

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
200V	19mΩ@10V	70A

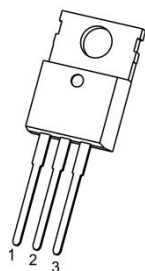
## Feature

- Fast Switchin
- High density cell design for ultra low Rdson
- Excellent package for good heat dissipation
- 100% Single Pulse avalanche energy Test

## Application

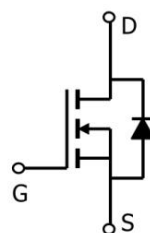
- Load switching
- PWM Application
- Power Management

## Package

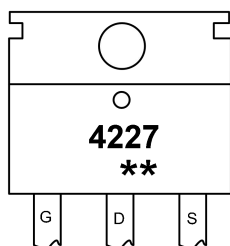


TO-220-3L-C(1:G 2:D 3:S)

## Circuit diagram



## Marking



4227 : Product code  
\*\* : Week code.

**Absolute maximum ratings (Ta=25°C, unless otherwise noted)**

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	200	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous (Tc=25°C)	$I_D$	70	A
Pulsed Drain Current	$I_{DM}$	280	A
Maximum Power Dissipation (Tc=25°C)	$P_D$	330	W
Single pulse avalanche energy <sup>(1)</sup>	$E_{AS}$	126	mJ
Thermal Resistance, Junction-to-Case <sup>(2)</sup>	$R_{\theta JC}$	0.38	°C/W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	°C

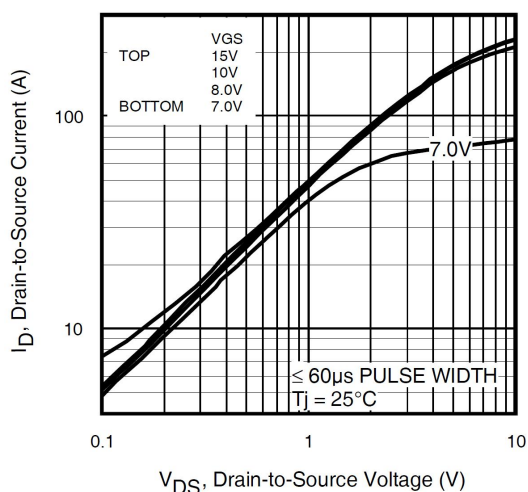
**Electrical characteristics (Ta=25 °C, unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V I <sub>D</sub> =250μA	200		-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =160V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	3	4	5	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =40A	-	19	24	mΩ
Dynamic Characteristics <sup>(4)</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, F=1.0MHz	-	4711	-	PF
Output Capacitance	C <sub>oss</sub>		-	469	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	97	-	
Switching Characteristics <sup>(4)</sup>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =100V, I <sub>D</sub> =40A, V <sub>GS</sub> =10V	-	75	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	47	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	23	-	
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =100V, I <sub>D</sub> =40A, V <sub>GS</sub> =10V, R <sub>G</sub> =2.5Ω	-	32	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	23	-	
Turn-Off Delay Time	t <sub>d(off)</sub>		-	25	-	
Turn-Off Fall Time	t <sub>f</sub>		-	31	-	
Drain-Source Diode Characteristics						
Diode Forward Voltage <sup>(3)</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A	-	-	1.2	V
Reverse Recovery Time	T <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> = 40A, V <sub>DD</sub> = 50V di/dt = 100A/μs	-	101	-	ns
Reverse Recovery Charge	Q <sub>rr</sub>		-	433	-	nC

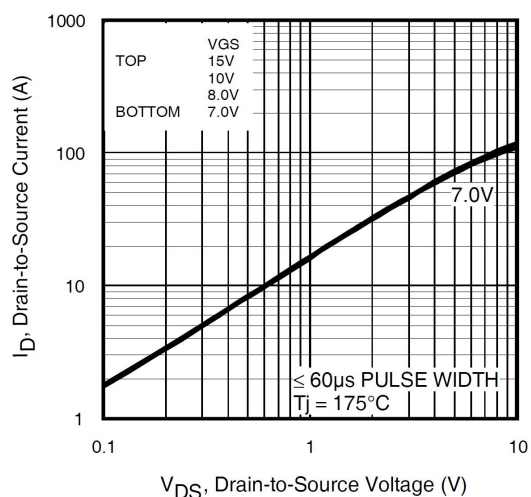
**Notes:**

1.  $E_{AS}$  condition :  $T_J=25^\circ C, V_{DD}=50V, V_G=10V, L=0.3mH, R_g=25\Omega$
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

