

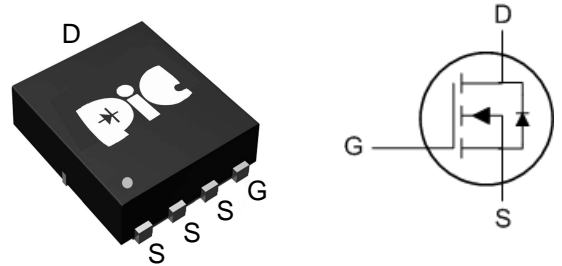
➤ General Description

This PAN00TY24AY 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	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, $V_{GS} @ 10V_{1,6}$	$I_D @ T_C=25^\circ C$	104	A
Continuous Drain Current, $V_{GS} @ 10V_{1,6}$	$I_D @ T_C=100^\circ C$	66	A
Pulsed Drain Current ²	I_{DM}	200	A
Single Pulse Avalanche Energy ³	EAS	180	mJ
Avalanche Current	I_{AS}	60	A
Total Power Dissipation ⁴	$P_D @ T_C=25^\circ C$	156	W
Storage Temperature Range	T_{STG}	-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	$R_{\theta JC}$	0.8	$^\circ C/W$

➤ Electrical Characteristics (T_J=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	100	---	---	V
Static Drain-Source On-Resistance ²	R _{DS(ON)}	V _{GS} =10V, I _D =15A	---	8.5	10	mΩ
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =250uA	2.5	---	4.5	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =80V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =80V, V _{GS} =0V, T _J =55°C	---	---	5	
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
Forward Transconductance	g _{fs}	V _{DS} =5V, I _D =30A	---	50	---	S
Gate Resistance	R _g	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	1.2	---	Ω
Total Gate Charge (10V)	Q _g	V _{DS} =80V, V _{GS} =10V, I _D =30A	---	84	---	nC
Gate-Source Charge	Q _{gs}		---	28	---	
Gate-Drain Charge	Q _{gd}		---	26	---	
Turn-On Delay Time	T _{d(on)}	V _{DD} =40V, V _{GS} =10V, R _G =3.3Ω, I _D =30A	---	36	---	ns
Rise Time	T _r		---	71	---	
Turn-Off Delay Time	T _{d(off)}		---	50	---	
Fall Time	T _f		---	23	---	
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	5580	---	pF
Output Capacitance	C _{oss}		---	571	---	
Reverse Transfer Capacitance	C _{rss}		---	278	---	

➤ Diode Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current ^{1,5}	I _s	V _G =V _D =0V, Force Current	---	---	104	A
Pulsed Source Current ^{2,5}	I _{SM}		---	---	200	A
Diode Forward Voltage ²	V _{SD}	V _{GS} =0V, I _s =A, T _J =25°C	---	---	1.2	V
Reverse Recovery Time	t _{rr}	I _F =30A, dI/dt=100A/μs, T _J =25°C	---	24	---	nS
Reverse Recovery Charge	Q _{rr}		---	28	---	nC

Note :

- 1.Pulse width limited by maximum junction temperature.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=60A
- 4.Ensure that the channel temperature does not exceed 150°C.
- 5.The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.
- 6.Package limitation current is 90A.

