

N-Channel Enhancement Mode Power MOSFET

Description

The HM80N03I uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

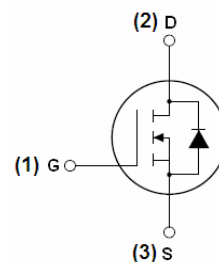
General Features

- $V_{DS} = 30V, I_D = 80A$
 $R_{DS(ON)} < 6.5m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 10m\Omega @ V_{GS} = 5V$
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

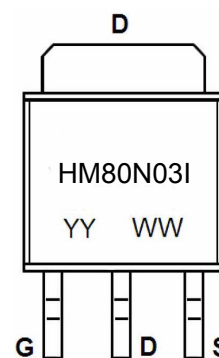
Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

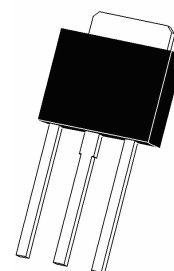
100% UIS TESTED!



Schematic diagram



Marking and pin assignment



TO-251 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
HM80N03I	HM80N03I	TO-251	-	-	-

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	80	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_D (100^\circ C)$	50	A
Pulsed Drain Current	I_{DM}	170	A
Maximum Power Dissipation	P_D	83	W
Derating factor		0.56	W/ $^\circ C$
Single pulse avalanche energy (Note 5)	E_{AS}	150	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	1.8	°C/W
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Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

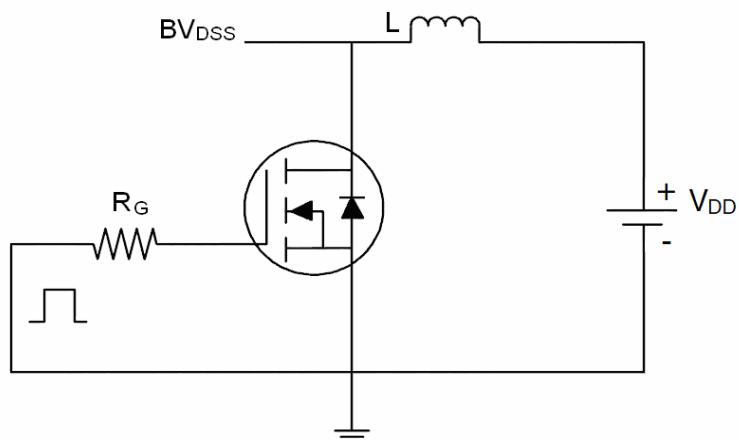
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1	1.5	3	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =30A	-	5.5	6.5	mΩ
		V _{GS} =5V, I _D =24A	-	7.5	10	
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =24A	20	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, F=1.0MHz	-	2330	-	PF
Output Capacitance	C _{oss}		-	460	-	PF
Reverse Transfer Capacitance	C _{rss}		-	230	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =10V, I _D =30A V _{GS} =10V, R _{GEN} =2.7Ω	-	20	-	nS
Turn-on Rise Time	t _r		-	15	-	nS
Turn-Off Delay Time	t _{d(off)}		-	60	-	nS
Turn-Off Fall Time	t _f		-	10	-	nS
Total Gate Charge	Q _g	V _{DS} =10V, I _D =30A, V _{GS} =10V	-	51	-	nC
Gate-Source Charge	Q _{gs}		-	14	-	nC
Gate-Drain Charge	Q _{gd}		-	11	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =24A	-	-	1.2	V
Diode Forward Current (Note 2)	I _S		-	-	80	A
Reverse Recovery Time	t _{rr}	TJ = 25°C, IF = 80A	-	32	50	nS
Reverse Recovery Charge	Q _{rr}	di/dt = 100A/μs(Note3)	-	12	20	nC

Notes:

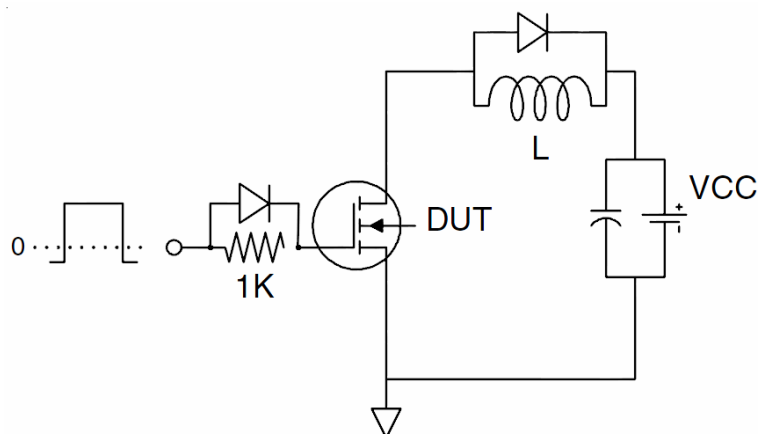
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=15V, V_G=10V, L=1mH, R_g=25\Omega$

