



## Description

The HXY50P03NF uses advanced trench technology 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 load switch or in PWM applications.

## General Features

$V_{DS} = -30V, I_D = -50A$

$R_{DS(ON)} < 15m\Omega @ V_{GS} = -10V$

$R_{DS(ON)} < 25m\Omega @ V_{GS} = -4.5V$

High Power and current handling capability

Lead free product is acquired

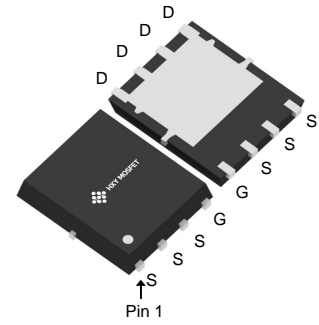
Surface mount package

## Application

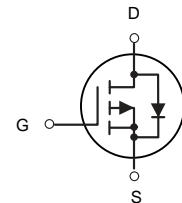
PWM applications

Load switch

Power management



DFN5X6-8L



P-Channel MOSFET

## Ordering Information

Product ID	Pack	Brand	Qty(PCS)
HXY50P03NF	DFN5X6-8L	HXY MOSFET	5000

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

Symbol	Parameter	Limit	Unit
V <sub>DS</sub>	Drain-Source Voltage	-30	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub>	Drain Current-Continuous ( $T_C = 25^\circ C$ )	-50	A
	Drain Current-Continuous ( $T_C = 100^\circ C$ )	-24	
I <sub>DM</sub>	Drain Current-Pulsed (Note 1)	-80	A
P <sub>D</sub>	Maximum Power Dissipation ( $T_C = 25^\circ C$ )	3	W
	Maximum Power Dissipation ( $T_C = 100^\circ C$ )	1.3	
EAS	Single pulse avalanche energy (Note 5)	231	mJ
T <sub>J</sub> , T <sub>STG</sub>	Operating Junction and Storage Temperature Range	-55 To 150	°C
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient (Note 2)	41.67	°C/W



**Electrical Characteristics ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
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	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.5	-3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-10A$	-	9	15	m $\Omega$
		$V_{GS}=-4.5V, I_D=-7A$	-	18	25	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=-10V, I_D=-10A$	-	20	-	S
Input Capacitance	$C_{iss}$	$V_{DS}=-15V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	1750	-	PF
Output Capacitance	$C_{oss}$		-	215	-	PF
Reverse Transfer Capacitance	$C_{rSS}$		-	180	-	PF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, I_D=-10A,$ $V_{GS}=-10V, R_{GEN}=1\Omega$	-	9	-	nS
Turn-on Rise Time	$t_r$		-	8	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	28	-	nS
Turn-Off Fall Time	$t_f$		-	10	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=-15V, I_D=-10A, V_{GS}=-10V$	-	24	-	nC
Gate-Source Charge	$Q_{gs}$		-	3.5	-	nC
Gate-Drain Charge	$Q_{gd}$		-	6	-	nC
Diode Forward Current <sup>(Note 2)</sup>	$I_s$		-	-	-12	A
Diode Forward Voltage <sup>(Note 3)</sup>	$V_{SD}$	$V_{GS}=0V, I_s=-12A$	-	-	-1.2	V

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production
5.  $E_{AS}$  condition:  $T_j=25^{\circ}\text{C}, V_{DD}=-15V, V_G=10V, L=0.5\text{mH}, R_g=25\Omega, I_{AS}=-34A$