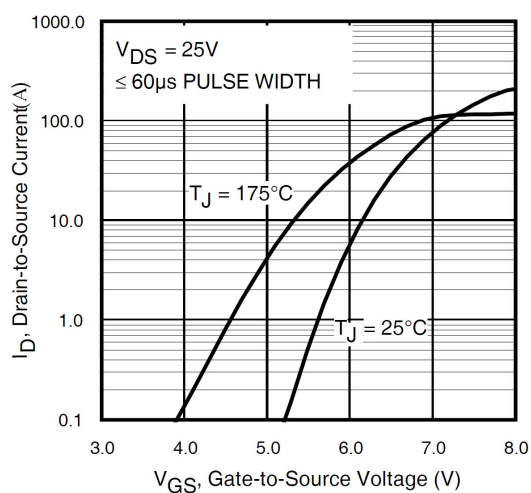
## Typical Characteristics



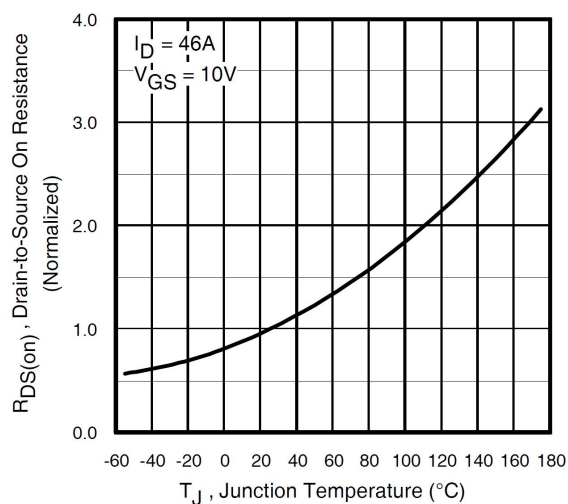
Typical Output Characteristics



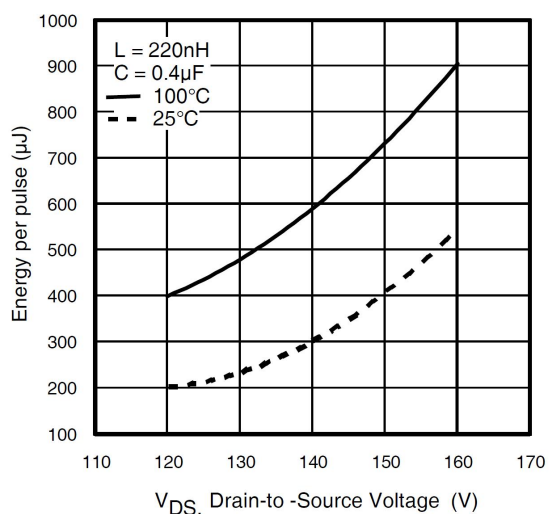
Typical Output Characteristics



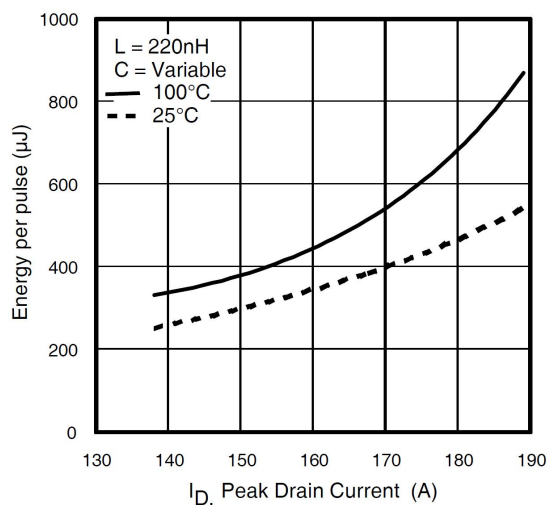
Typical Transfer Characteristics



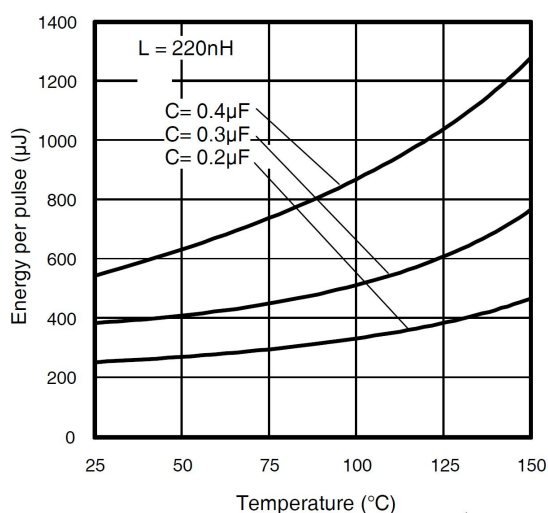
Normalized On-Resistance vs. Temperature