➤ Typical Characteristics

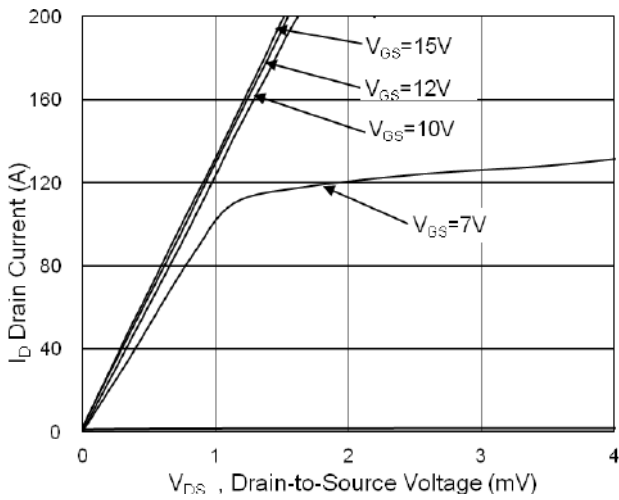


Fig.1 Typical Output Characteristics

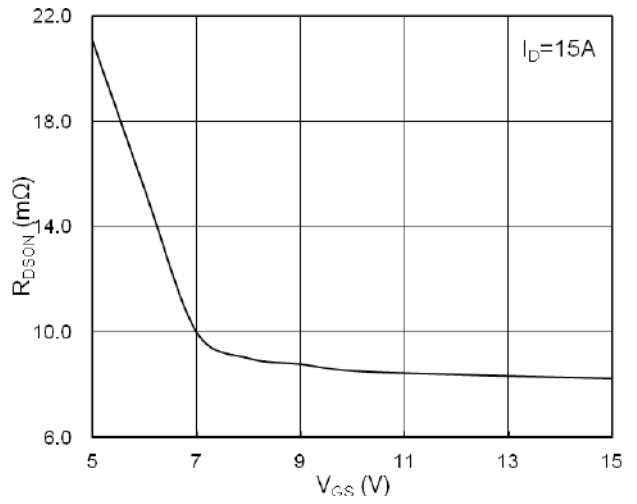


Fig.2 On-Resistance v.s Gate-Source

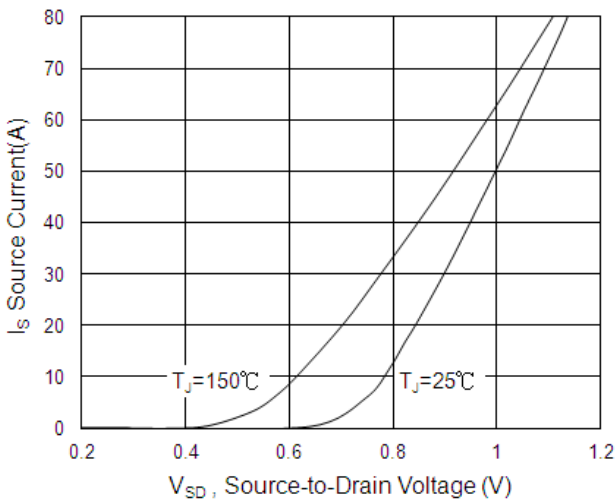


Fig.3 Forward Characteristics of Reverse

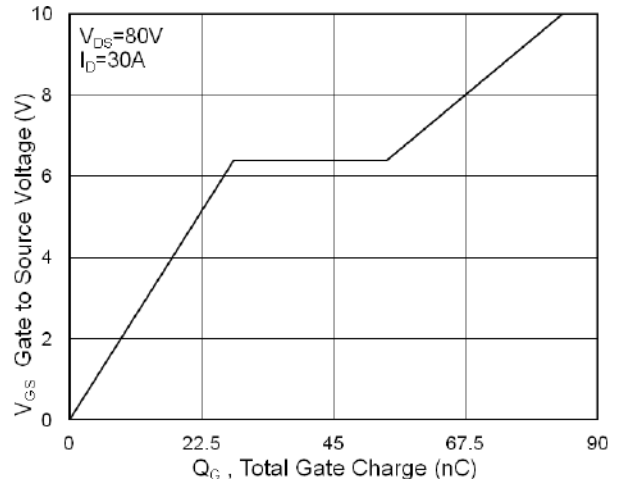


