



# SPN2054

## N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPN2054 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. These devices are particularly suited for low voltage application, such as DC/DC converter and Desktop computer power management.

The package is universally preferred for commercial industrial surface mount applications

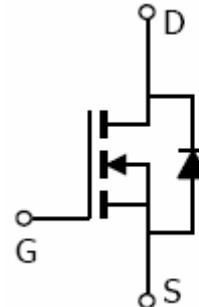
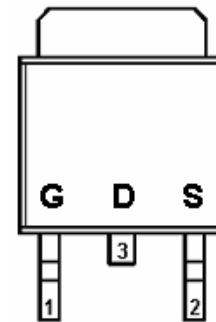
### FEATURES

- ◆ 20V/12A, $R_{DS(ON)}=40m\Omega@V_{GS}=10V$
- ◆ 20V/ 7A, $R_{DS(ON)}=45m\Omega@V_{GS}=4.5V$
- ◆ 20V/ 4A, $R_{DS(ON)}=50m\Omega@V_{GS}=2.5V$
- ◆ 20V/ 2A, $R_{DS(ON)}=60m\Omega@V_{GS}=1.8V$
- ◆ Super high density cell design for extremely low RDS (ON)
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ TO-252-2L package design

### APPLICATIONS

- Power Management in Desktop Computer
- DC/DC Converter
- LCD Display inverter

### PIN CONFIGURATION(TO-252-2L)



### PART MARKING



A : Lot Code  
B : Date Code



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### PIN DESCRIPTION

Pin	Symbol	Description
1	G	Gate
2	S	Source
3	D	Drain

### ORDERING INFORMATION

Part Number	Package	Part Marking
SPN2054T252RG	TO-252-2L	SPN2054

※ Week Code : A ~ Z ( 1 ~ 26 ) ; a ~ z ( 27 ~ 52 )

※ SPN2054T252RG : Tape Reel ; Pb – Free

### ABSOLUTE MAXIMUM RATINGS

( $T_A=25^{\circ}\text{C}$  Unless otherwise noted)

Parameter	Symbol	Typical	Unit
Drain-Source Voltage	$V_{DSS}$	20	V
Gate –Source Voltage	$V_{GSS}$	$\pm 12$	V
Continuous Drain Current( $T_J=150^{\circ}\text{C}$ )	ID	$T_A=25^{\circ}\text{C}$ 12	A
		$T_A=70^{\circ}\text{C}$ 8	
Pulsed Drain Current	$I_{DM}$	20	A
Continuous Source Current(Diode Conduction)	$I_S$	12	A
Power Dissipation	PD	$T_A=25^{\circ}\text{C}$ 40	W
		$T_A=70^{\circ}\text{C}$ 20	
Operating Junction Temperature	$T_J$	-55/150	$^{\circ}\text{C}$
Storage Temperature Range	$T_{STG}$	-55/150	$^{\circ}\text{C}$
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	105	$^{\circ}\text{C}/\text{W}$



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### ELECTRICAL CHARACTERISTICS