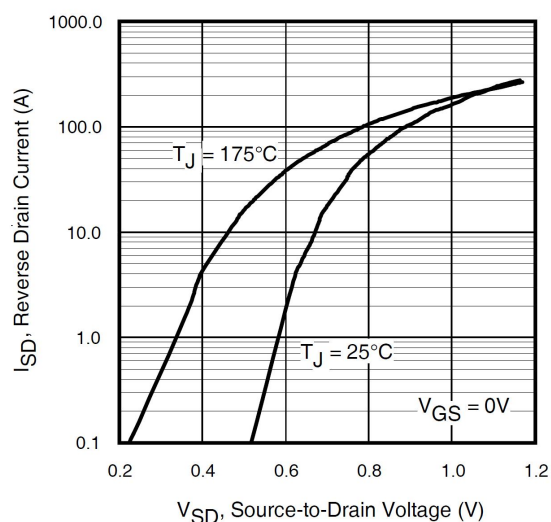
Typical  $E_{PULSE}$  vs. Drain-to-Source Voltage



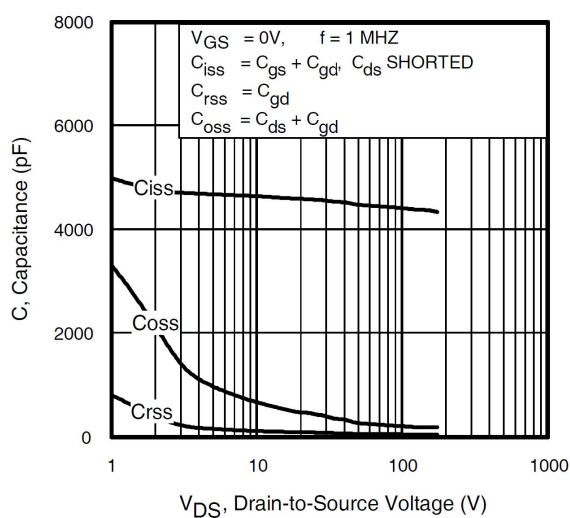
Typical  $E_{PULSE}$  vs. Drain Current



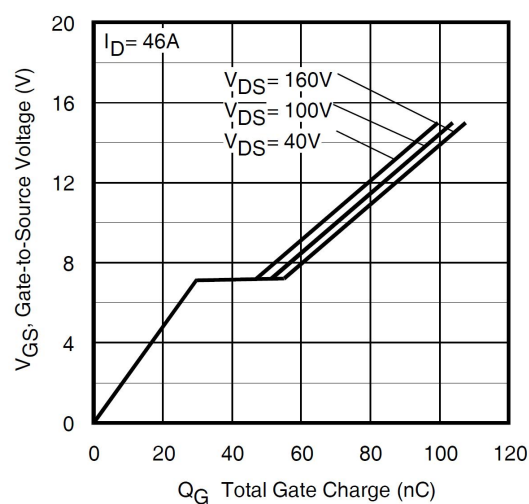
Typical  $E_{\text{PULSE}}$  vs. Temperature



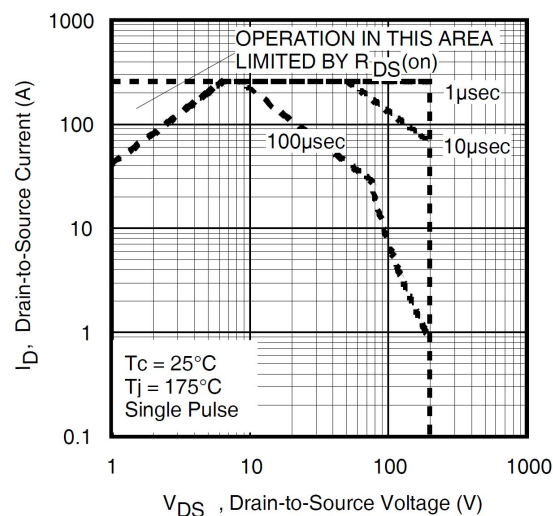
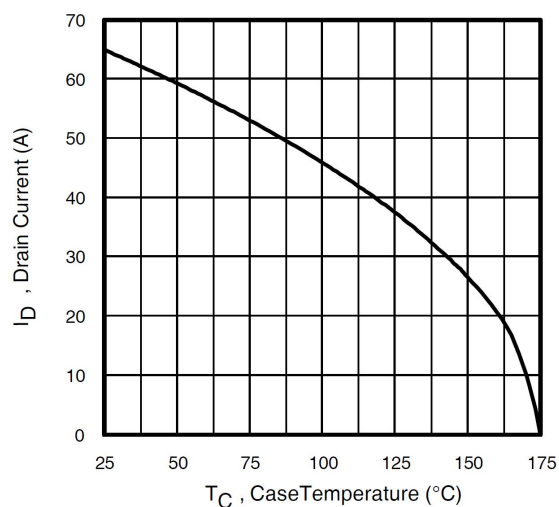
Typical Source-Drain Diode Forward Voltage