Fig.4 Gate-Charge Characteristics

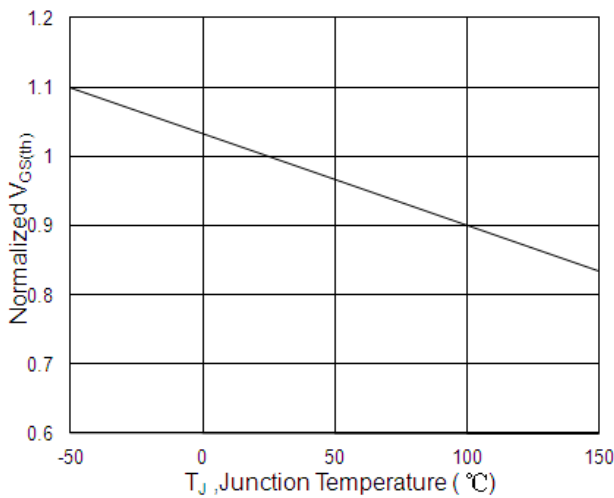


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

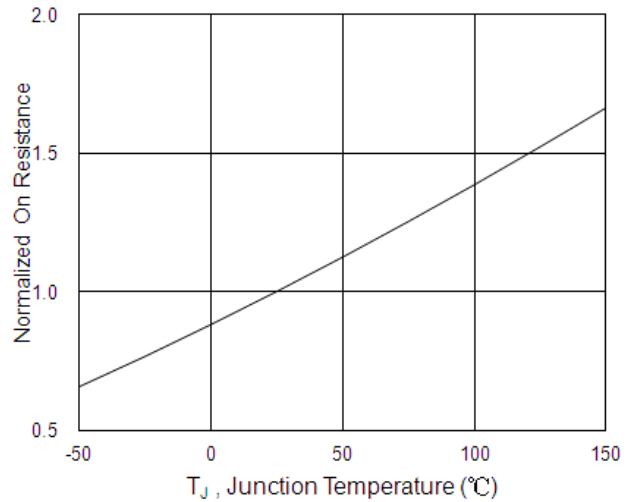


Fig.6 Normalized $R_{DS(ON)}$ vs. T_J

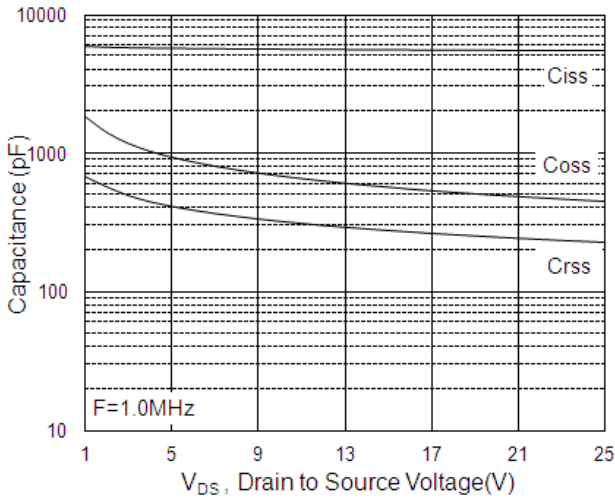


Fig.7 Capacitance

