

General Description

The MY24N50TP is silicon N-channel Enhanced VDMOSFETS, obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy.

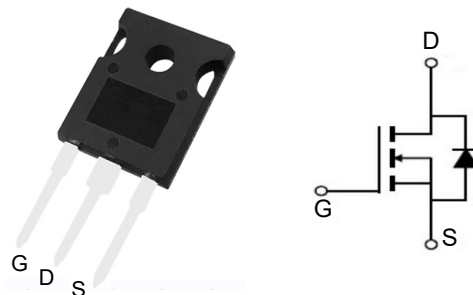


Features

V_{DSS}	500	V
I_D	24	A
P_D ($T_C = 25^\circ\text{C}$)	45	W
$R_{DS(ON)}$ (at $V_{GS} = 10\text{V}$)	0.27	Ω

Application

- High efficiency switch mode power supplies
- Power factor correction
- Electronic lamp ballast



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
MY24N50TP	TO-247	MY24N50TP	600

Absolute Maximum Ratings ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	500	V
I_D	Continuous Drain Current	24	A
	Continuous Drain Current $T_C = 100^\circ\text{C}$	12.5	A
I_{DM}^{a1}	Pulsed Drain Current	80	A
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}^{a2}	Single Pulse Avalanche Energy	1200	mJ
dv/dt^{a3}	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	45	W
	Derating Factor above 25°C	0.36	W/ $^\circ\text{C}$
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, -55 to 150	$^\circ\text{C}$
T_L	Maximum Temperature for Soldering	300	$^\circ\text{C}$

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

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Unit
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	500	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	$I_D=250\mu A, \text{Reference } 25^{\circ}\text{C}$	--	0.6	--	V/ $^{\circ}\text{C}$
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=500V, V_{GS}=0V, T_a=25^{\circ}\text{C}$	--	--	1	μA
		$V_{DS}=400V, V_{GS}=0V, T_a=125^{\circ}\text{C}$	--	--	100	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	$V_{GS}=+30V$	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	$V_{GS}=-30V$	--	--	-100	nA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	$V_{GS}=10V, I_D=10A$	--	0.27	0.33	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	--	4.0	V
Pulse width $tp \leq 300\mu s, \delta \leq 2\%$						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Trans conductance	$V_{DS}=15V, I_D=10A$	--	18	--	S
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=25V, f=1.0MHz$	--	2919	--	pF
C_{oss}	Output Capacitance		--	277	--	
C_{rss}	Reverse Transfer Capacitance		--	16	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	$I_D=20A, V_{DD}=250V, R_G=10\Omega$	--	34	--	ns
t_r	Rise Time		--	65	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	82	--	
t_f	Fall Time		--	45	--	
Q_g	Total Gate Charge	$I_D=20A, V_{DD}=400V, V_{GS}=10V$	--	52	--	nC
Q_{gs}	Gate to Source Charge		--	12.6	--	
Q_{gd}	Gate to Drain ("Miller") Charge		--	18.6	--	

Ratings and Characteristic curves

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I _S	Continuous Source Current (Body Diode)		--	--	24	A
I _{SM}	Maximum Pulsed Current (Body Diode)		--	--	80	A
V _{SD}	Diode Forward Voltage	I _S =20A, V _{GS} =0V	--	--	1.5	V
trr	Reverse Recovery Time	I _S =20A, T _j = 25°C dI _F /dt=100A/us, V _{GS} =0V	--	535	--	ns
Q _{rr}	Reverse Recovery Charge		--	5671	--	nC
I _{RRM}	Reverse Recovery Current		--	21.2	--	A
Pulse width tp≤300 μs, δ ≤2%						

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case	2.78	$^{\circ}C/W$
$R_{\theta JA}$	Junction-to-Ambient	62.5	$^{\circ}C/W$

^{a1}: Repetitive rating; pulse width limited by maximum junction temperature

^{a2}: $L=10mH, I_D=15.5A, \text{Start } T_J=25^{\circ}C$

^{a3}: $I_{SD}=20A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}, \text{Start } T_J=25^{\circ}C$

