

# FH5010TL

## N-Channel Trench Power MOSFET

### ◆ General Description

The FH5010TL is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance.

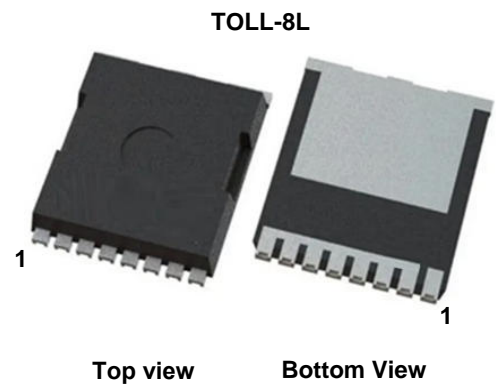
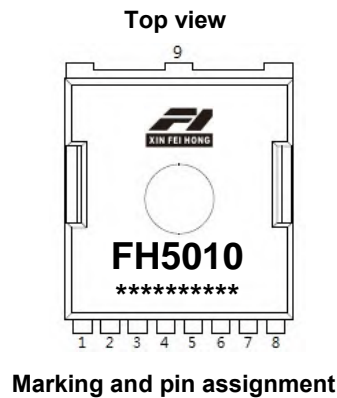
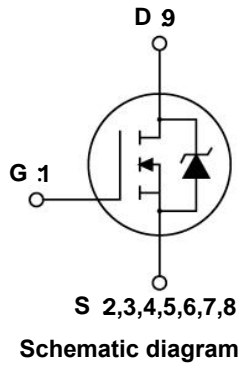
### ◆ Features

$V_{DS} = 100V$  ;  $I_D = 300A$

- $R_{DS(ON)}$  (Typ) :  $1.6 m\Omega @ V_{GS} = 10V$
- Surface-mounted package
- Advanced trench cell design

### ◆ Applications

- High power inverter system
- LCD TV appliances
- Load Switch



### Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{DS}$	Drain-Source Voltage	$T_C = 25\text{ }^\circ\text{C}$	-	100	V
$V_{GS}$	Gate-Source Voltage	$T_C = 25\text{ }^\circ\text{C}$	-	$\pm 20$	V
$I_D^*$	Drain Current ( DC )	$T_C = 25\text{ }^\circ\text{C}, V_{GS} = 10\text{ V}$	-	300	A
		$T_C = 100\text{ }^\circ\text{C}, V_{GS} = 10\text{ V}$	-	246	A
$I_{DM}^{*,**}$	Drain Current ( Pulsed )	$T_C = 25\text{ }^\circ\text{C}, V_{GS} = 10\text{ V}$	-	1200	A
$P_{tot}$	Drain power dissipation	$T_C = 25\text{ }^\circ\text{C}$	-	333	W
$T_{stg}$	Storage Temperature		-55	150	$^\circ\text{C}$
$T_J$	Junction Temperature		-	150	$^\circ\text{C}$
$I_S$	Continuous-Source Current	$T_C = 25\text{ }^\circ\text{C}$	-	300	A
$E_{AS}^*$	Single Pulsed Avalanche Energy	$V_{DD}=100V, L=0.1mH$	-	1900	mJ
$R_{\theta JA}^*$	Thermal Resistance- Junction to Ambient		-	32.8	$^\circ\text{C/W}$
$R_{\theta JC}^*$	Thermal Resistance- Junction to Case		-	0.45	

Notes :

