

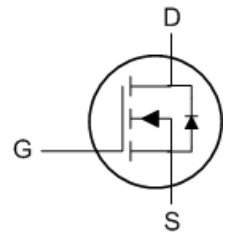
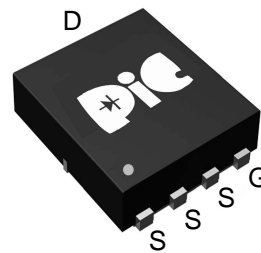
➤ General Description

This PAN60TY32Y N-Channel enhancement mode power field effect transistor is the high density trench technology and this advanced technology can provide excellent $R_{ds(On)}$ performance and efficiency for power switching and load switching application., this device also comply with the RoHS and Green Product requirement with full function reliability approved.

➤ Feature

- Super Low Gate Charge
- 100% EAS Guaranteed
- Green Device Available
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

➤ DFN5X6A-EP1



➤ Application

- DC/DC Primary Side Switch
- Industrial Synchronous
- Rectification Load Switch
- DC/DC Converters

➤ Absolute Maximum Ratings

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, V_{GS} @ 10V ¹	$I_D@TC=25^\circ C$	75	A
Continuous Drain Current, V_{GS} @ 10V ¹	$I_D@TC=100^\circ C$	47	A
Pulsed Drain Current ²	I_{DM}	280	A
Single Pulse Avalanche Energy ³	EAS	80	mJ
Avalanche Current	IAS	40	A
Total Power Dissipation ⁴	$PD@TC=25^\circ C$	41	W
Storage Temperature Range	TSTG	-55 to 150	$^\circ C$
Operating Junction Temperature Range	T_J	-55 to 150	$^\circ C$
Thermal Resistance Junction-ambient ¹	$R_{\theta JA}$	62	$^\circ C/W$
Thermal Resistance Junction-case ¹	$R_{\theta JC}$	1.4	$^\circ C/W$

➤ Electrical Characteristics ($T_J=25^\circ C$ Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BVDSS	$V_{GS}=0V$, $I_D=250\mu A$	60	---	---	V
Static Drain-Source On-Resistance ²	RDS(ON)	$V_{GS}=10V$, $I_D=10A$	---	7.1	8.5	m Ω
		$V_{GS}=4.5V$, $I_D=5A$	---	9.5	12	m Ω
Gate Threshold Voltage	VGS(th)	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.2	---	2.5	V
Drain-Source Leakage Current	IDSS	$V_{DS}=48V$, $V_{GS}=0V$, $T_J=25^\circ C$	---	---	1	μA
		$V_{DS}=48V$, $V_{GS}=0V$, $T_J=55^\circ C$	---	---	5	
Gate-Source Leakage Current	IGSS	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
Gate Resistance	Rg	$V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$	---	1.2	---	Ω
Total Gate Charge (10V)	Qg	$V_{DS}=30V$, $V_{GS}=10V$, $I_D=18A$	---	57	---	nC
Gate-Source Charge	Qgs		---	8.7	---	
Gate-Drain Charge	Qgd		---	14	---	
Turn-On Delay Time	Td(on)	$V_{DD}=30V$, $V_{GS}=10V$, $R_G=3.3$, $I_D=20A$	---	16.2	---	ns
Rise Time	Tr		---	41.2	---	
Turn-Off Delay Time	Td(off)		---	56.4	---	
Fall Time	Tf		---	16.2	---	
Input Capacitance	Ciss	$V_{DS}=30V$, $V_{GS}=0V$, $f=1MHz$	---	3307	---	μF
Output Capacitance	Coss		---	201	---	
Reverse Transfer Capacitance	Crss		---	151	---	

➤ Diode Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current ^{1,5}	Is	$V_G=V_D=0V$, Force Current	---	---	75	A
Diode Forward Voltage ²	VSD	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ C$	---	---	1.2	V
Reverse Recovery Time	trr	$I_F=20A$, $dI/dt=100A/\mu s$, $T_J=25^\circ C$	---	22	---	nS
Reverse Recovery Charge	Qrr		---	72	---	nC

Note :

1. Pulse width limited by maximum junction temperature.

2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

3. The EAS data shows Max. rating. The test condition is $V_{DD}=50V$, $V_{GS}=10V$, $L=0.1mH$, $I_{AS}=40A$

4. Ensure that the channel temperature does not exceed $150^\circ C$.

5. The data is theoretically the same as I_D and IDM , in real applications, should be limited by total power dissipation.