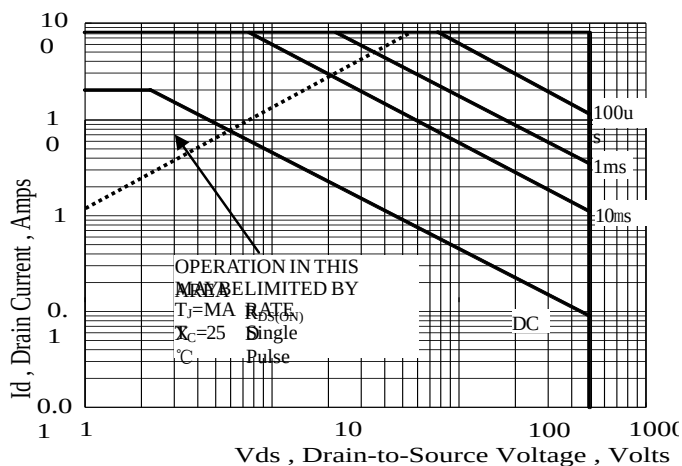


Figure 1 Maximum Forward Bias Safe Operating Area

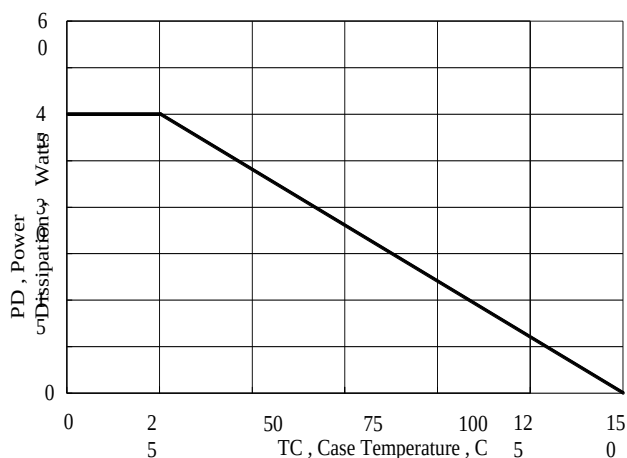


Figure 2 Maximum Power Dissipation vs Case Temperature

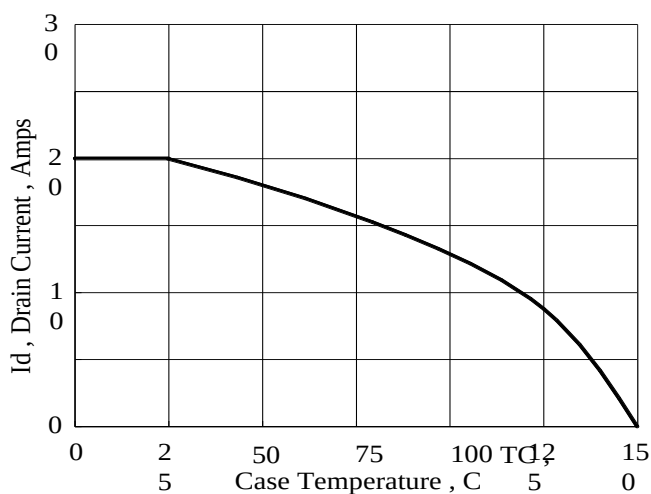


Figure 3 Maximum Continuous Drain Current vs Case Temperature

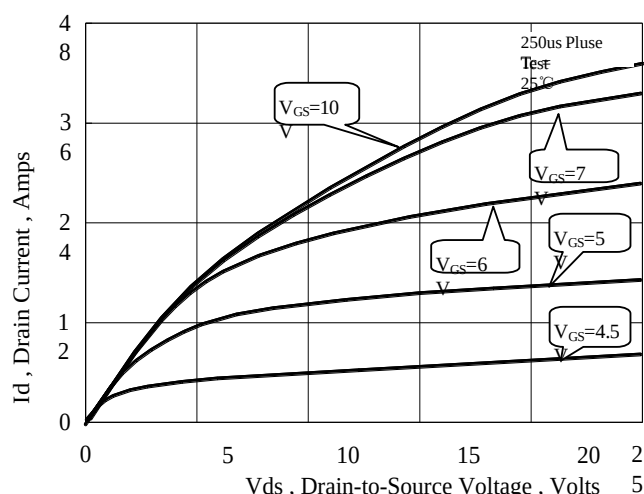


Figure 4 Typical Output Characteristics