### Typical Electrical and Thermal Characteristics

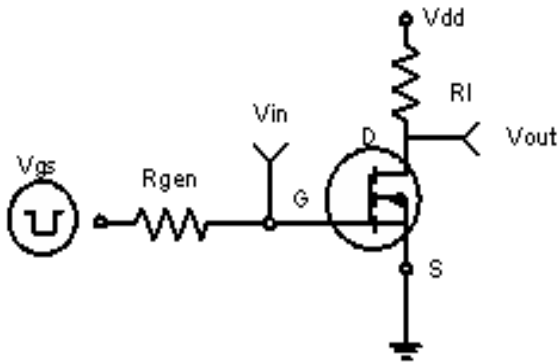


Figure 1: Switching Test Circuit

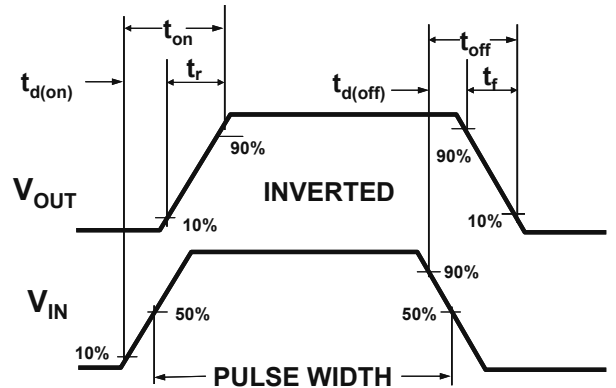
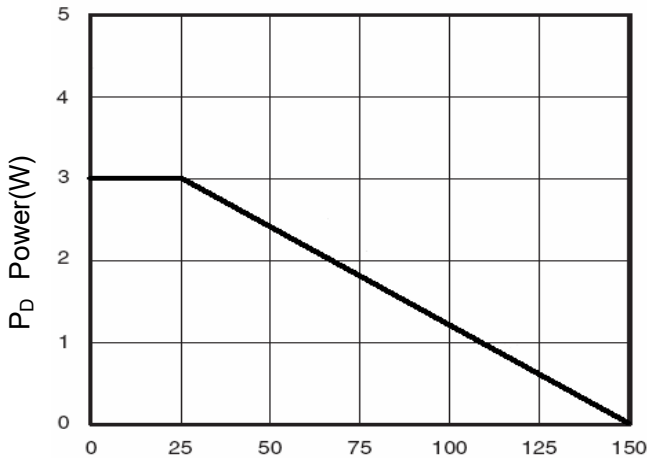
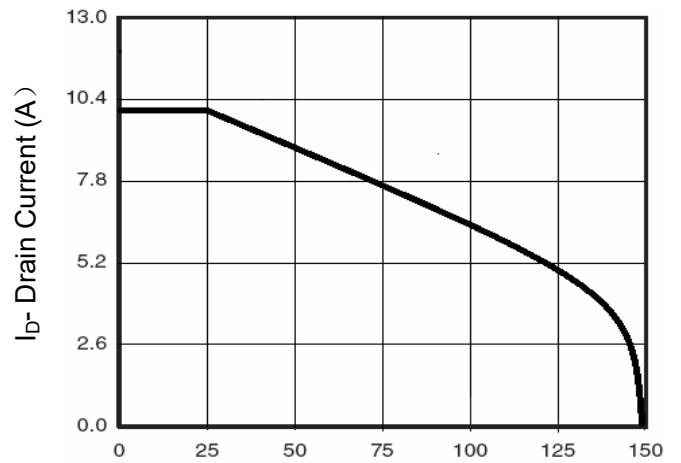