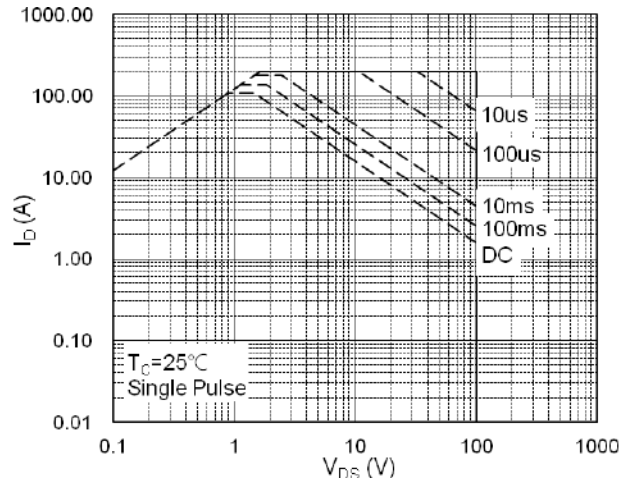


Fig.8 Safe Operating Area

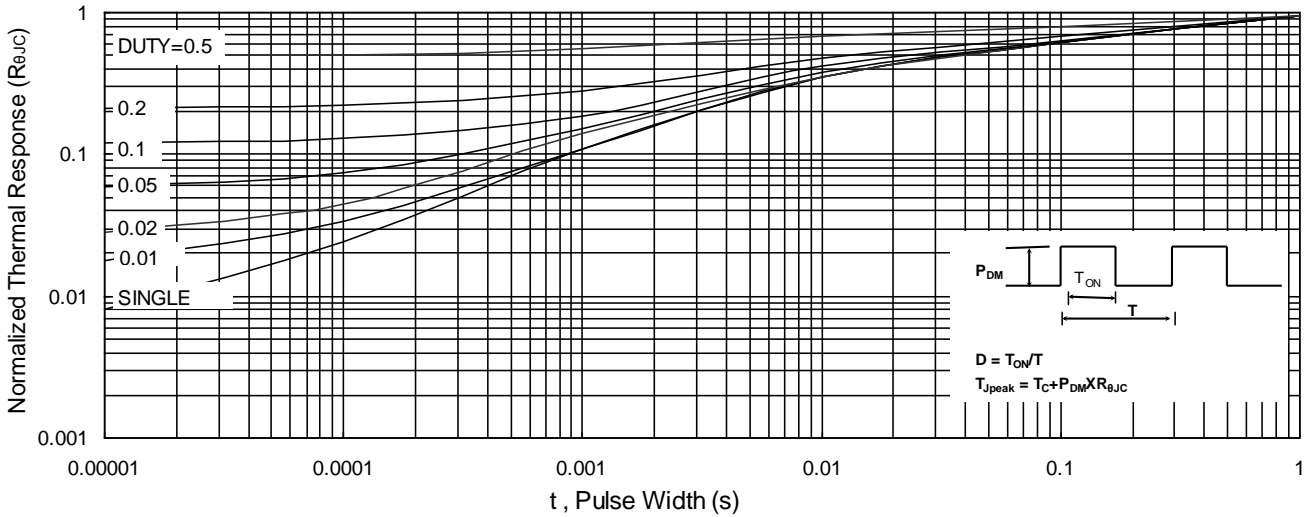


Fig.9 Normalized Maximum Transient Thermal Impedance

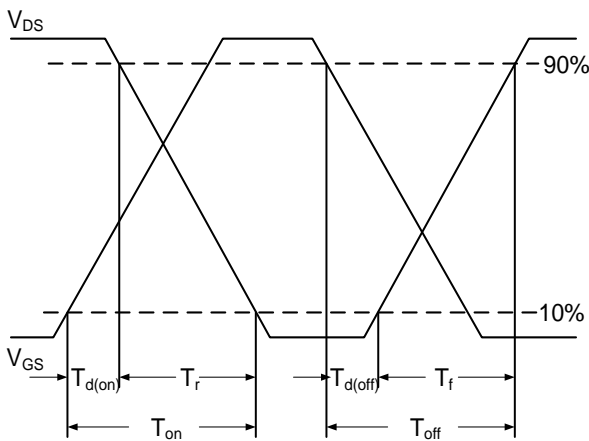


Fig.10 Switching Time Waveform

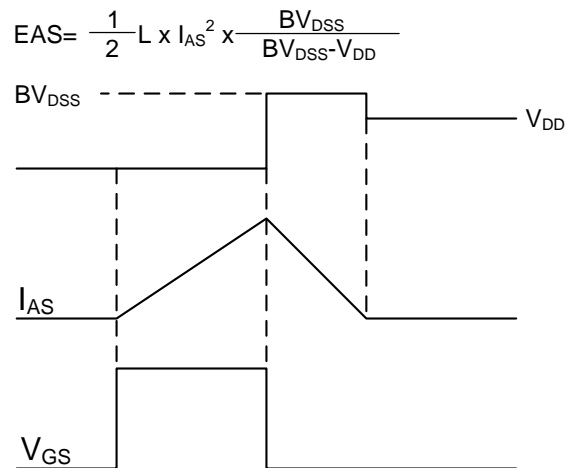
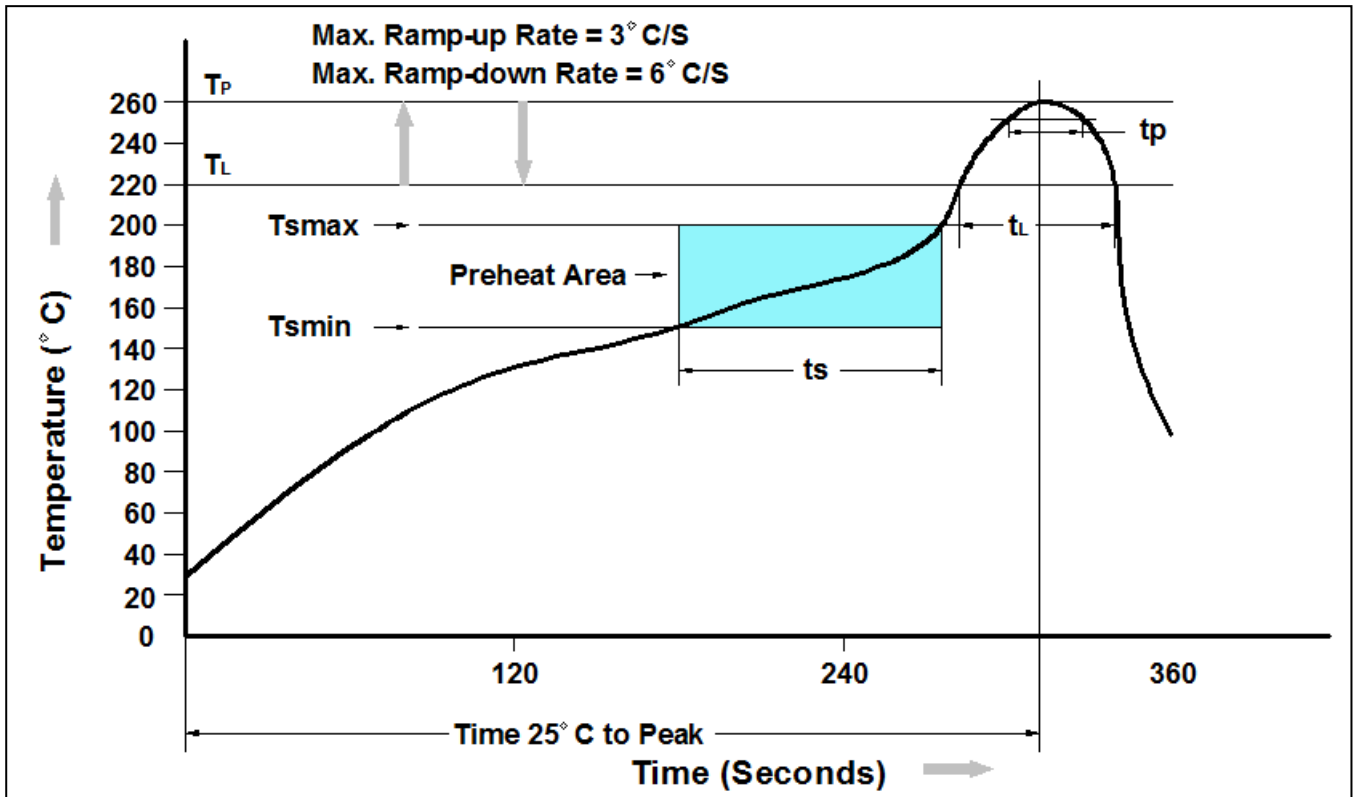