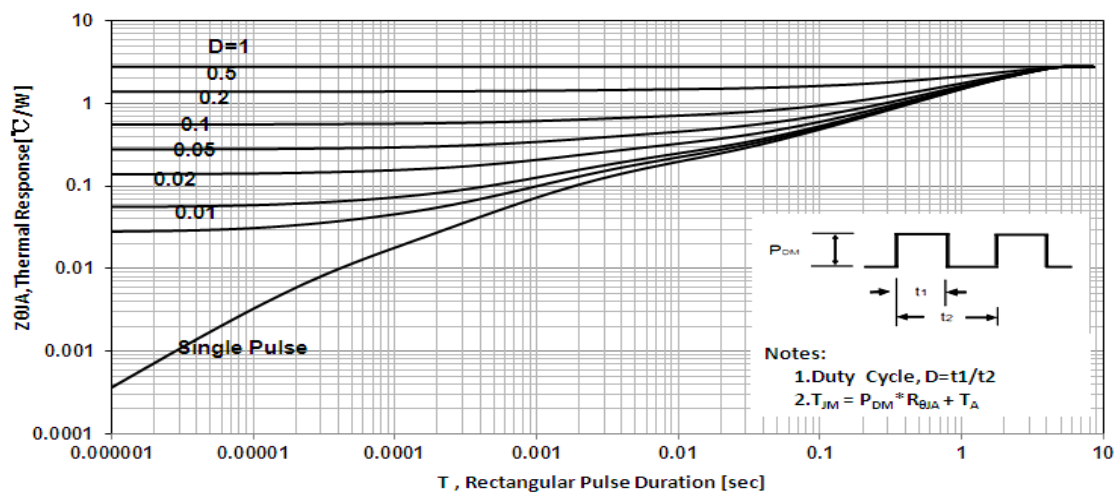


Figure 5 Maximum Effective Thermal Impedance, Junction to Case

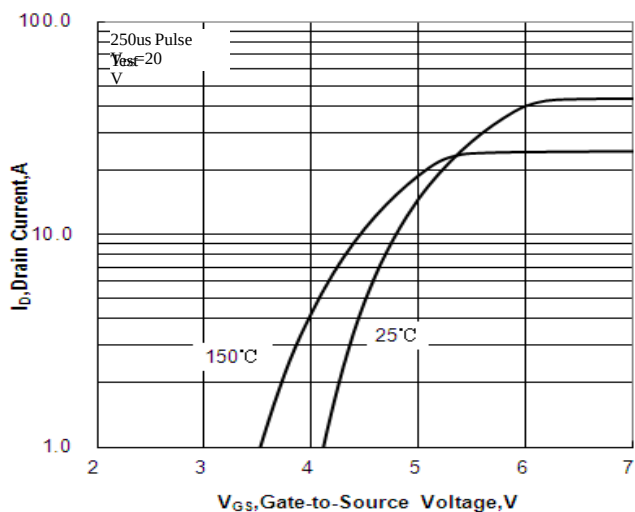


Figure 6 Typical Transfer Characteristics

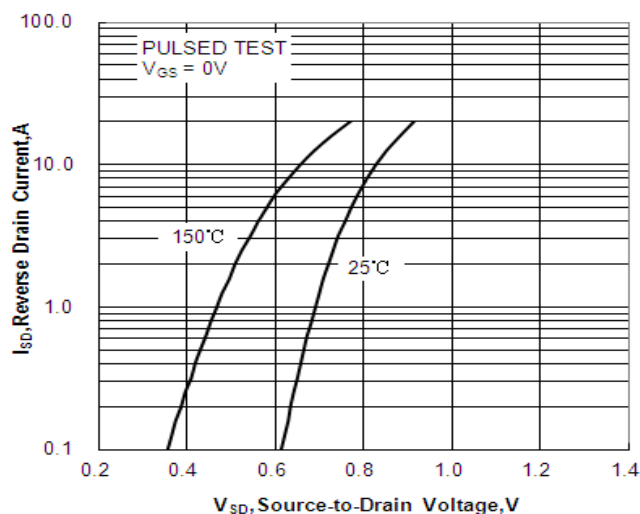


Figure 7 Typical Body Diode Transfer Characteristics

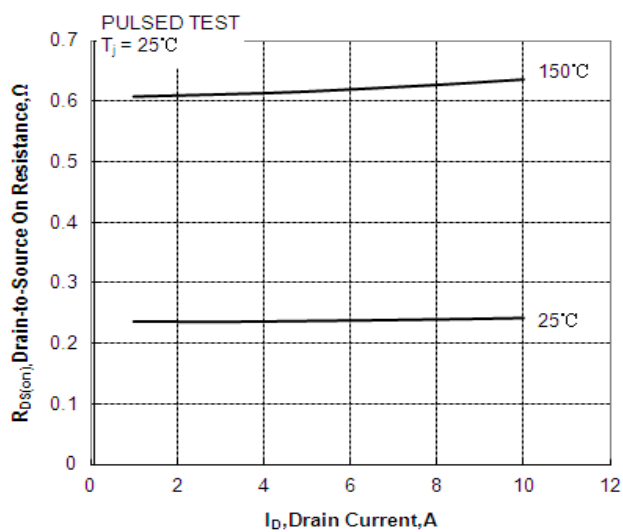


Figure 8 Typical Drain to Source ON Resistance
vs Drain Current

