



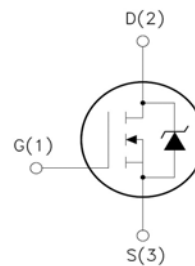
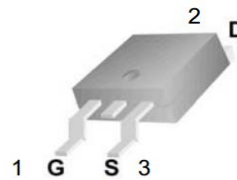
## WGD30N06S

60V N-Channel MOSFET

### Features:

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge : $Q_g = 50\text{nC}$  (Typ.).
- $BV_{DSS} = 60\text{V}, I_D = 30\text{A}$
- $R_{DS(on)} : 0.024\Omega$  (Max) @  $V_G = 10\text{V}$
- 100% Avalanche Tested

TO-252



1. Gate (G)
2. Drain (D)
3. Source (S)

### Absolute Maximum Ratings\* ( $T_c = 25^\circ\text{C}$ Unless otherwise noted)

Symbol	PARAMETER	Value	Unit
$V_{DSS}$	Drain-Source Voltage	60	V
$I_D$	Drain Current	$T_c = 25^\circ\text{C}$	30
		$T_c = 100^\circ\text{C}$	21
$V_{GS(TH)}$	Gate Threshold Voltage	$\pm 20$	V
$E_{AS}$	Single Pulse Avalanche Energy (note1)	72	mJ
$I_{AR}$	Avalanche Current (note2)	90	A
$P_D$	Power Dissipation ( $T_c = 25^\circ\text{C}$ )	45	W
$T_j$	Junction Temperature(MAX)	175	$^\circ\text{C}$
$T_{stg}$	Storage Temperature	-55~+175	$^\circ\text{C}$
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

### Thermal Characteristics

Symbol	PARAMETER	Typ.	MAX.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	-	3.3	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	-	-	$^\circ\text{C}/\text{W}$
$R_{\theta CS}$	Thermal Resistance, Case to Sink	-	110	$^\circ\text{C}/\text{W}$

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b> (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.6	2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=30A$	-	24	35	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=5A$	11	-	-	S
<b>Dynamic Characteristics</b> (Note 4)						
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	590	-	PF
Output Capacitance	$C_{oss}$		-	70	-	PF
Reverse Transfer Capacitance	$C_{riss}$		-	64	-	PF
<b>Switching Characteristics</b> (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=2A,$ $V_{GS}=10V, R_G=3\Omega$	-	6.0	-	nS
Turn-on Rise Time	$t_r$		-	6.1	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	17	-	nS
Turn-Off Fall Time	$t_f$		-	3.0	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=30V, I_D=15A,$ $V_{GS}=10V$	-	25.3	-	nC
Gate-Source Charge	$Q_{gs}$		-	4.7	-	nC
Gate-Drain Charge	$Q_{gd}$		-	6.1	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=30A$	-	-	1.2	V
Diode Forward Current (Note 2)	$I_S$		-	-	30	A
Reverse Recovery Time	$t_{rr}$	$T_J = 25^\circ\text{C}, I_F = 30A$	-	29.5	-	nS
Reverse Recovery Charge	$Q_{rr}$	$di/dt = 100A/\mu s$ (Note 3)	-	50	-	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,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production
5. EAS condition :  $T_j=25^\circ\text{C}, V_{DD}=30V, V_G=10V, L=0.5\text{mH}, R_g=25\Omega$