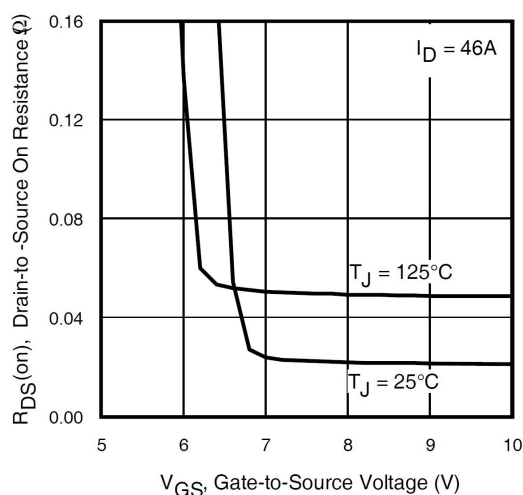


Typical Capacitance vs. Drain-to-Source Voltage

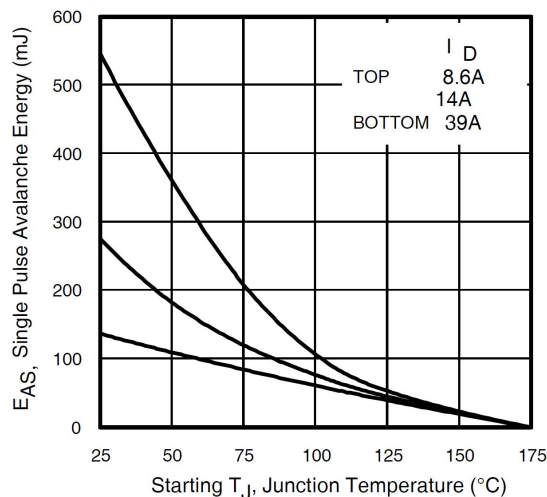


Typical Gate Charge vs. Gate-to-Source Voltage

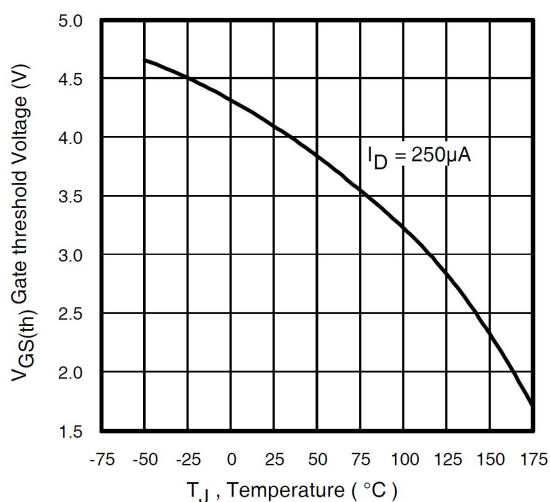




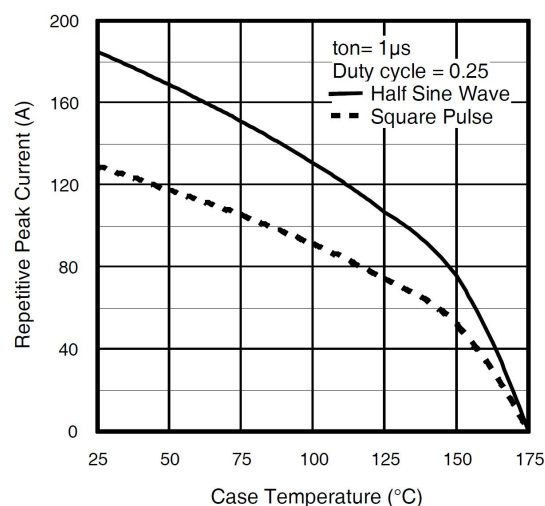
On-Resistance Vs. Gate Voltage



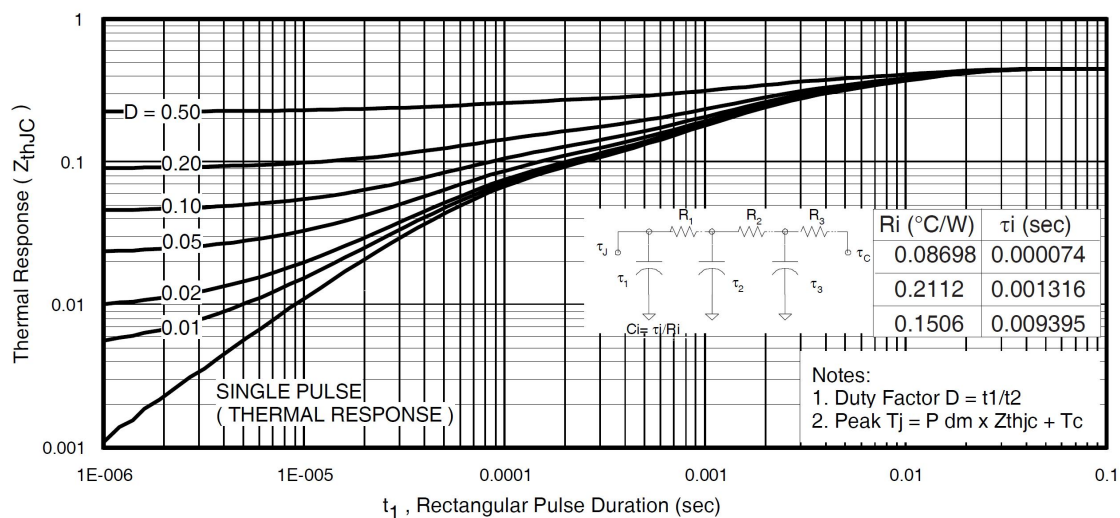