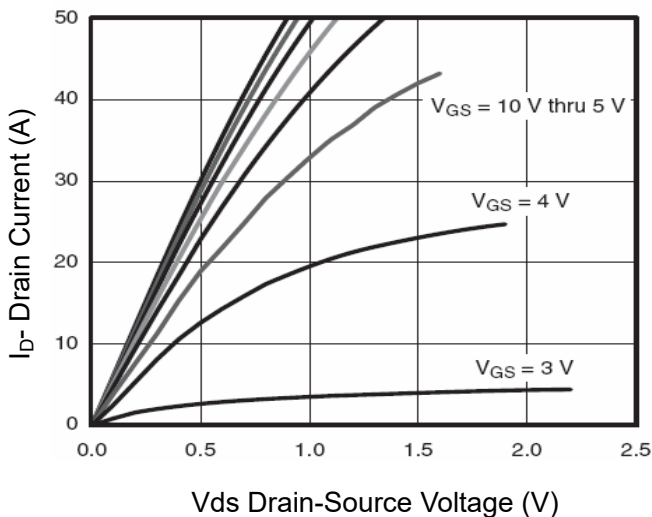
Figure 2: Switching Waveforms



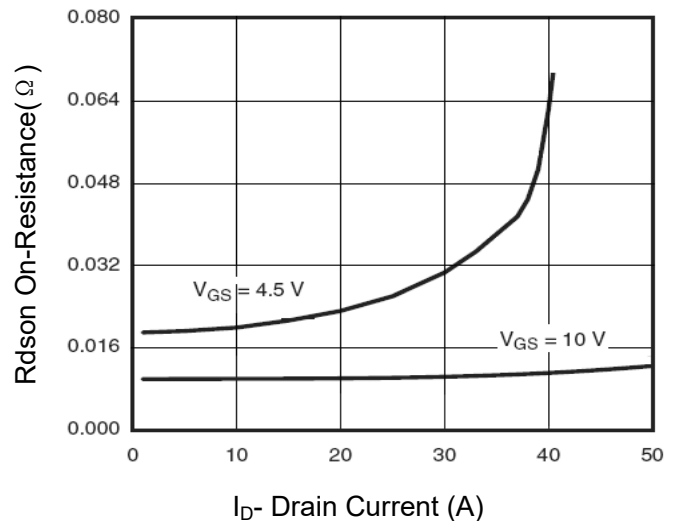
T<sub>J</sub>-Junction Temperature(°C)  
Figure 3 Power Dissipation



T<sub>J</sub>-Junction Temperature(°C)  
Figure 4 Drain Current



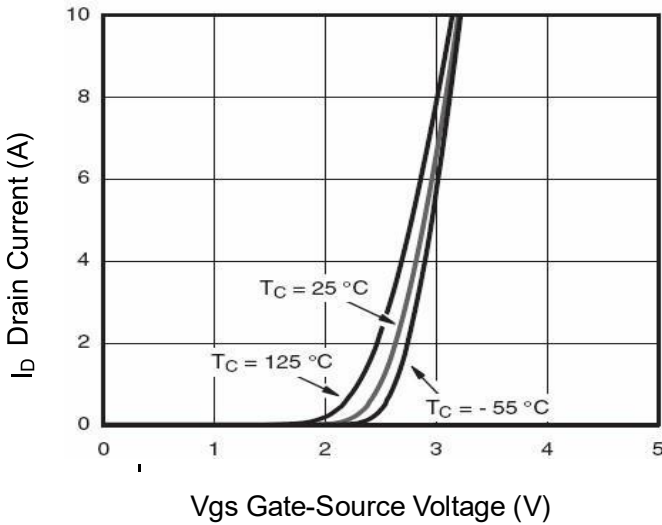
V<sub>ds</sub> Drain-Source Voltage (V)  
Figure 5 Output Characteristics



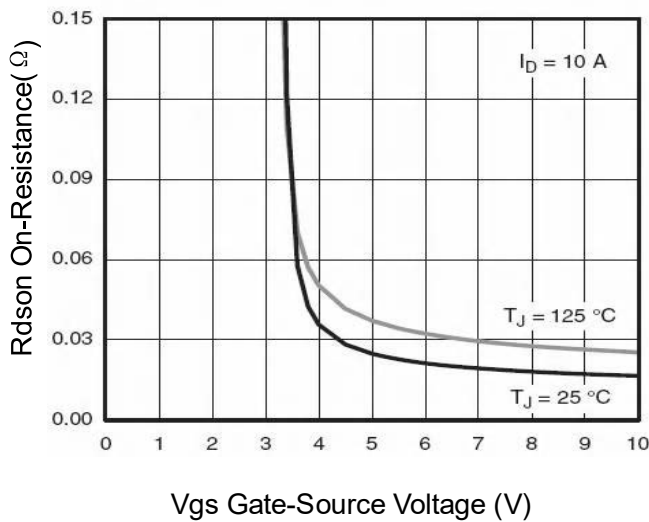
ID- Drain Current (A)  
Figure 6 Drain-Source On-Resistance