Typical Characteristics

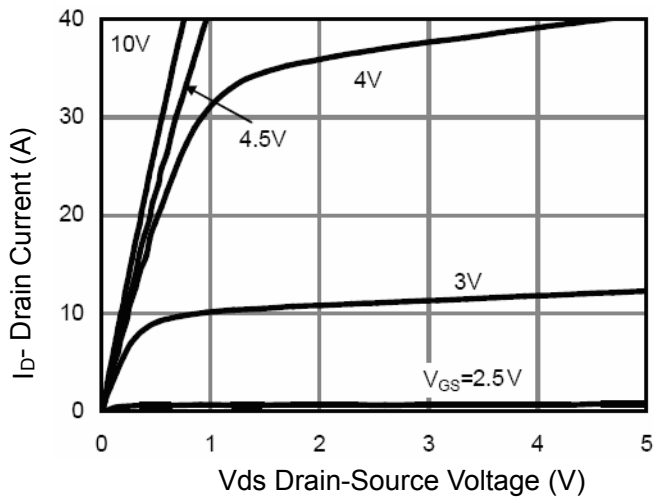


Figure 1 Output Characteristics

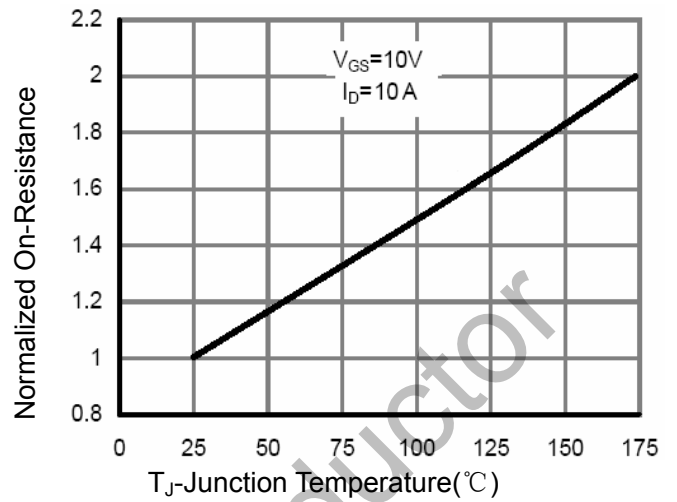


Figure 4  $R_{Dson}$ -Junction Temperature

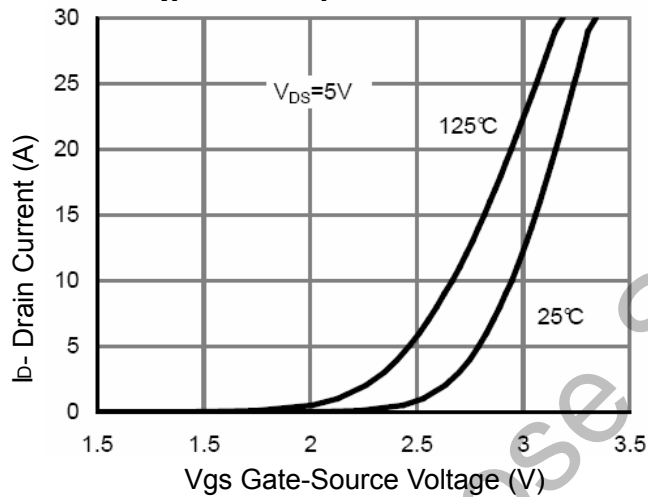


Figure 2 Transfer Characteristics