Fig.11 Unclamped Inductive Switching Waveform

➤ Recommend IR Reflow Soldering Thermal Profile

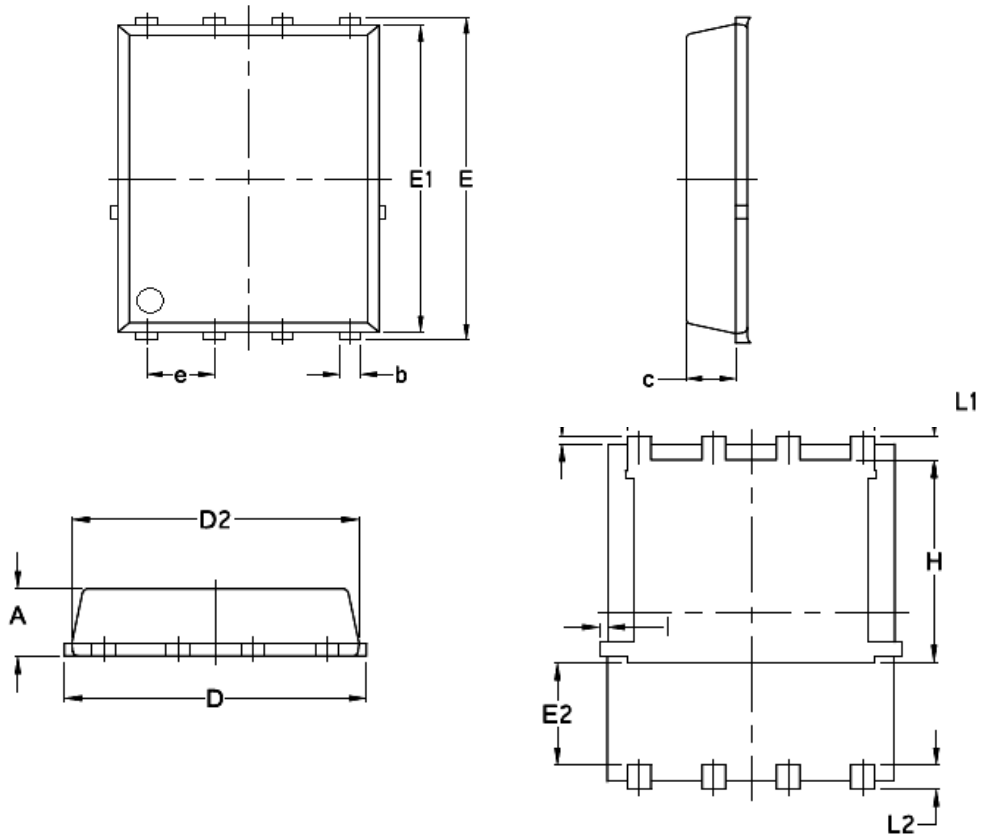


Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T_{smin})	150°C
Temperature Max. (T_{smax})	200°C
Time (t_s) from (T_{smin} to T_{smax})	60-120 seconds
Average Ramp-up Rate (t_L to t_P)	3°C/second max.
Liquidous Temperature (T_L)	217°C
Time (t_L) Maintained Above (T_L)	60 – 150 seconds
Peak 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
PAN00TY24AY	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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