➤ Typical Characteristics

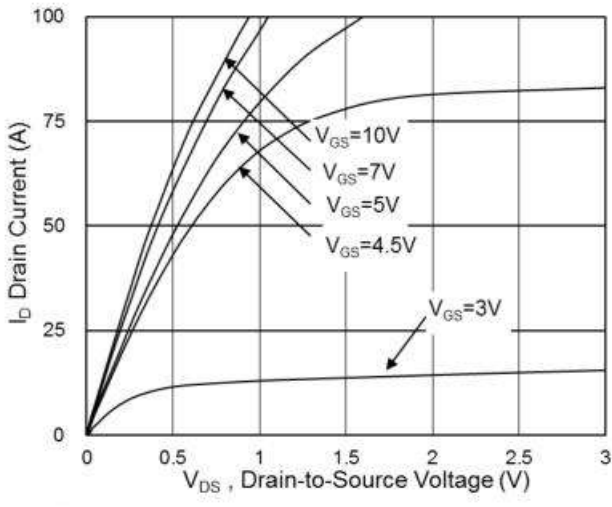


Fig.1 Typical Output Characteristics

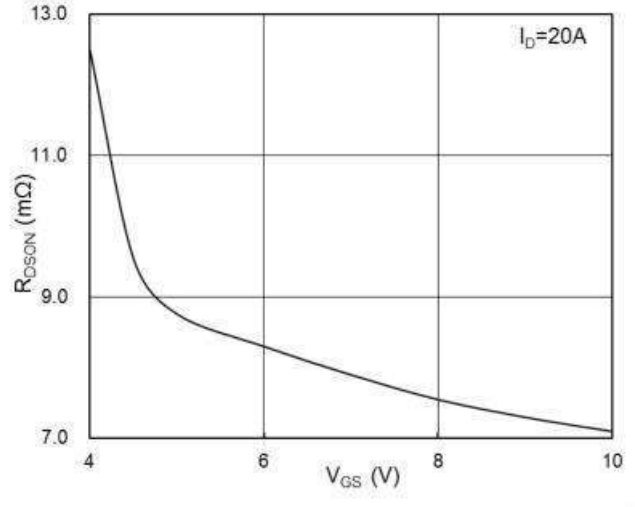


Fig.2 On-Resistance vs Gate-Source Voltage

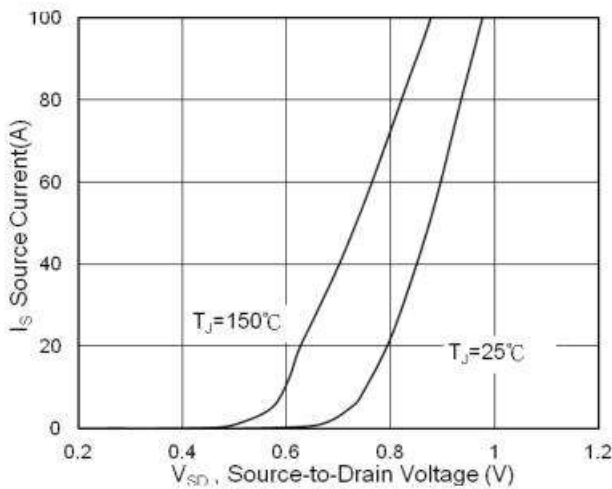


Fig.3 Forward Characteristics of Reverse

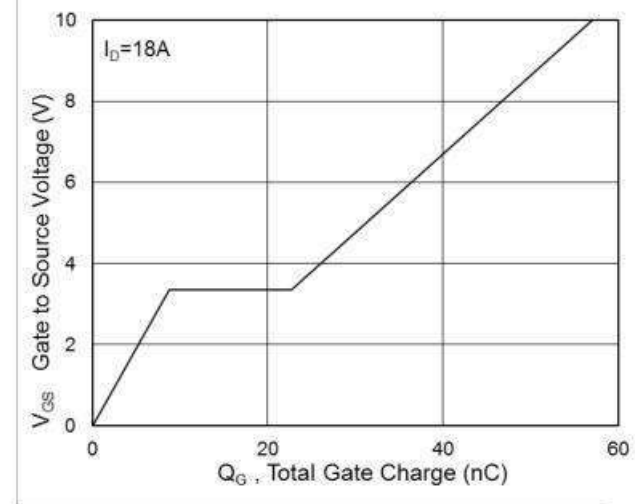