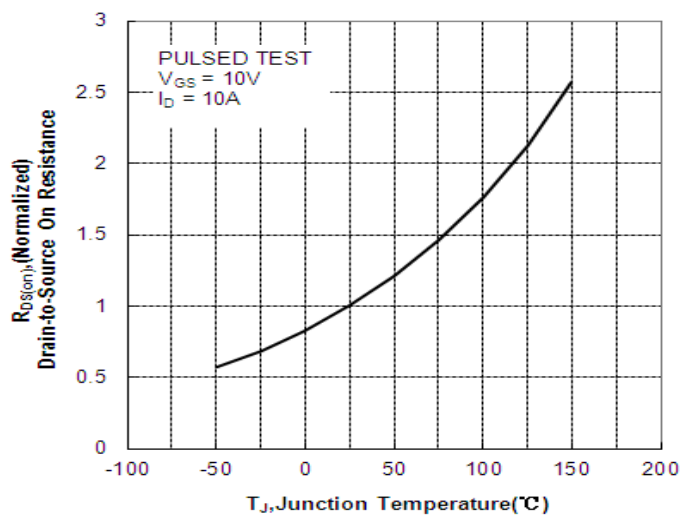


Figure 9 Typical Drain to Source on Resistance
vs Junction Temperature

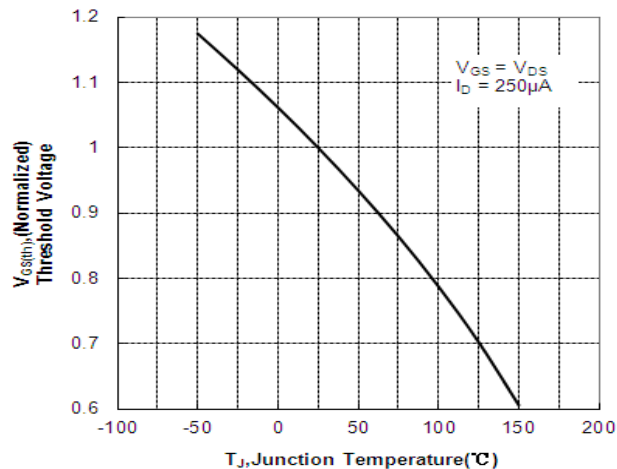


Figure 10 Typical Theshold Voltage vs Junction Temperature

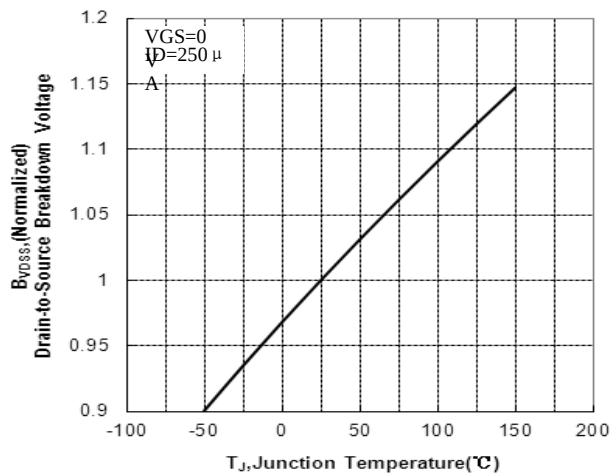


Figure 11 Typical Breakdown Voltage vs Junction Temperature

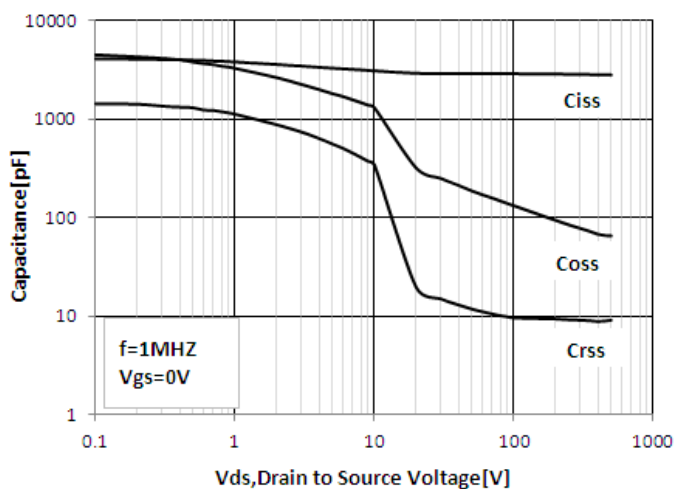