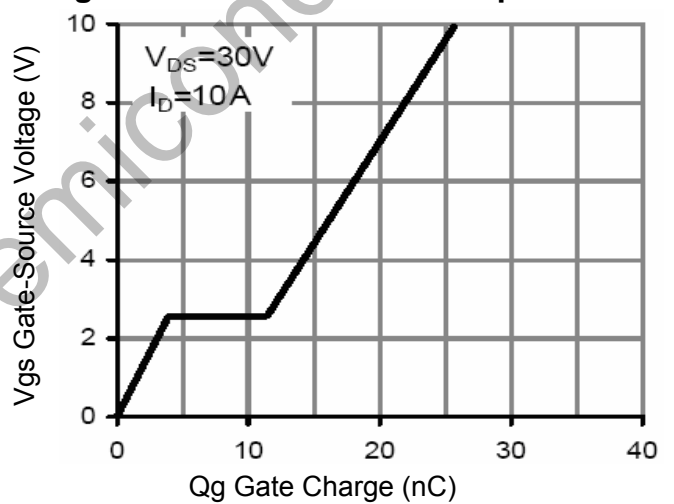


Figure 5 Gate Charge

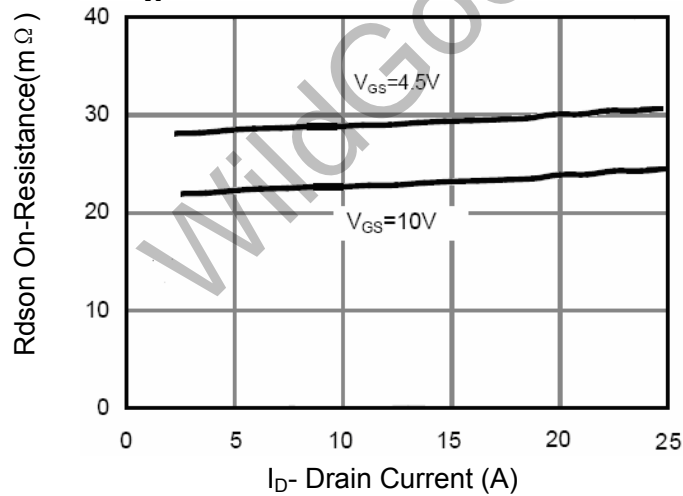


Figure 3  $R_{Dson}$ - Drain Current

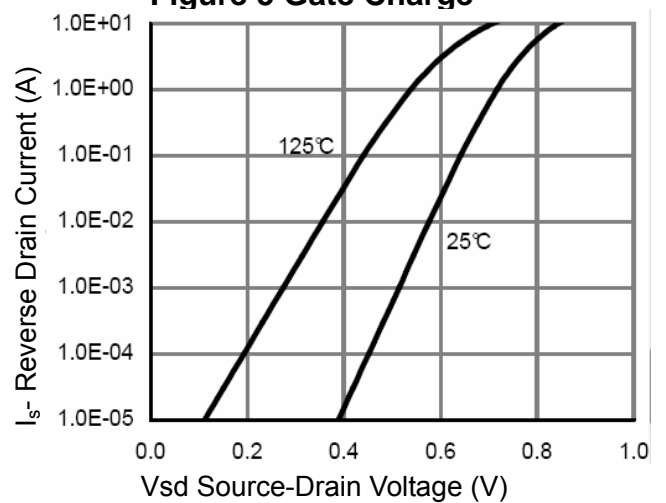


Figure 6 Source- Drain Diode Forward

Typical Characteristics (Continued)