\* Surface Mounted on  $1\text{ in}^2$  pad area,  $t = 10\text{ sec}$

\*\* Pulse width 300  $\mu\text{s}$ , duty cycle 2 %

\*\*\* limited by bonding wire

## Electrical Characteristics ( $T_A=25^\circ$ Unless Otherwise Noted )

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$ , $I_{DS} = 250\ \mu\text{A}$	100	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ , $I_{DS} = 250\ \mu\text{A}$	2	-	4	V
$I_{DSS}$	Drain Leakage Current	$V_{DS} = 80\text{ V}$ , $V_{GS} = 0\text{ V}$	-	-	1	$\mu\text{A}$
$I_{GSS}$	Gate Leakage Current	$V_{GS} = \pm 20\text{ V}$ , $V_{DS} = 0\text{ V}$	-	-	$\pm 100$	nA
$R_{DS(ON)}^a$	On-State Resistance	$V_{GS} = 10\text{ V}$ , $I_{DS} = 50\text{ A}$	-	1.6	1.8	$\text{m}\Omega$
Diode Characteristics						
$V_{SD}^a$	Diode Forward Voltage	$I_{SD} = 50\text{ A}$ , $V_{GS} = 0\text{ V}$	-	-	1.3	V
$t_{rr}$	Reverse Recovery Time	$I_{DS} = 50\text{ A}$ , $V_{GS} = 0\text{ V}$ $dI_{SD}/dt = 100\text{ A}/\mu\text{s}$	-	137	-	nS
$Q_{rr}$	Reverse Recovery Charge		-	347	-	nC
Dynamic Characteristics <sup>b</sup>						
$C_{iss}$	Input Capacitance	$V_{GS} = 0\text{ V}$ , $V_{DS} = 50\text{ V}$ Frequency = 1 MHz	-	12574	-	pF
$C_{oss}$	Output Capacitance		-	2036	-	
$C_{rss}$	Reverse Transfer Capacitance		-	196	-	
$t_{d(on)}$	Turn-on Delay Time	$V_{DS} = 50\text{ V}$ , $V_{GEN} = 10\text{ V}$ , $R_G = 4.5\ \Omega$ , $R_L = 1\ \Omega$ , $I_{DS} = 50\text{ A}$	-	44	-	nS
$t_r$	Turn-on Rise Time		-	132	-	
$t_{d(off)}$	Turn-off Delay Time		-	154	-	
$t_f$	Turn-off Fall Time		-	137	-	
Gate Charge Characteristics <sup>b</sup>						
$Q_g$	Total Gate Charge	$V_{DS} = 50\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_{DS} = 50\text{ A}$	-	167	-	nC
$Q_{gs}$	Gate-Source Charge		-	71	-	
$Q_{gd}$	Gate-Drain Charge		-	58	-	