Maximum Avalanche Energy Vs. Temperature



Threshold Voltage vs. Temperature



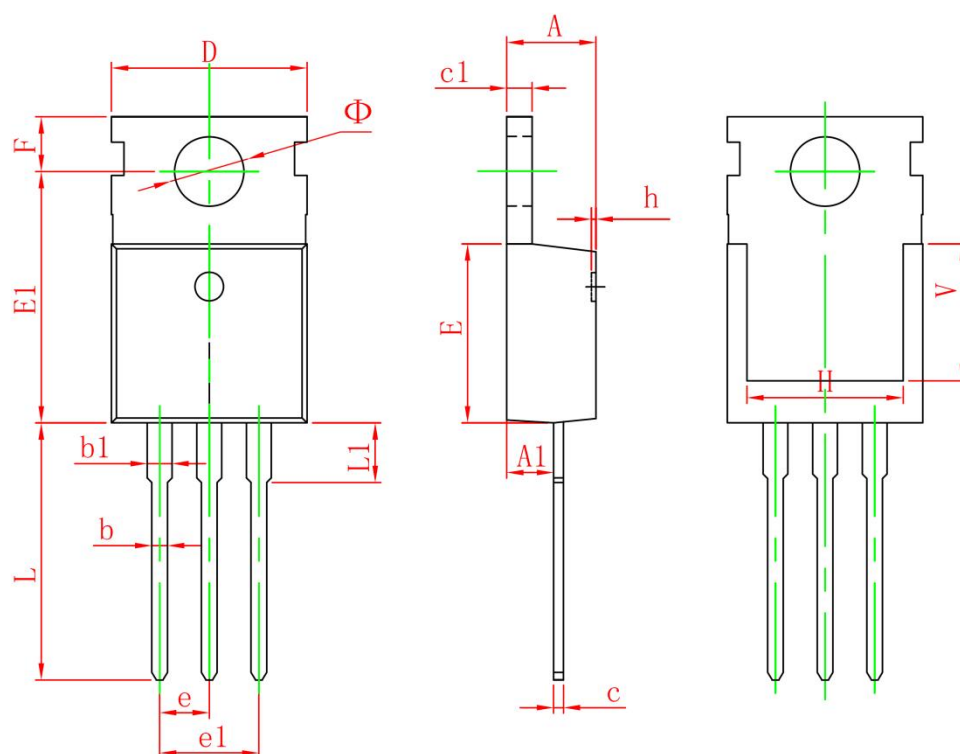
Typical Repetitive peak Current vs. Case temperature



Maximum Effective Transient Thermal Impedance, Junction-to-Case



## TO-220-3L-C Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150