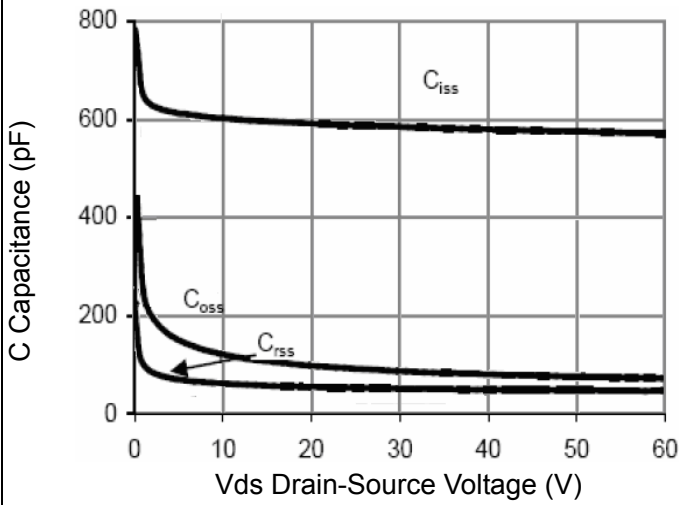


Figure 7 Capacitance vs Vds

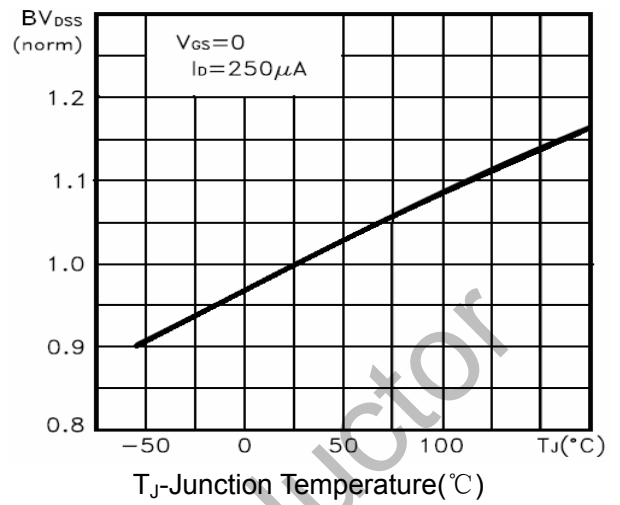


Figure 9  $BV_{DSS}$  vs Junction Temperature

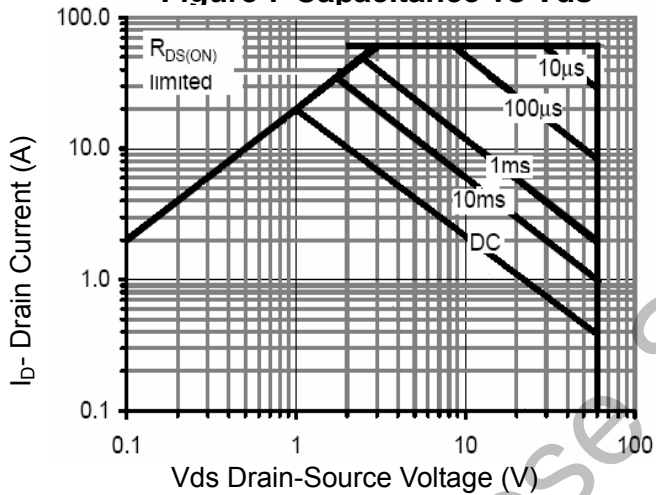


Figure 8 Safe Operation Area