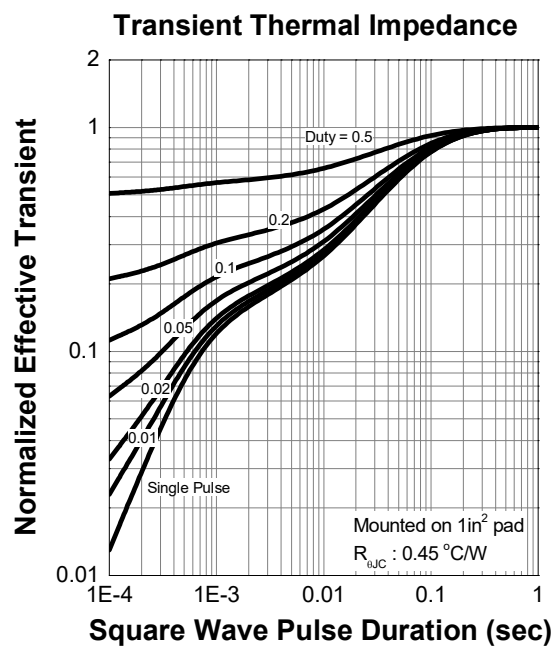
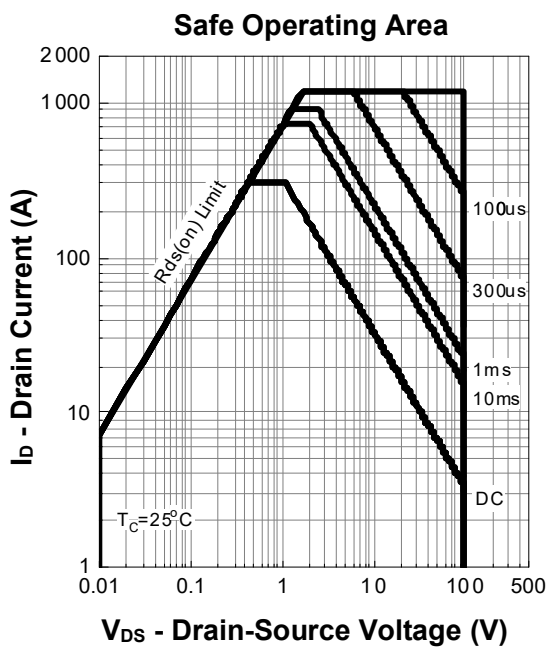
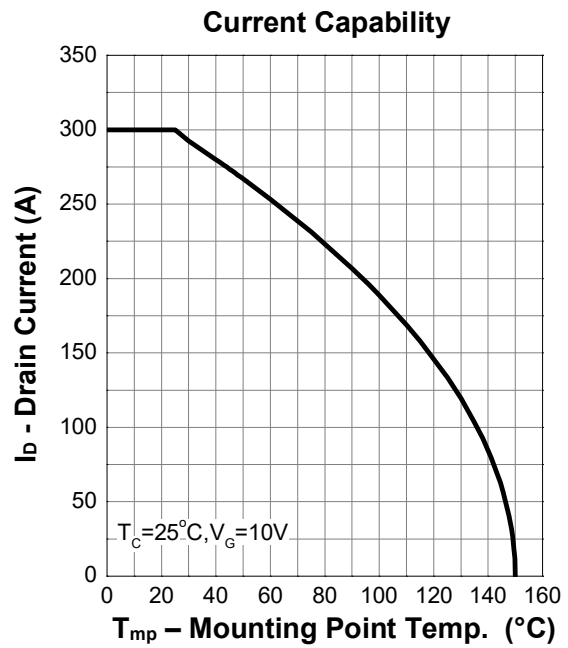
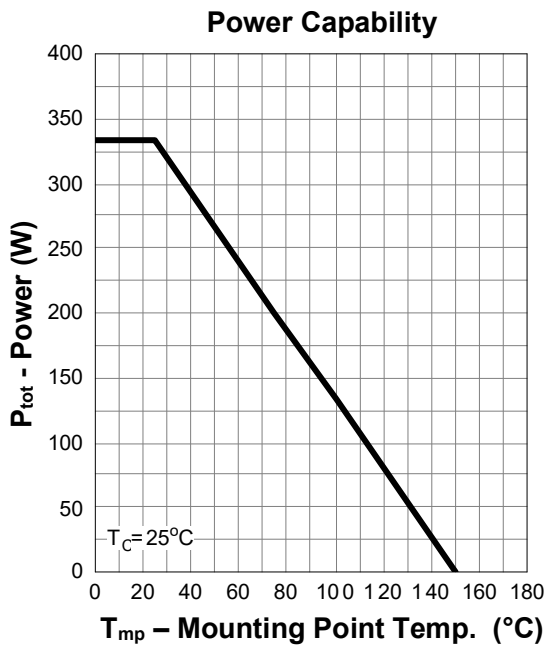
## Notes :