Test Circuit

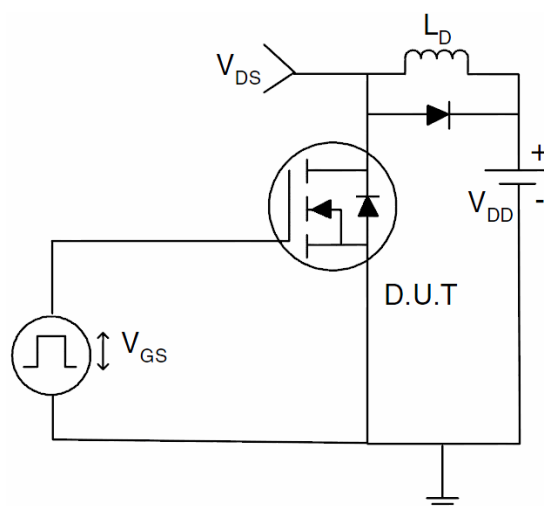
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit:



3) Switch Time Test Circuit:



Typical Electrical and Thermal Characteristics (Curves)

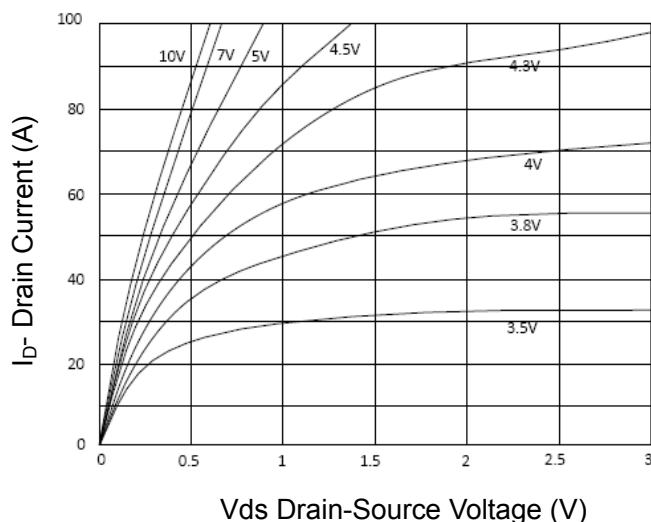


Figure 1 Output Characteristics