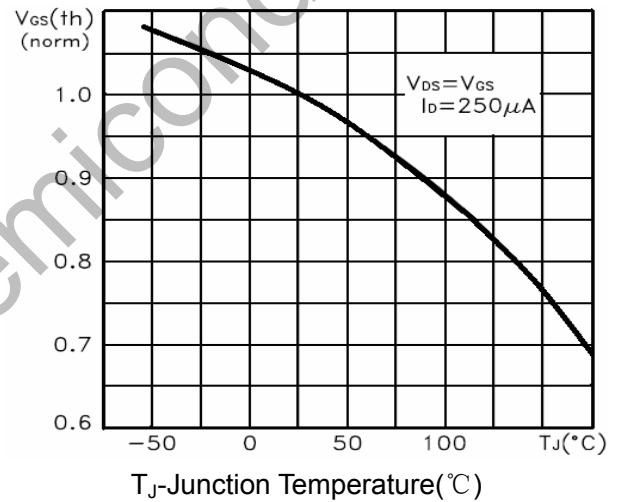


Figure 10  $V_{GS(th)}$  vs Junction Temperature

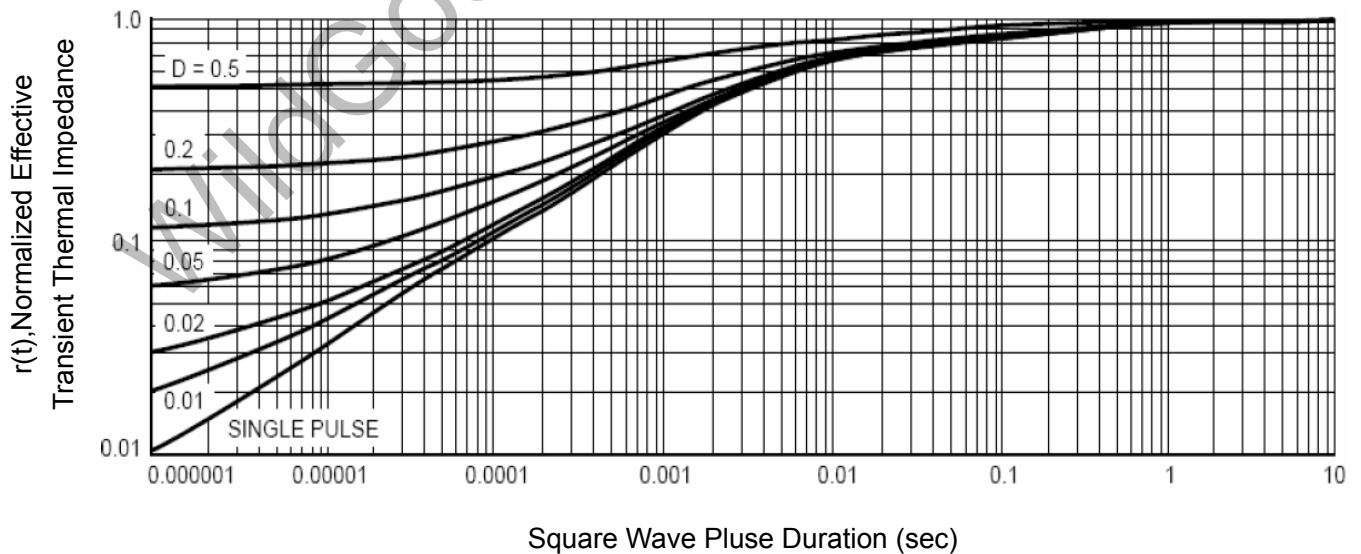
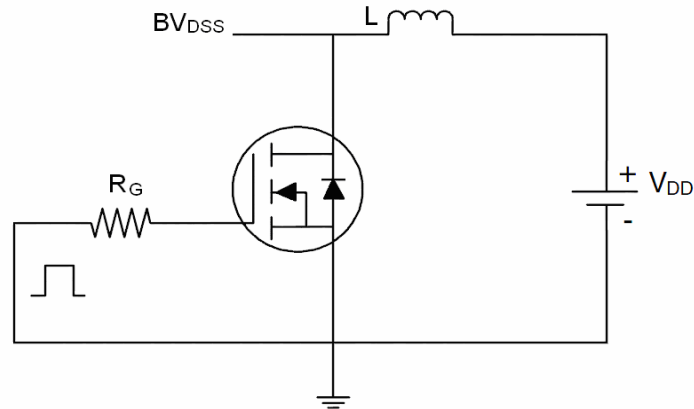


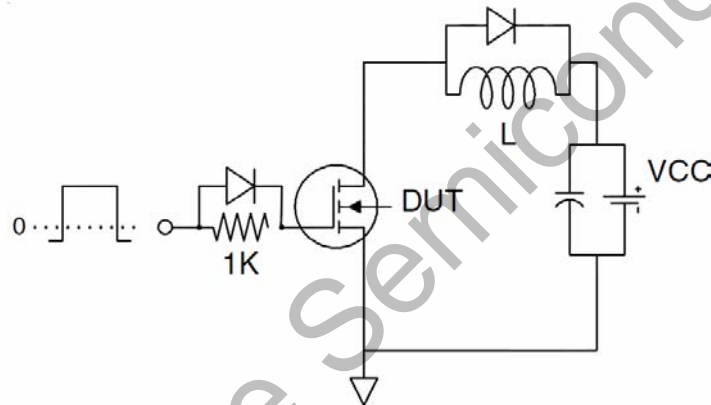
Figure 11 Normalized Maximum Transient Thermal Impedance