a : Pulse test ; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$

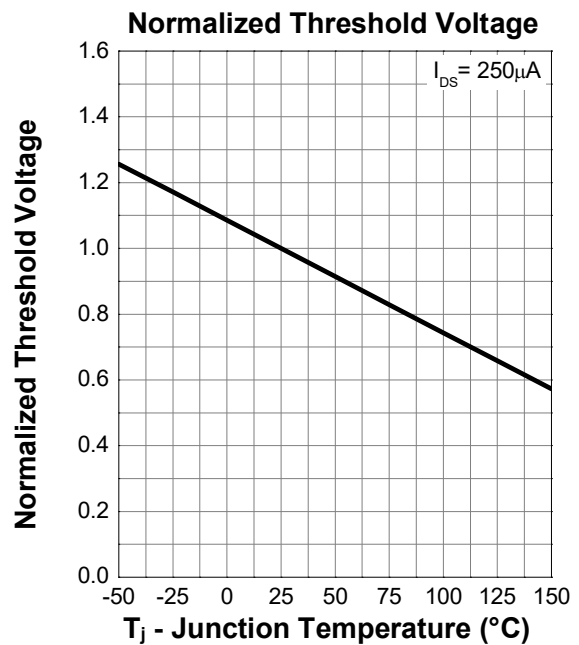
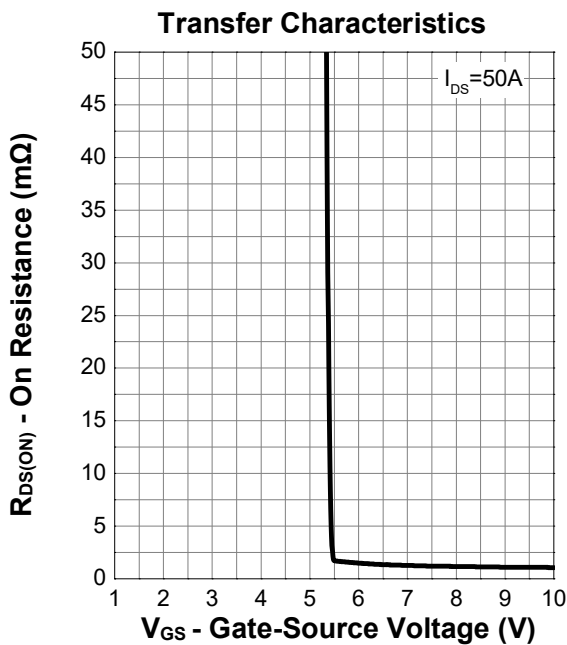
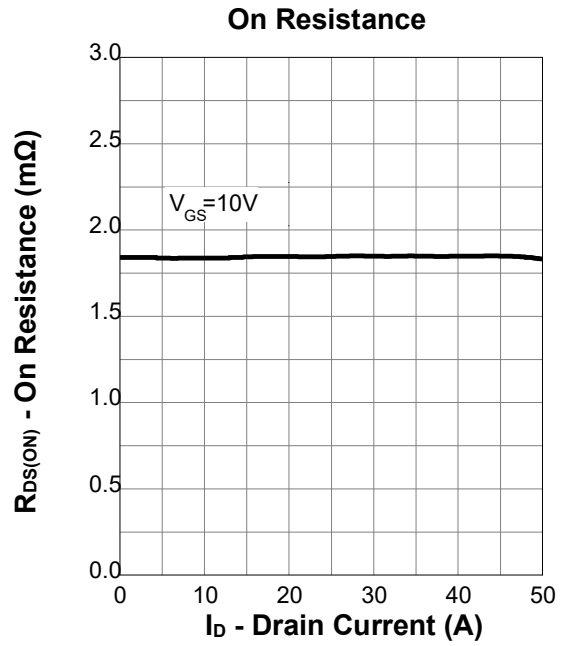
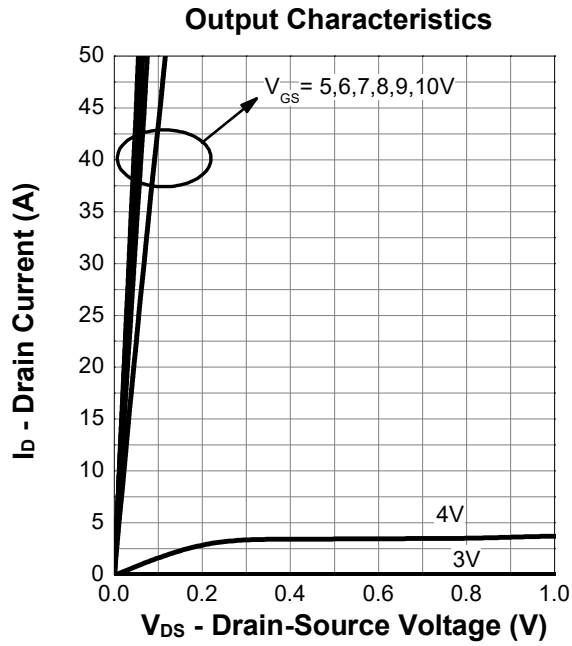
b : Guaranteed by design, not subject to production testing

c : defines " Green " as lead-free ( RoHS compliant ) and halogen free ( Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C )