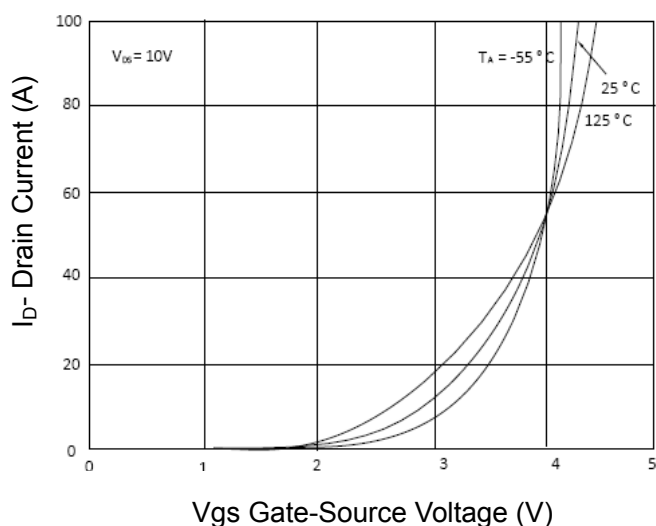


Figure 2 Transfer Characteristics

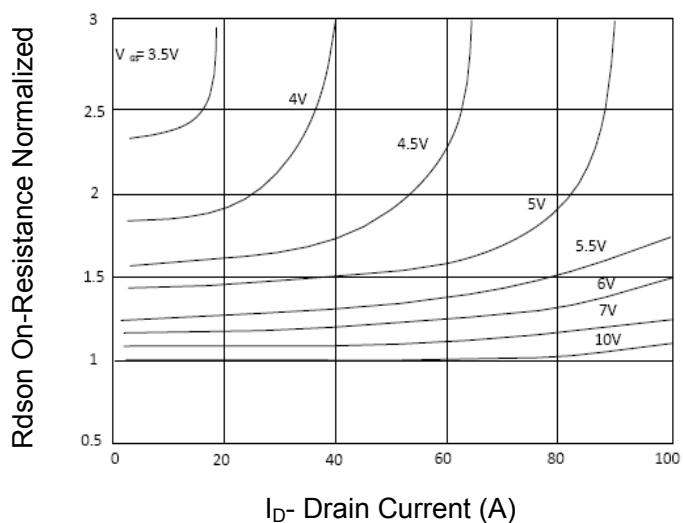


Figure 3 Rdson- Drain Current

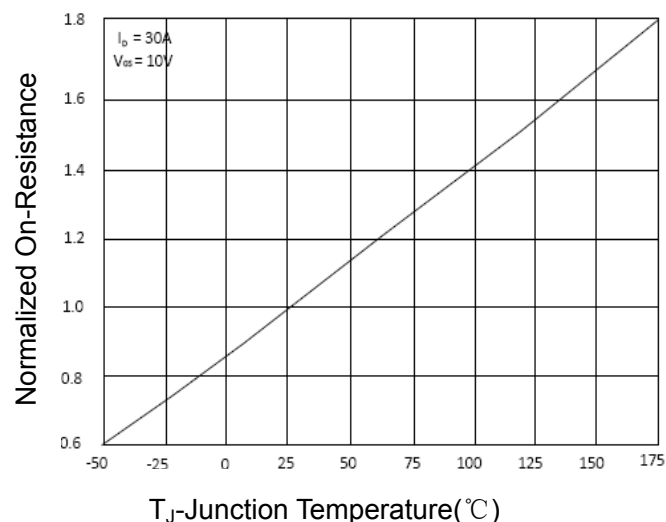


Figure 4 Rdson-Junction Temperature

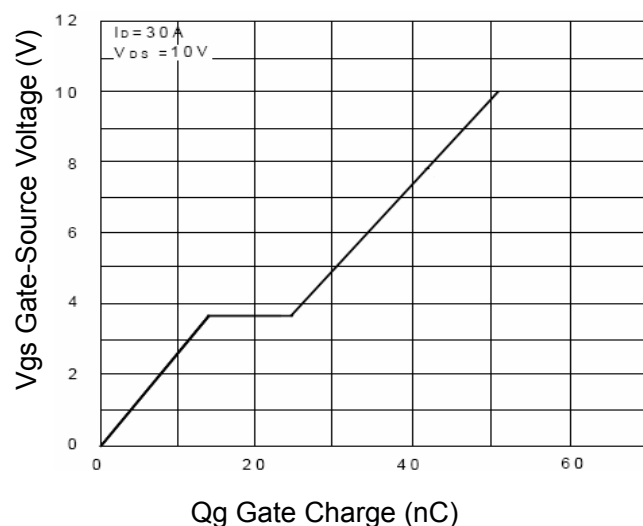


Figure 5 Gate Charge