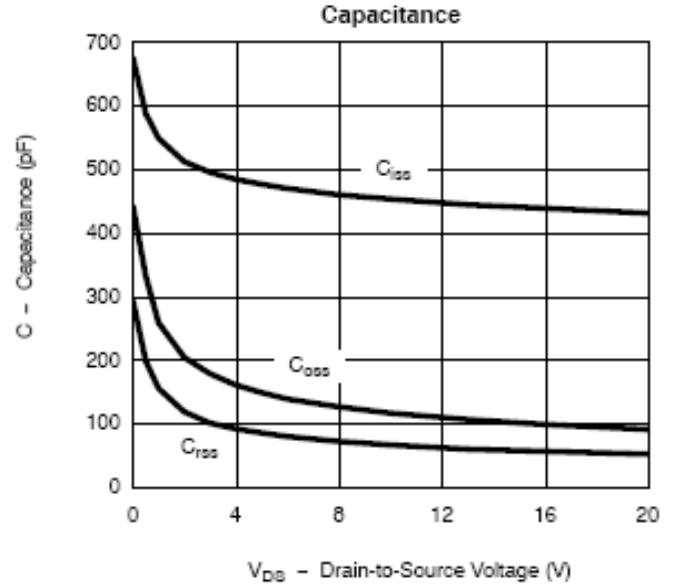
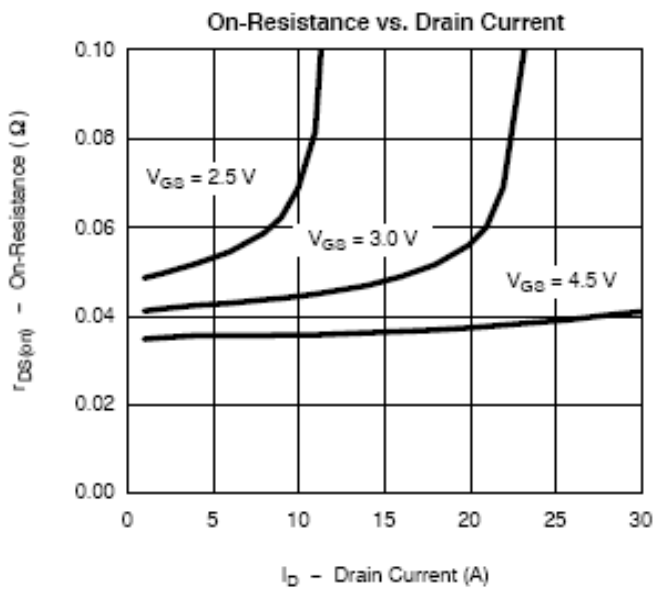
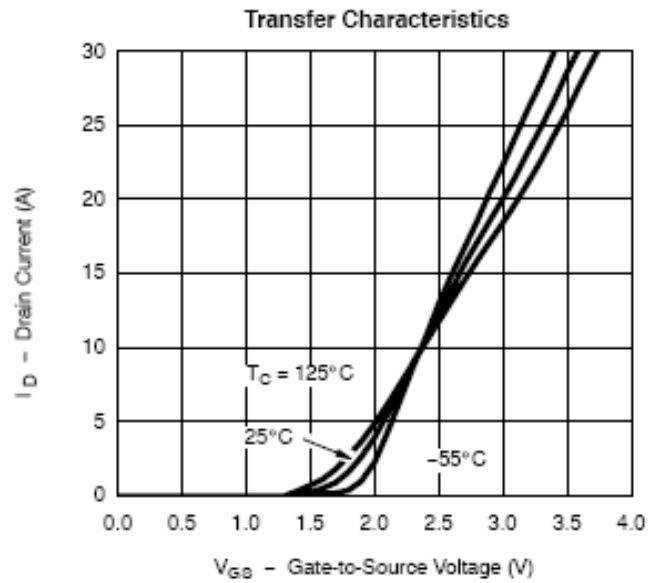
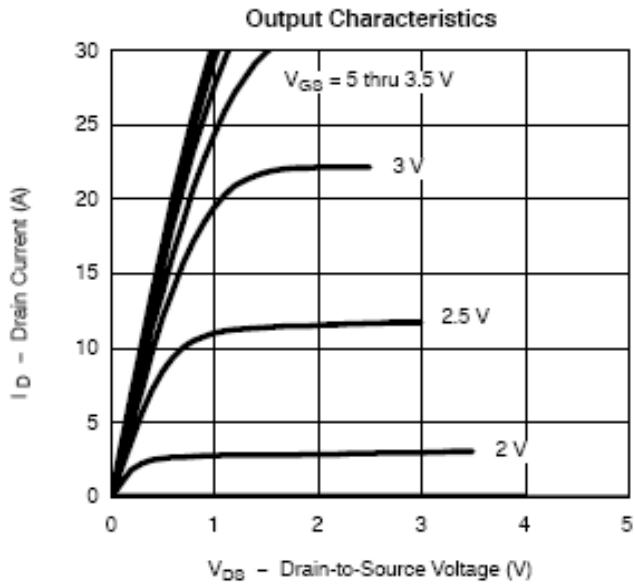
(T<sub>A</sub>=25°C Unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	20			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.36		1.0	
Gate Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V			1	μA
		V <sub>DS</sub> =20V, V <sub>GS</sub> =0V T <sub>J</sub> =55°C			5	
Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =12A		0.031	0.040	Ω
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =7A		0.035	0.045	
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =4A		0.040	0.050	
		V <sub>GS</sub> =1.8V, I <sub>D</sub> =2A		0.048	0.060	
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =-3.6A		10		S
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =7A, V <sub>GS</sub> =0V		0.95	1.2	V
<b>Dynamic</b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V I <sub>D</sub> =12A		4.8	8	nC
Gate-Source Charge	Q <sub>gs</sub>			1.0		
Gate-Drain Charge	Q <sub>gd</sub>			1.0		
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V f=1MHz		485		pF
Output Capacitance	C <sub>oss</sub>			85		
Reverse Transfer Capacitance	C <sub>rss</sub>			40		
Turn-On Time	t <sub>d(on)</sub>	V <sub>DD</sub> =10V, R <sub>L</sub> =6Ω I <sub>D</sub> =1.0A, V <sub>GEN</sub> =4.5V R <sub>G</sub> =6Ω		8	14	ns
	t <sub>r</sub>			12	18	
Turn-Off Time	t <sub>d(off)</sub>			30	35	
	t <sub>f</sub>			12	16	