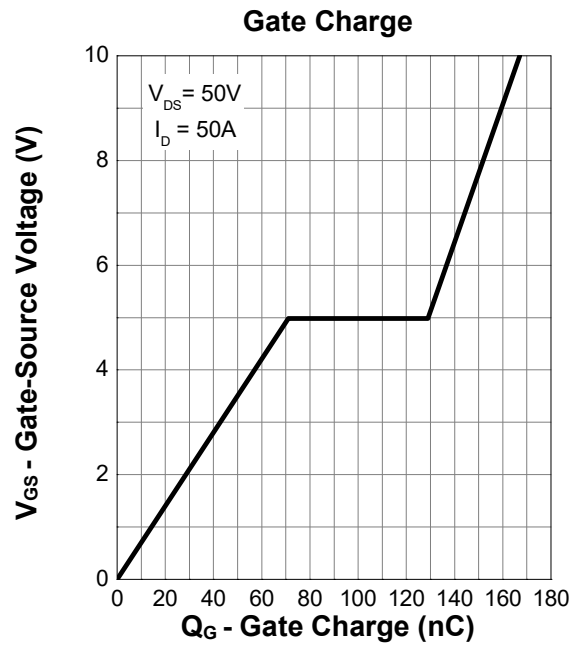
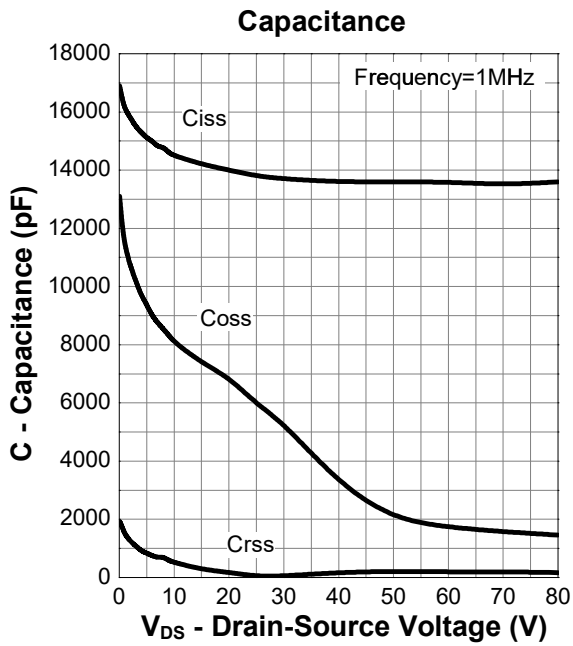
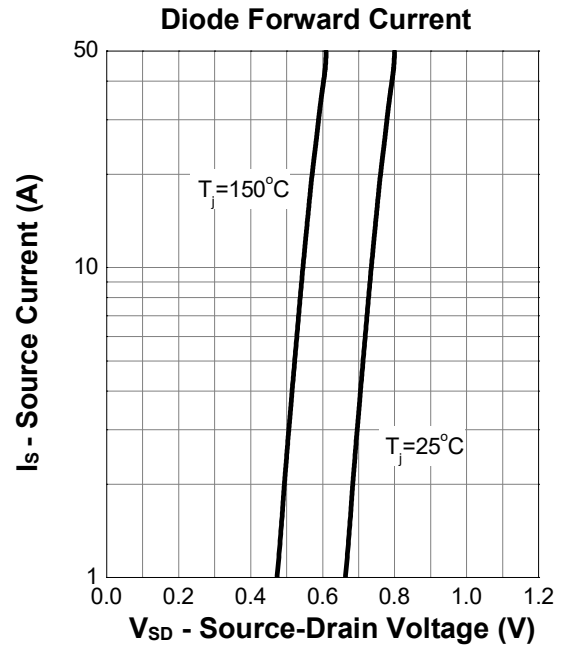
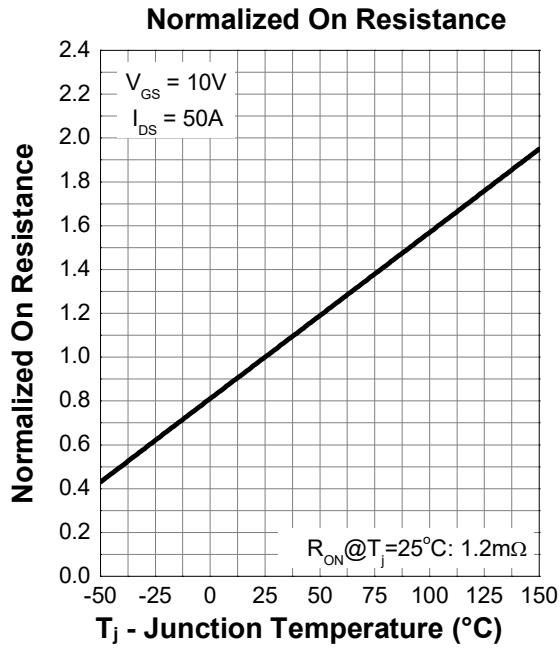
Typical Characteristics