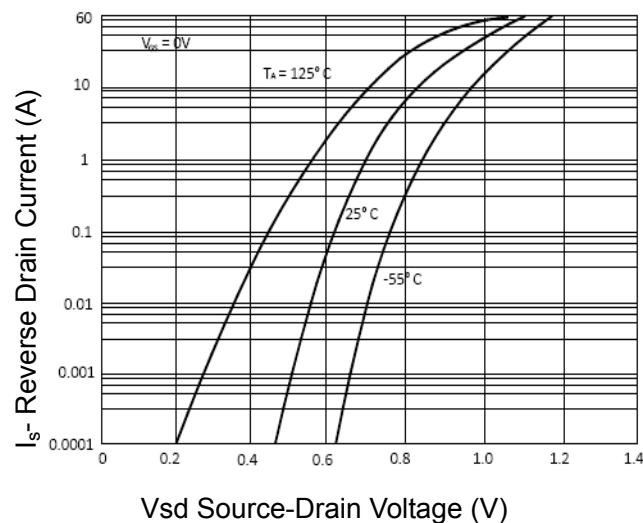
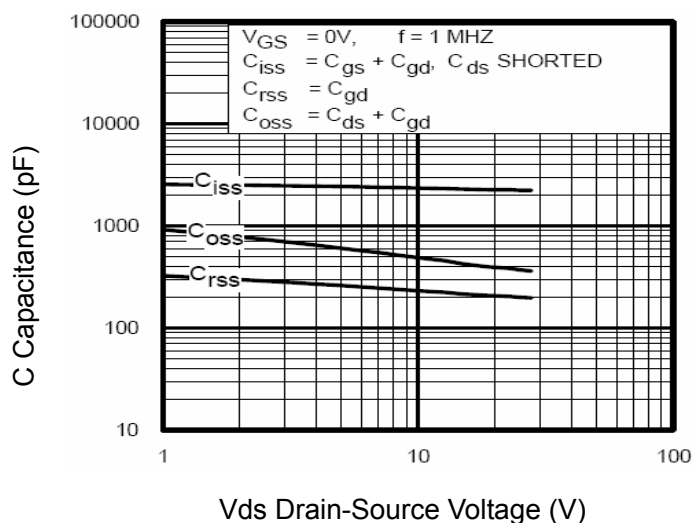
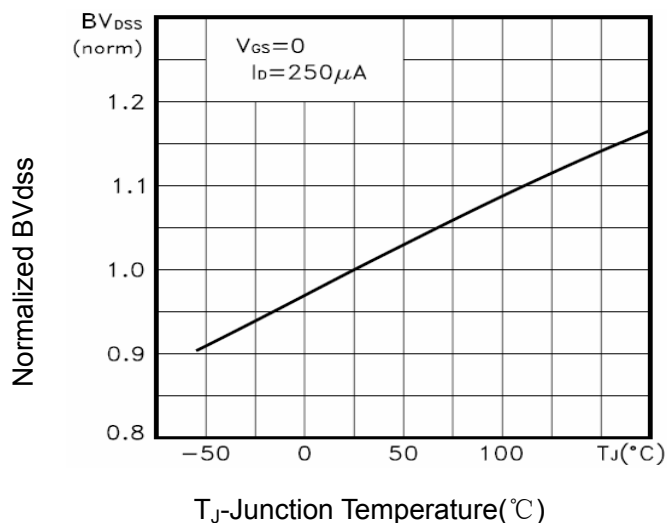


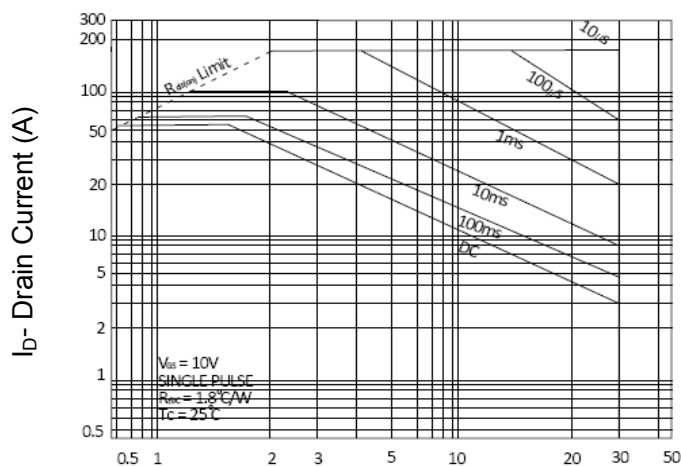
Figure 6 Source- Drain Diode Forward



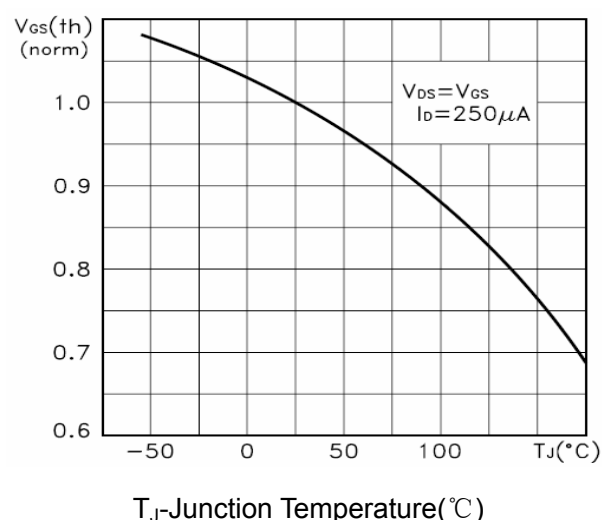
Vds Drain-Source Voltage (V)
Figure 7 Capacitance vs Vds