Fig.4 Gate-Charge Characteristics

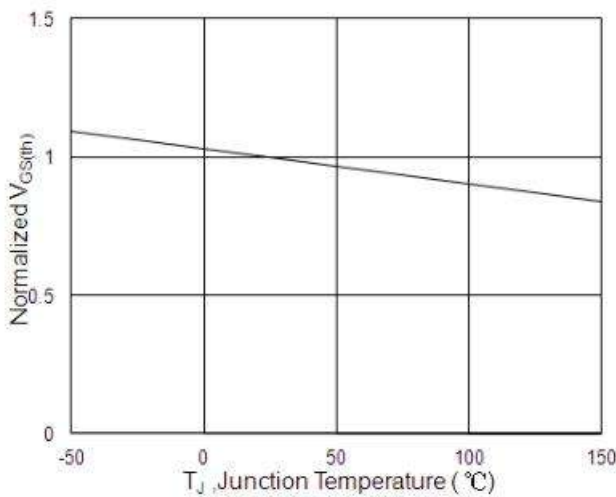


Fig.5 Normalized $V_{GS(th)}$ vs T_J

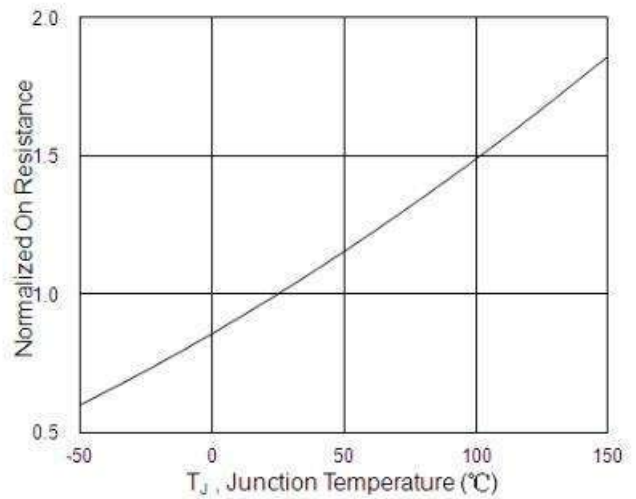


Fig.6 Normalized $R_{DS(ON)}$ vs T_J

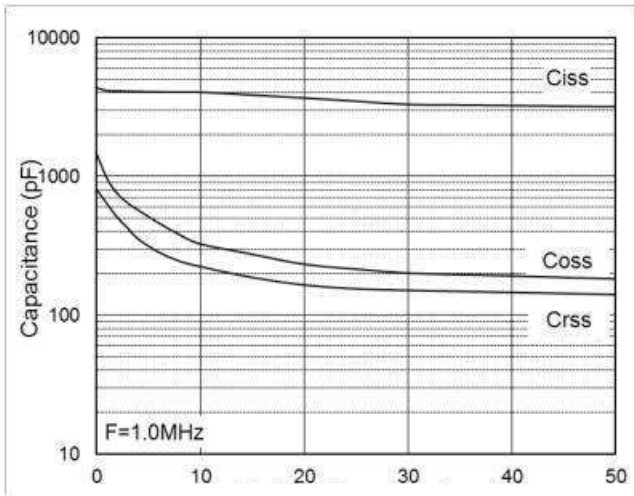


Fig.7 Capacitance