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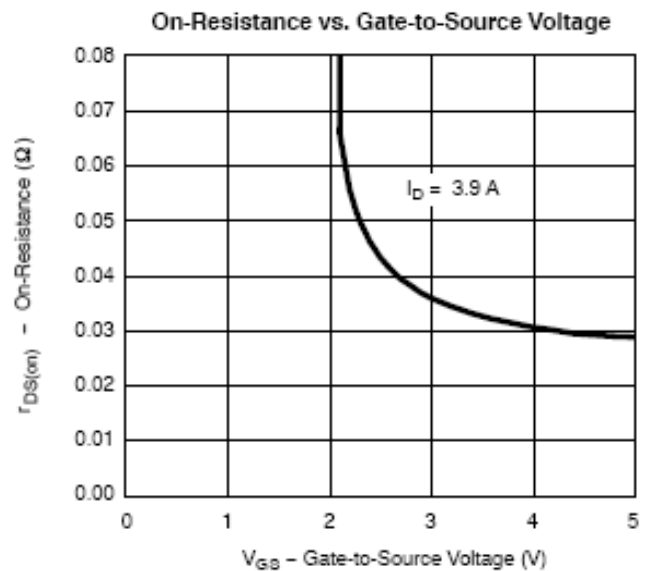
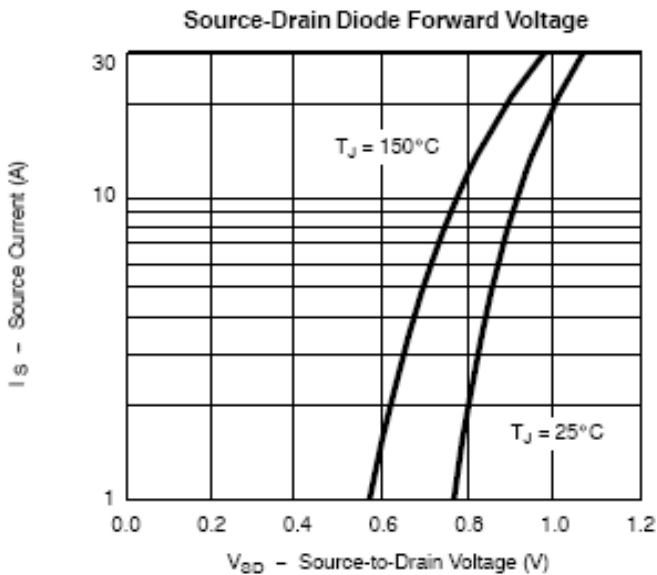
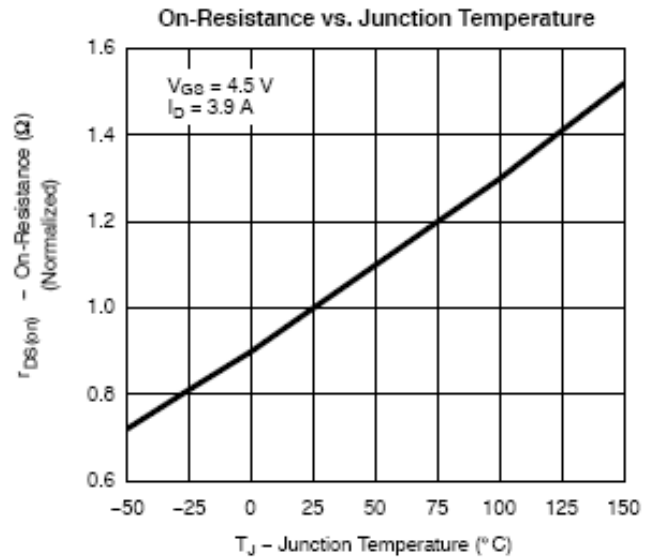
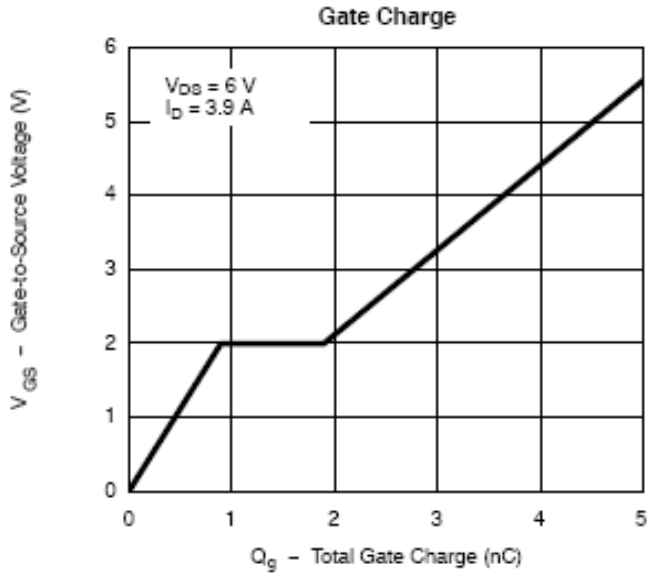
## TYPICAL CHARACTERISTICS