TJ-Junction Temperature(°C)
Figure 9 BV_{DSS} vs Junction Temperature



Vds Drain-Source Voltage (V)
Figure 8 Safe Operation Area



TJ-Junction Temperature(°C)
Figure 10 V_{GS(th)} vs Junction Temperature

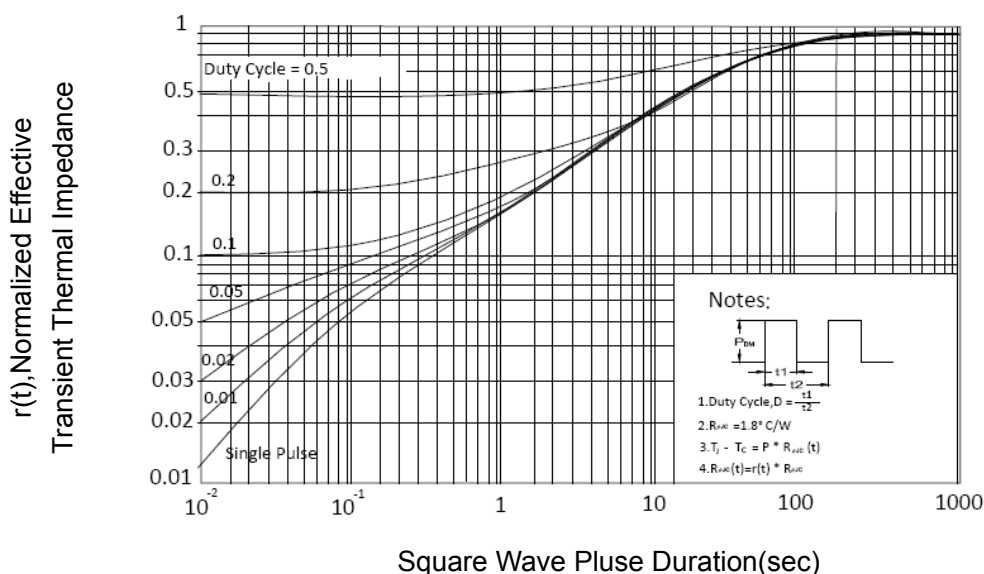
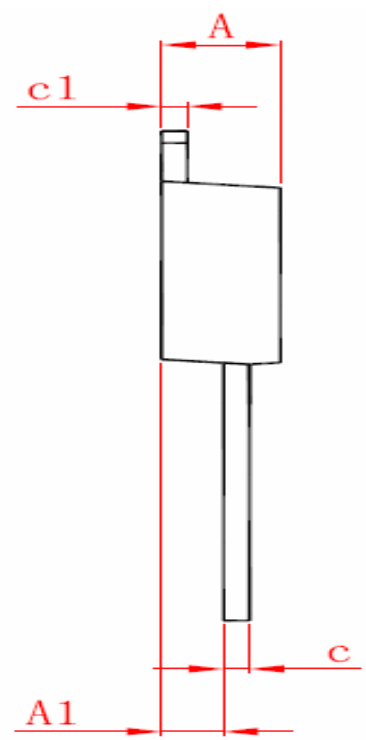
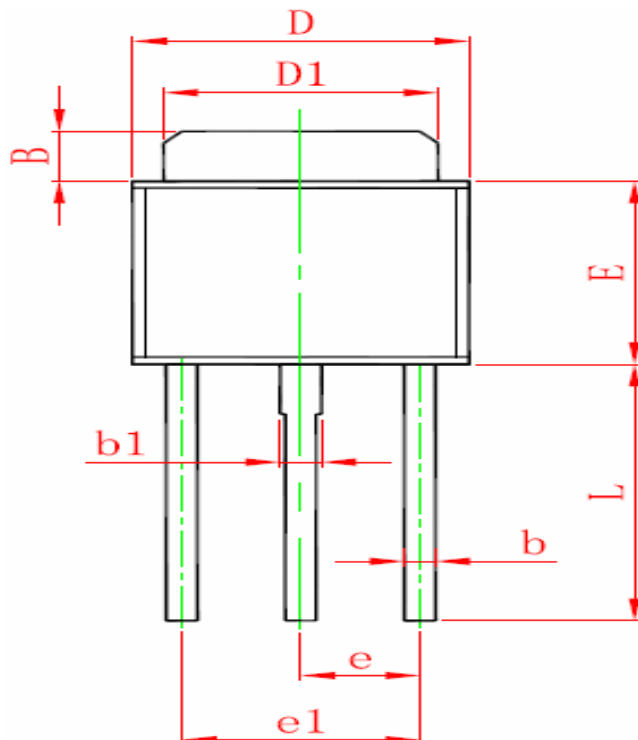


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-251 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	1.050	1.350	0.042	0.054
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP		0.091 TYP	
e1	4.500	4.700	0.177	0.185
L	7.500	7.900	0.295	0.311

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