**Test Circuit**

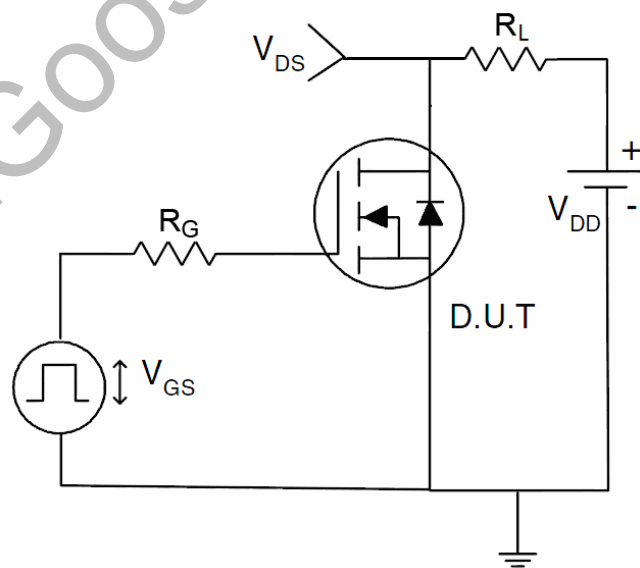
**1)  $E_{AS}$  test Circuit**



**2) Gate charge test Circuit**



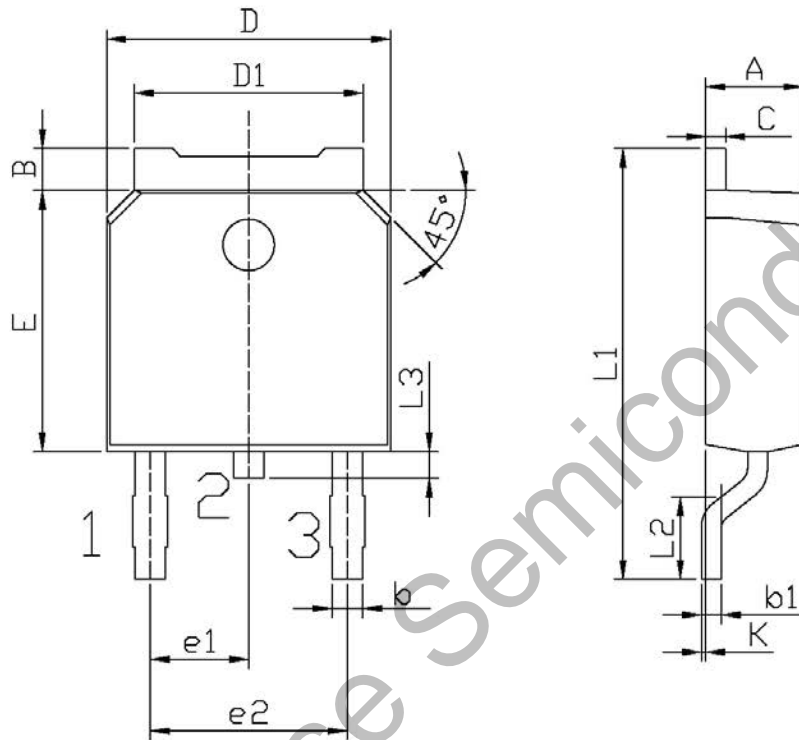
**3) Switch Time Test Circuit**



**Package Dimension**

TO-252

Unit:mm



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.70	0.90	e2	4.43	4.73
b1	0.45	0.55	L1	9.85	10.35
C	0.45	0.55	L2	1.25	1.75
D	6.45	6.75	L3	0.60	0.90
D1	5.20	5.40	K	0.00	0.10