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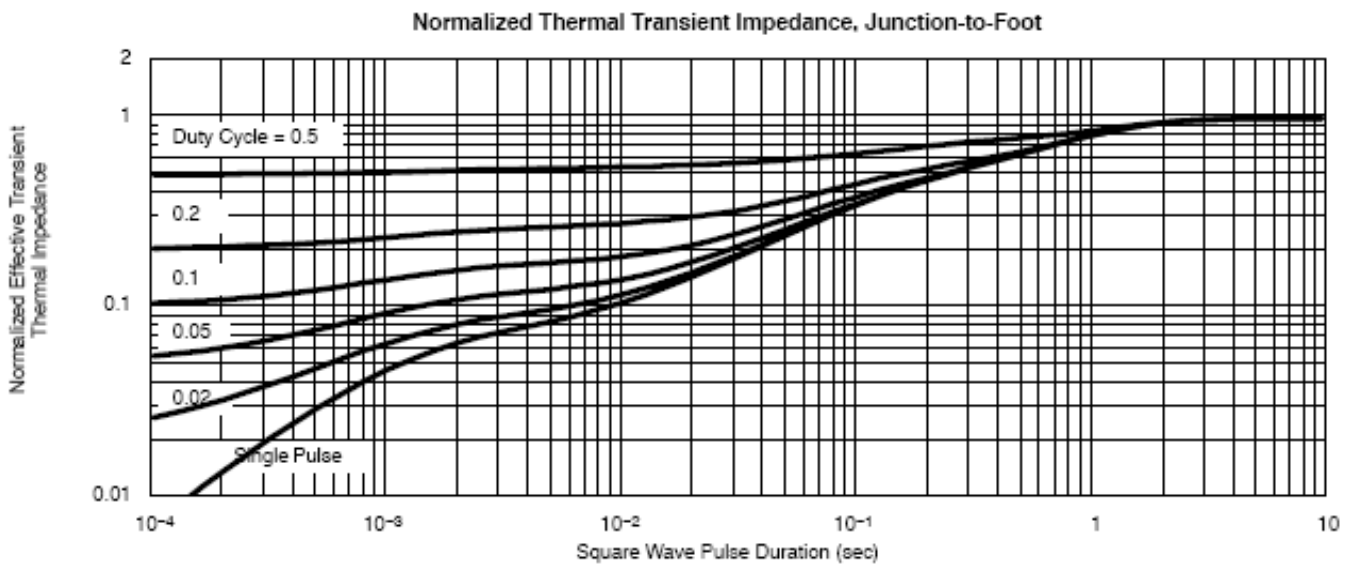
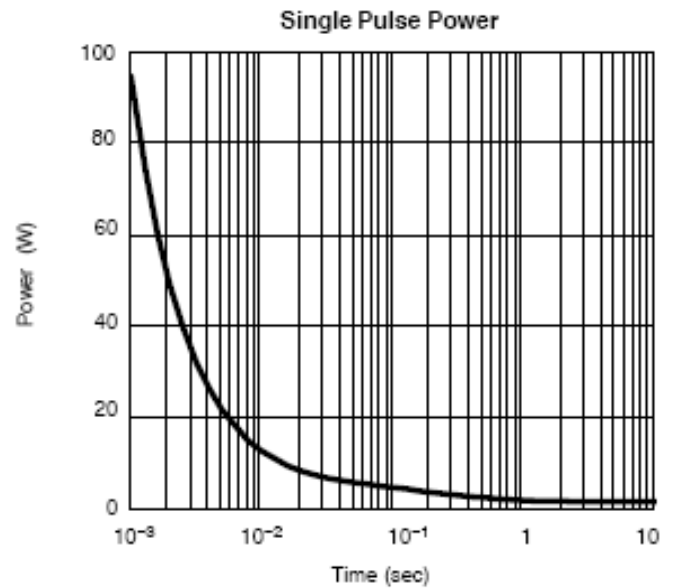
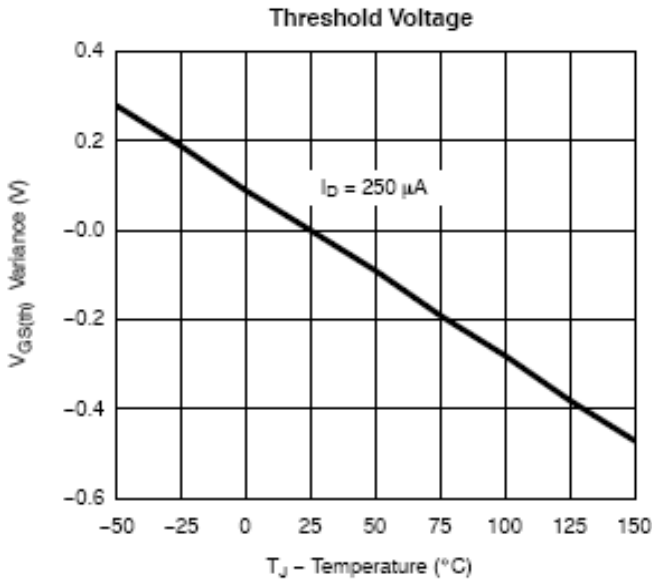
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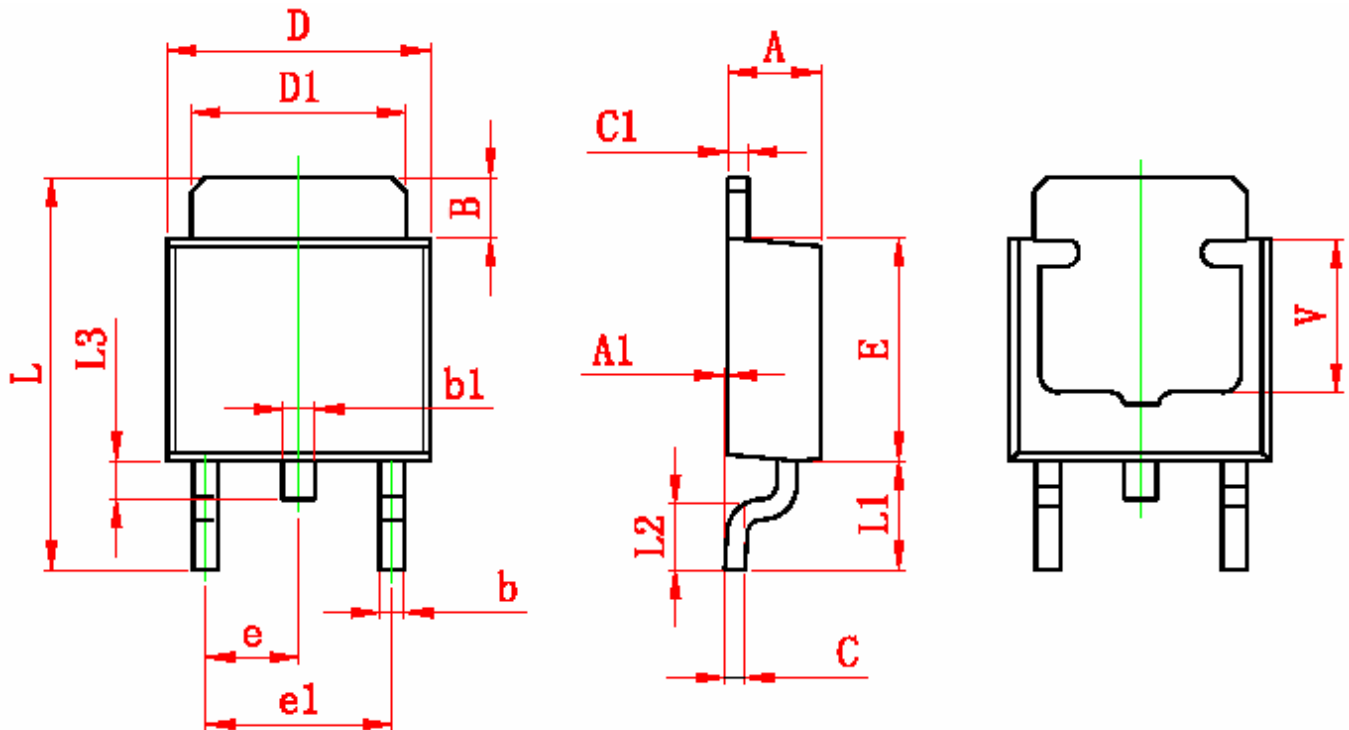




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### TO-252-2L PACKAGE OUTLINE



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
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	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.800 REF.		0.150 REF.	



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