Figure 12 Typical Capacitance vs Drain to Source Voltage

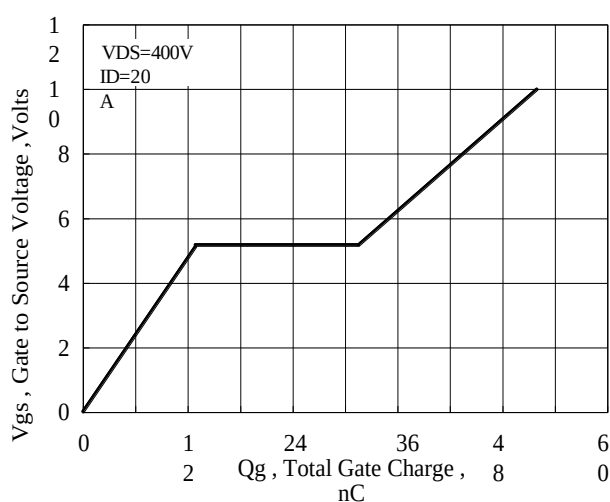
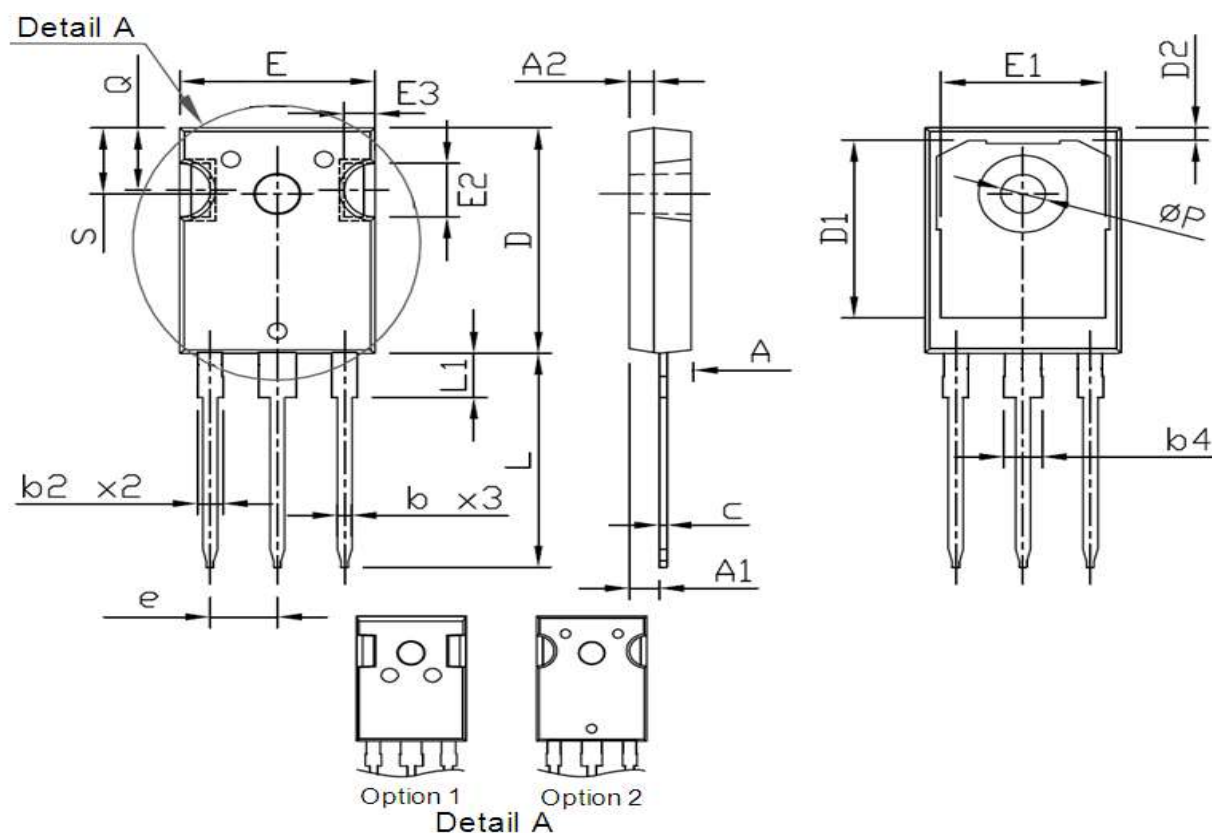


Figure 13 Typical Gate Charge vs Gate to Source Voltage

Package Mechanical Data-TO-247 Single



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.70	5.30	0.185	0.209
A1	2.20	2.60	0.087	0.102
A2	1.50	2.49	0.059	0.098
b	1.04	1.33	0.041	0.052
b2	1.90	2.41	0.075	0.095
b4	2.87	3.43	0.113	0.135
c	0.55	0.70	0.022	0.028
D	20.70	21.30	0.815	0.839
D1	16.25	17.65	0.640	0.695
D2	0.51	1.40	0.020	0.055
e	5.44 BSC.		0.214 BSC.	
E	15.50	16.30	0.610	0.642
E1	13.08	14.16	0.515	0.557
E2	3.80	5.49	0.150	0.216
E3	1.00	2.75	0.039	0.108
L	19.72	20.32	0.776	0.800
L1	3.85	4.50	0.152	0.177
Q	5.25	6.25	0.207	0.246
P	3.50	3.70	0.138	0.146
S	6.04	6.30	0.238	0.248