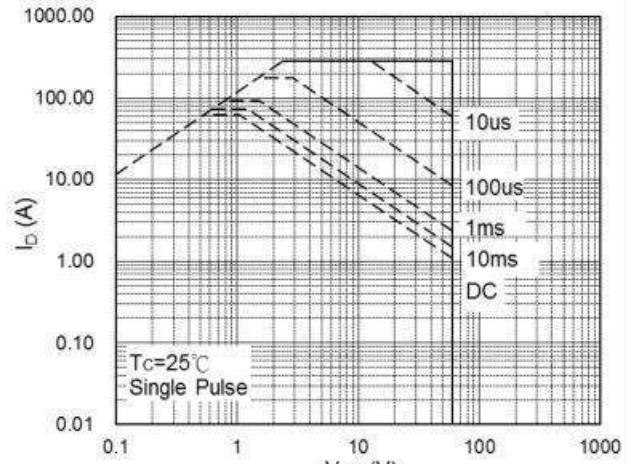


Fig.8 Safe Operating Area

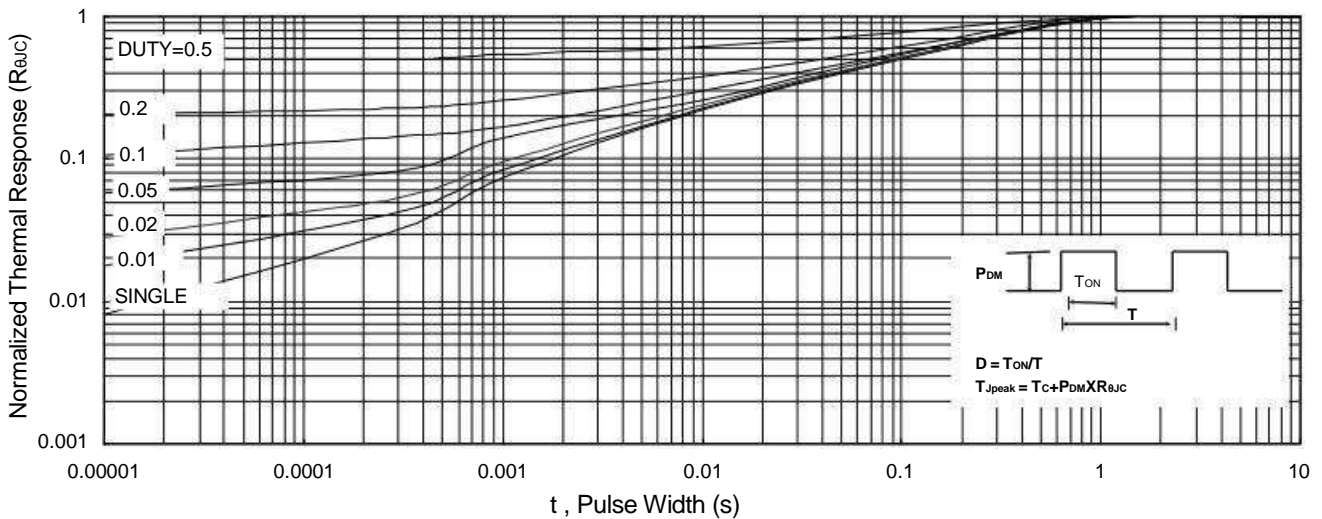


Fig.9 Normalized Maximum Transient Thermal Impedance

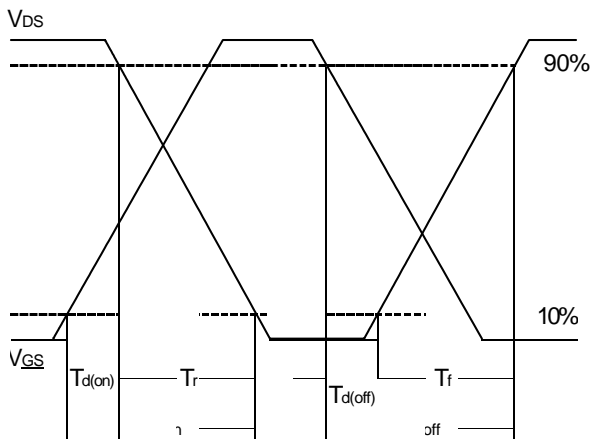


Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS2} \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

