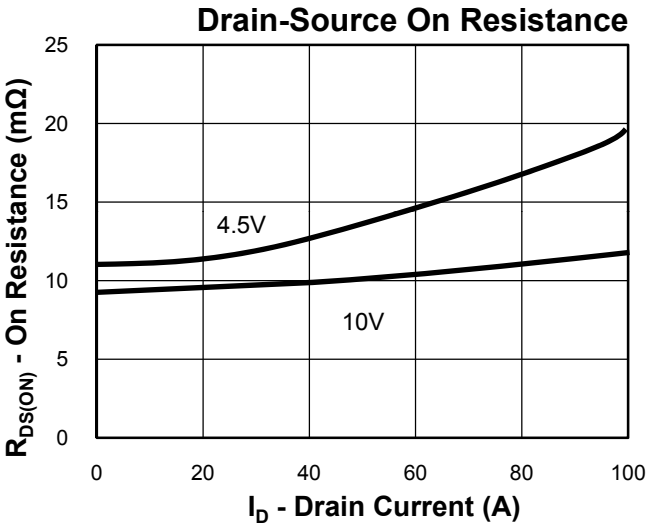


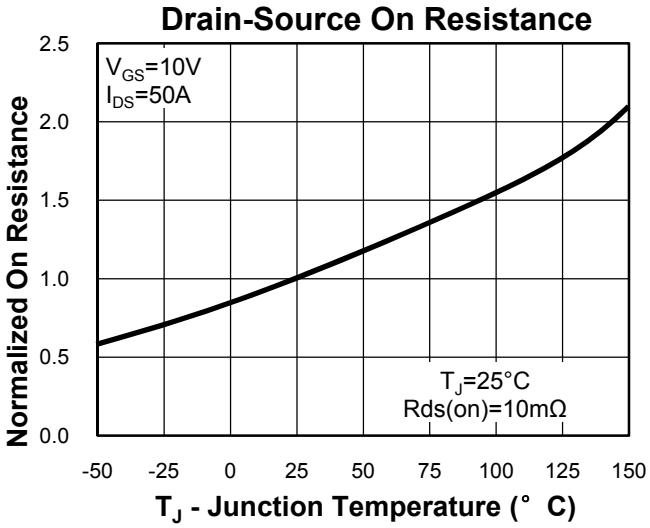


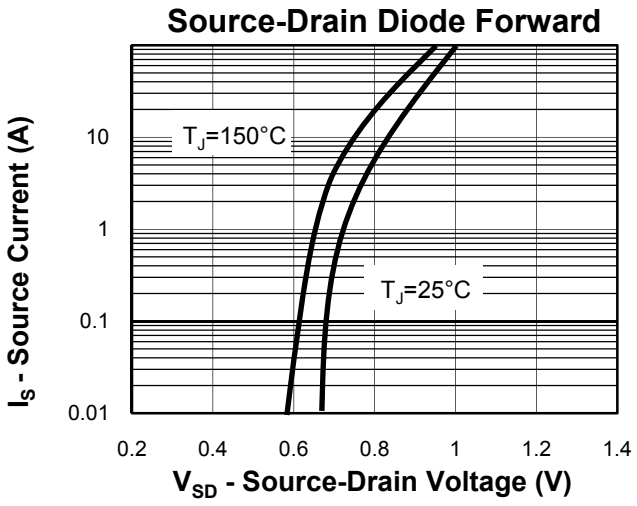


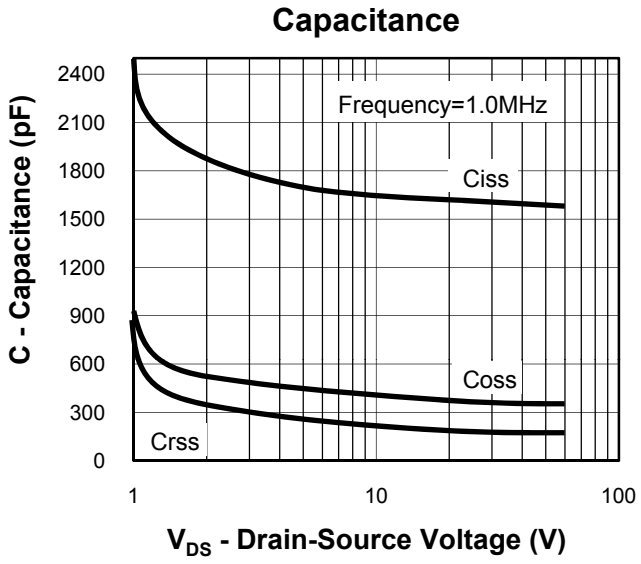
Typical Characteristics

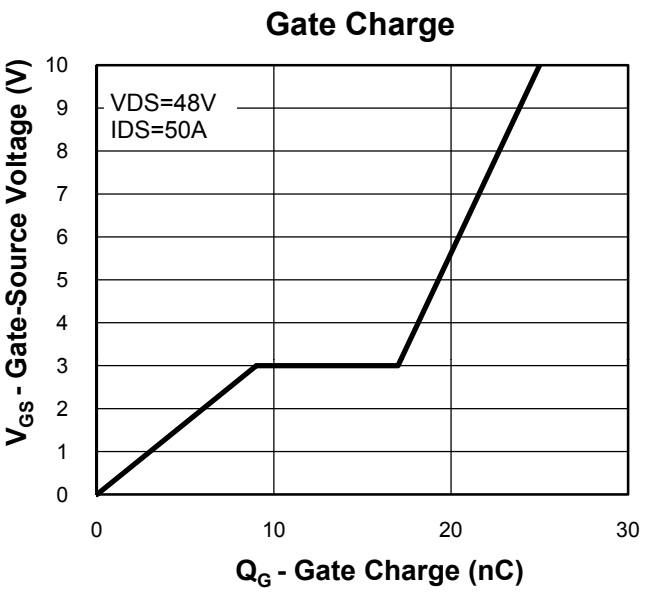




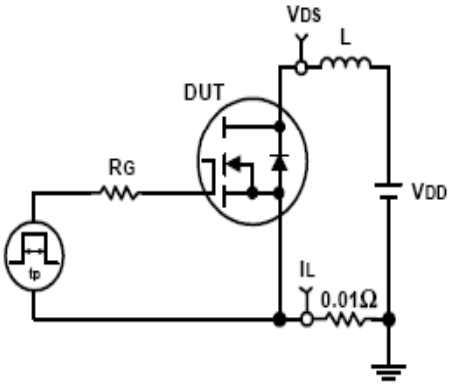


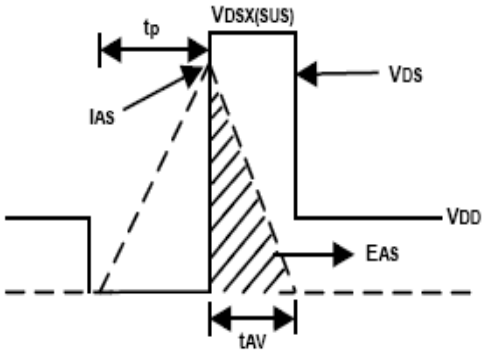




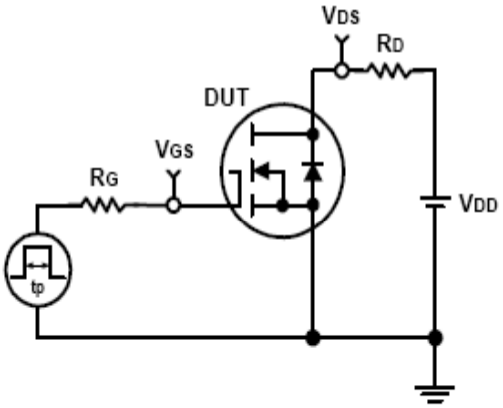


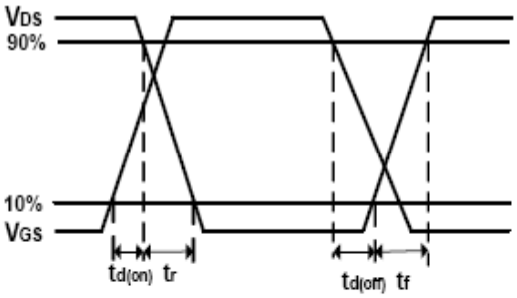