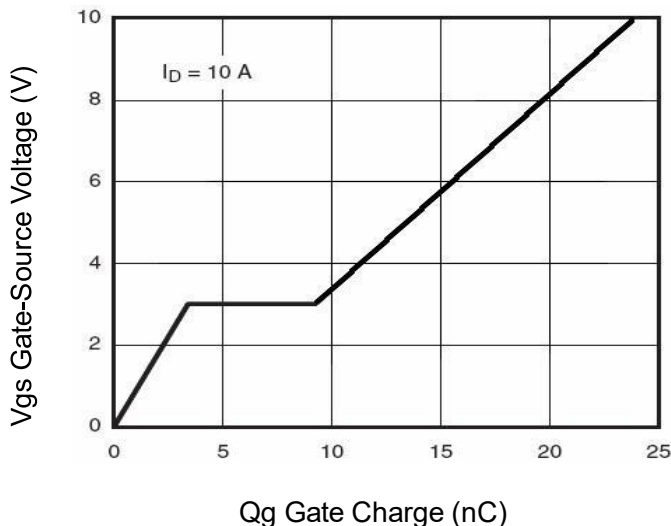
**Figure 5 Output Characteristics**



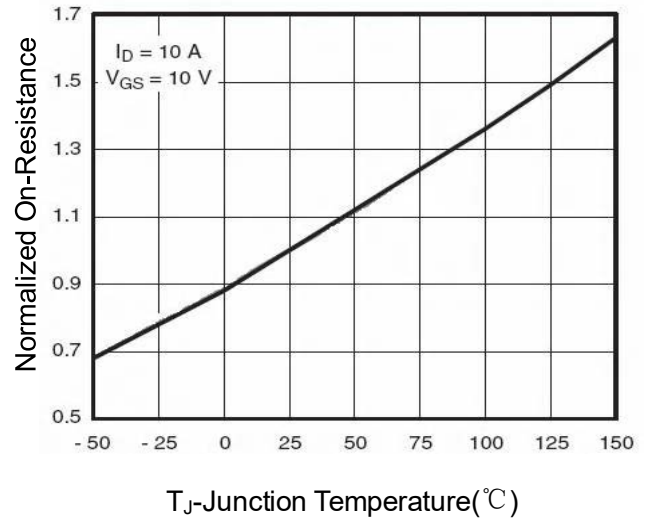
**Figure 7 Transfer Characteristics**



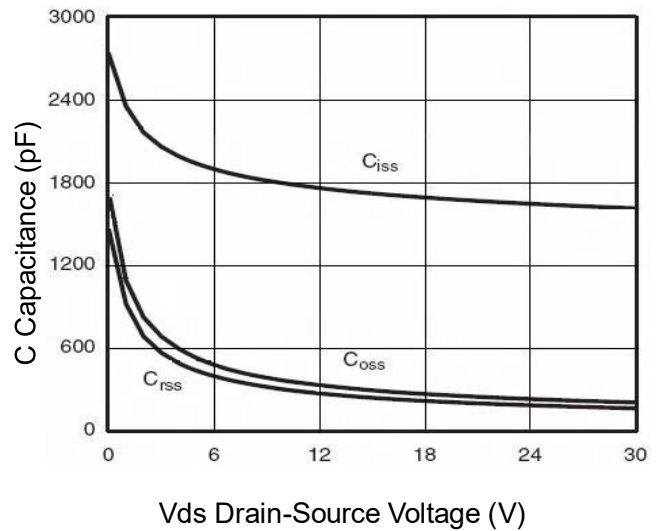
**Figure 9 Rds(on) vs Vgs**



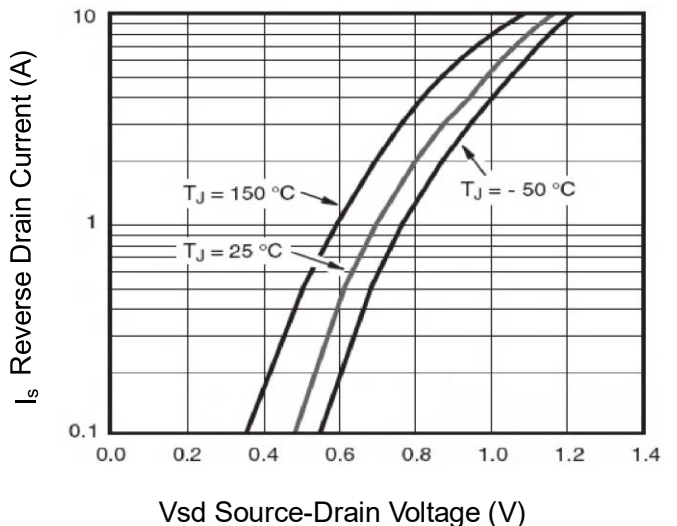
**Figure 11 Gate Charge**



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