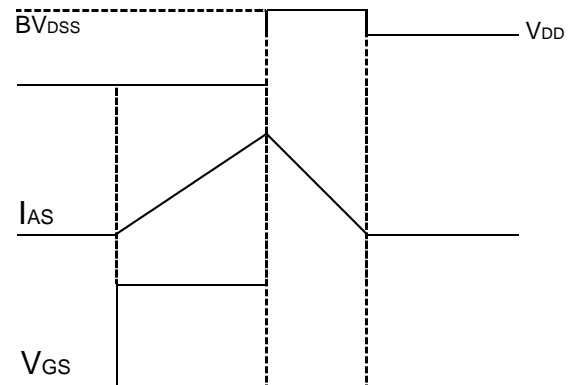
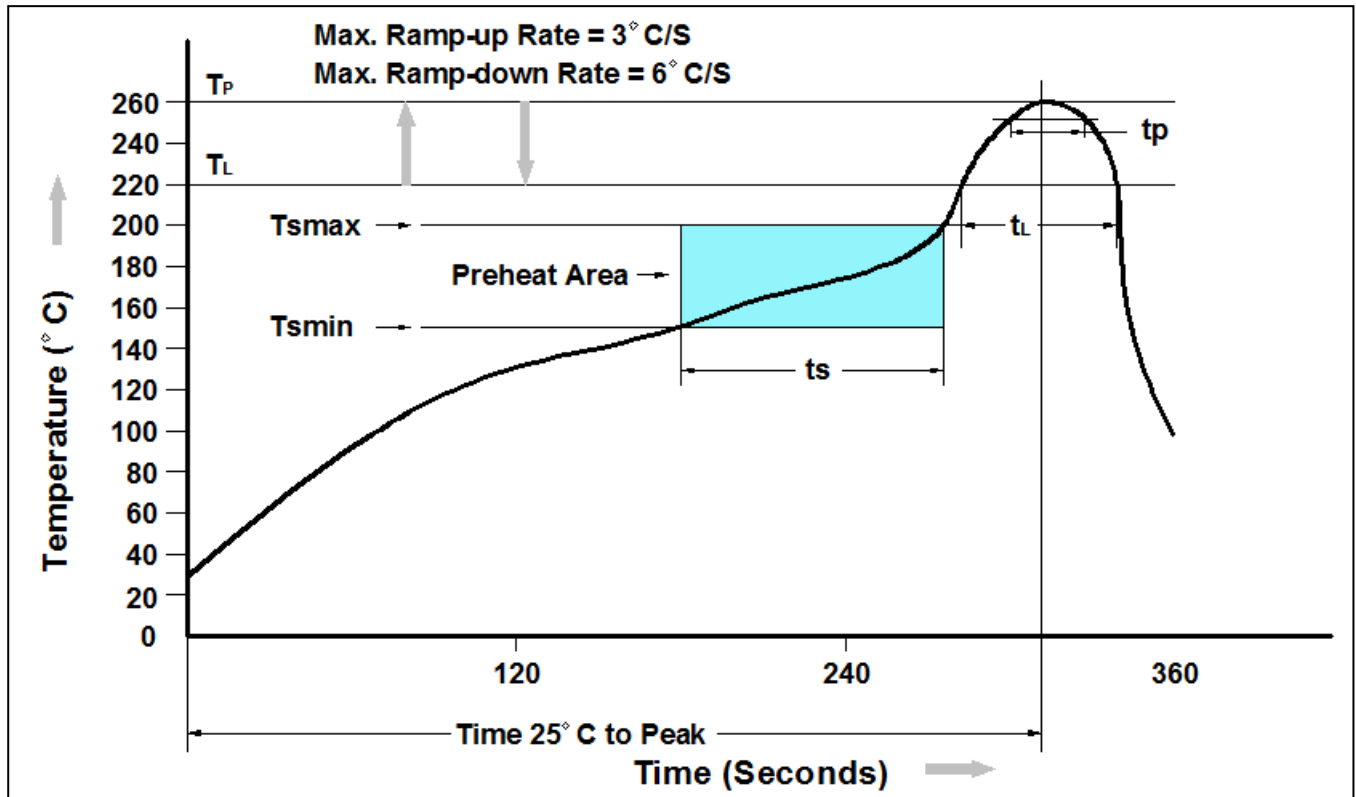