Avalanche Test Circuit and Waveforms





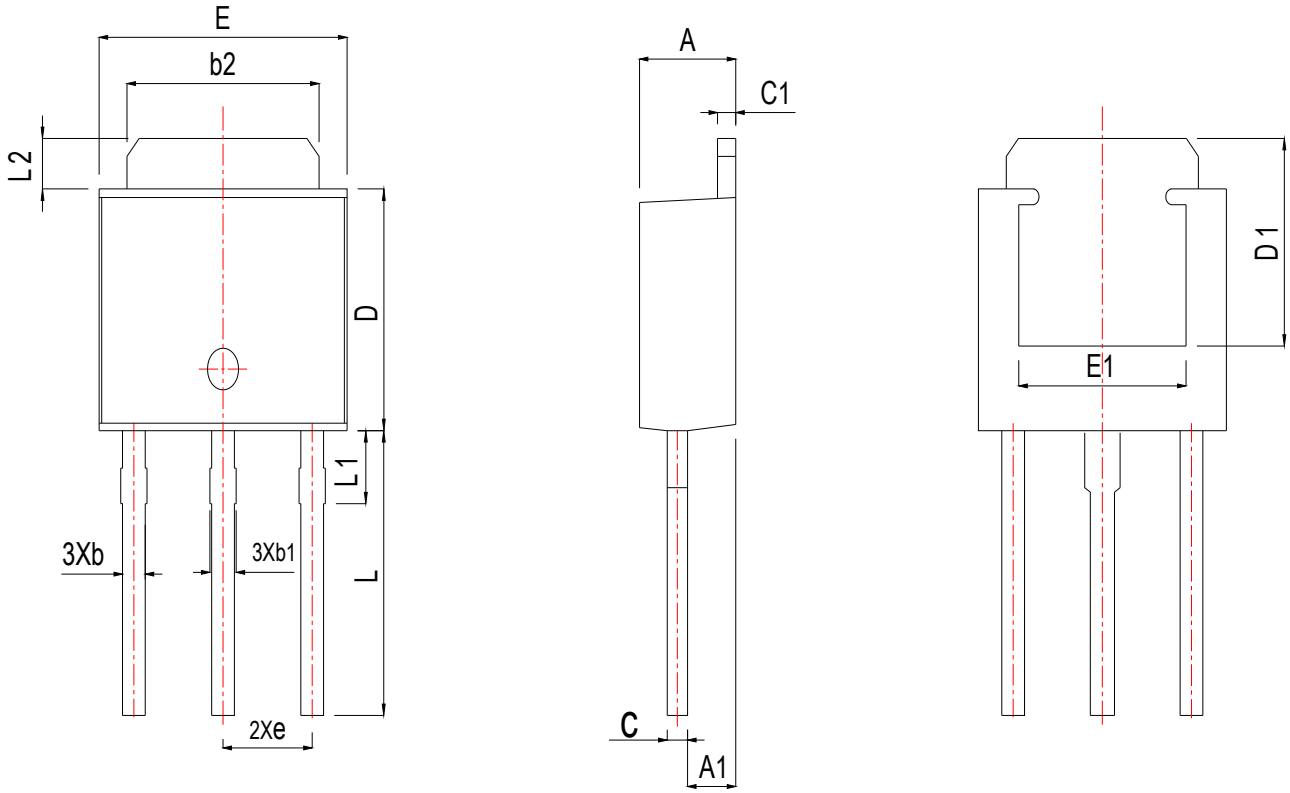
Switching Time Test Circuit and Waveforms





Package Information

TO251



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	2.220	2.320	2.420	0.087	0.091	0.095
A1	0.890	1.015	1.140	0.035	0.040	0.045
b	0.550	0.610	0.670	0.022	0.024	0.026
b1	0.760	0.860	0.960	0.030	0.034	0.038
b2	5.200	5.300	5.400	0.205	0.209	0.213
c	0.460	0.515	0.570	0.018	0.020	0.022
c1	0.450	0.500	0.550	0.018	0.020	0.022
D	5.950	6.100	6.250	0.234	0.240	0.246
D1	4.200	4.350	4.500	0.165	0.171	0.177
E	6.400	6.550	6.700	0.252	0.258	0.264
E1	4.750	4.800	4.850	0.187	0.189	0.191
e	2.280 REF			0.090 REF		
L	8.900	9.200	9.500	0.350	0.362	0.374
L1	1.900	2.095	2.290	0.075	0.082	0.090
L2	0.900	0.950	1.000	0.035	0.037	0.039

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