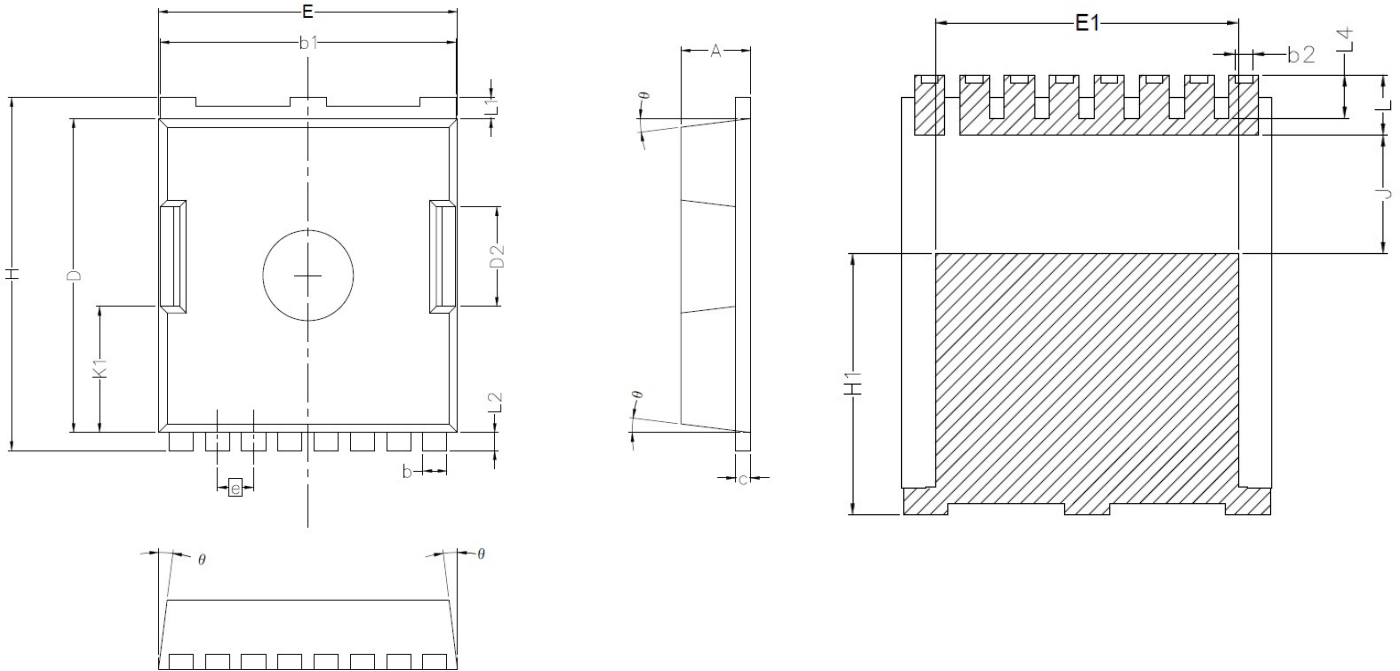
Typical Characteristics (cont.)



Typical Characteristics (cont.)



## Package Information : TOLL-8L



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	2.20	2.40
b	0.90	0.90
b1	9.70	9.90
b2	0.42	0.50
c	0.40	0.60
D	10.28	10.58
D2	3.10	3.50
E	9.70	10.10
E1	7.90	8.30
e	1.20BSC	
H	11.48	11.88
H1	6.75	7.15
N	8	
J	3.00	3.30
K1	3.98	4.38
L	1.40	1.80
L1	0.60	0.80
L2	0.50	0.70
L4	1.00	1.30
$\theta$	4°	10°