Fig.11 Unclamped Inductive Switching Waveform

➤ Recommend IR Reflow Soldering Thermal Profile

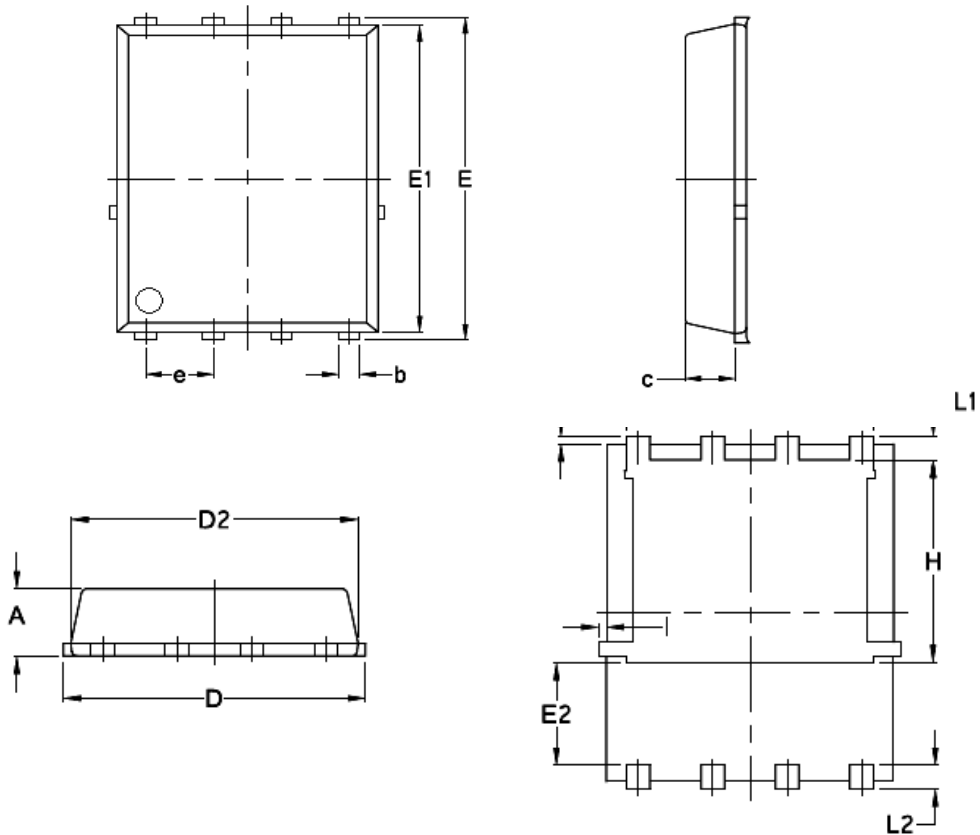


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	150°C
Temperature Max. (T _{smax})	200°C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds
Average Ramp-up Rate (t _L to t _P)	3°C/second max.
Liquidous Temperature (T _L)	217°C
Time (t _L) Maintained Above (T _L)	60 – 150 seconds
Peak Temperature	260°C +0°C / -5°C
Time (t _P) within 5°C of actual Peak Temperature	30 seconds
Ramp-down Rate (T _P to T _L)	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.

➤ Ordering Information

Part Number	Description	Quantity
PAN60TY32Y	DFN5X6A-EP1 Reel	3000 pcs

➤ Package Information (DFN5X6A-EP1)



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.970	0.0324	0.0382
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
I	---	0.18	---	0.0070
E	5.90	6.15	0.2323	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.10	---	0.0433	---
e	1.27 BSC		0.05 BSC	
H	3.30	3.78	0.1299	0.1488
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.61	0.0150	0.0240
L2	0.38	0.71	0.0150	0.0279

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