**Figure 10 Capacitance vs Vds**



**Figure 12 Source- Drain Diode Forward**

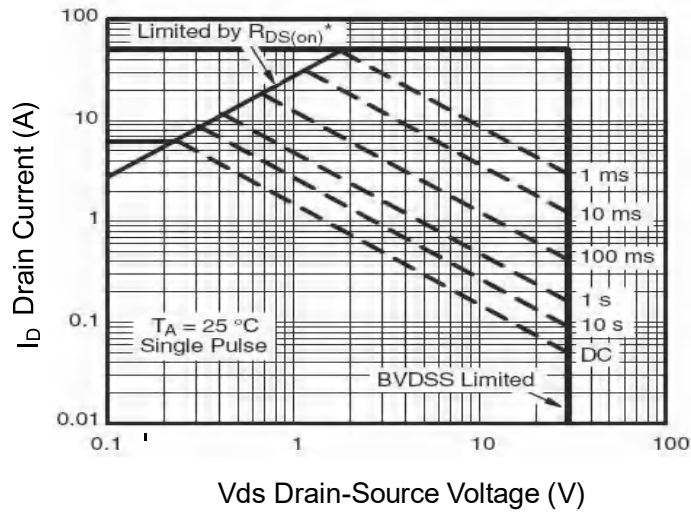


Figure 13 Safe Operation Area

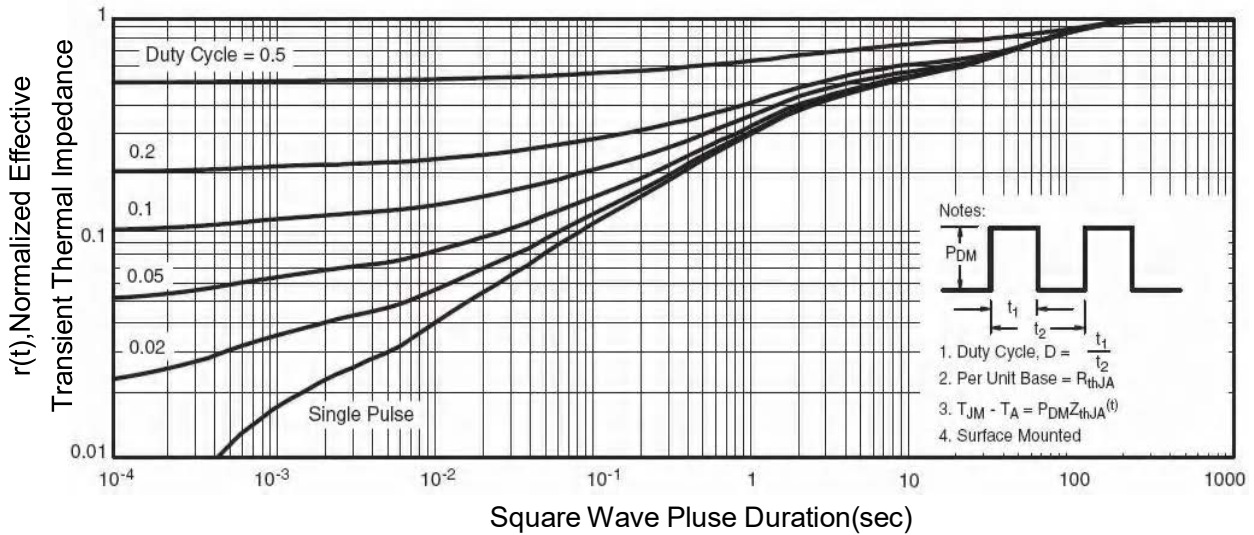
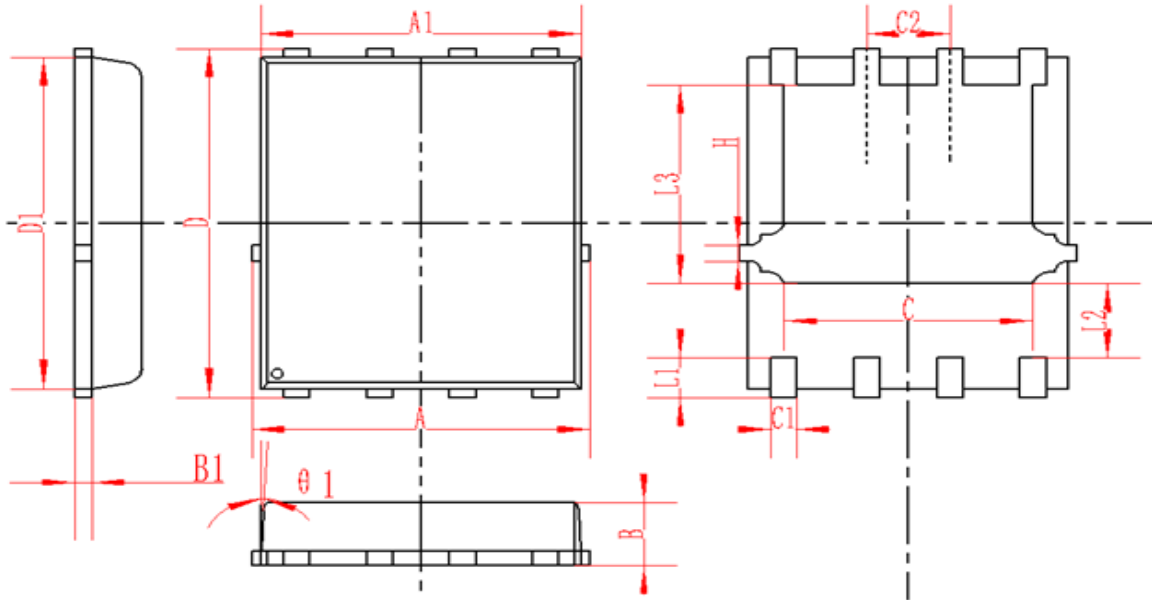


Figure 14 Normalized Maximum Transient Thermal Impedance



### DFN5X6-8L Package Information



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.95	5	5.05	0.195	0.197	0.199
A1	4.82	4.9	4.98	0.190	0.193	0.196
D	5.98	6	6.02	0.235	0.236	0.237
D1	5.67	5.75	5.83	0.223	0.226	0.230
B	0.9	0.95	1	0.035	0.037	0.039
B1	0.254REF			0.010REF		
C	3.95	4	4.05	0.156	0.157	0.159
C1	0.35	0.4	0.45	0.014	0.016	0.018
C2	1.27TYP			0.5TYP		
$\theta 1$	8°	10°	12°	8°	10°	12°
L1	0.63	0.64	0.65	0.025	0.025	0.026
L2	1.2	1.3	1.4	0.047	0.051	0.055
L3	3.415	3.42	3.425	0.134	0.135	0.135
H	0.24	0.25	0.26	0.009	0.010	0.010



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