N-Channel Super Trench Power MOSFET

Description

The HMS4264 uses **Super Trench** technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$ and Q_g. This device is ideal for high-frequency switching and synchronous rectification.

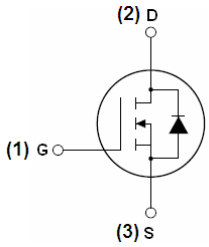
General Features

- V_{DS} =60V,I_D =14A
  $R_{DS(ON)}$=8.5mΩ (typical) @ V_{GS}=10V
  $R_{DS(ON)}$=11mΩ (typical) @ V_{GS}=4.5V
- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- 150℃ operating temperature
- Pb-free lead plating
- 100% UIS tested

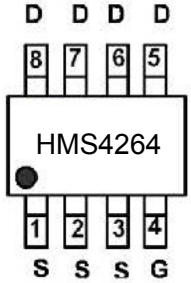
Application

- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

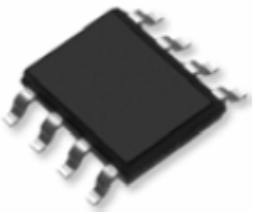
100% UIS TESTED!



Schematic diagram



Marking and pin assignment



SOP-8 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
HMS4264	HMS4264	SOP-8	Ø330mm	12mm	2500 units

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	14	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	10	A
Pulsed Drain Current	I_{DM}	42	A
Maximum Power Dissipation	P_D	3.5	W
Single pulse avalanche energy (Note 5)	E_{AS}	320	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient(Note 2)	$R_{\theta JA}$	36	℃/W

Electrical Characteristics (T_A=25℃unless otherwise noted)

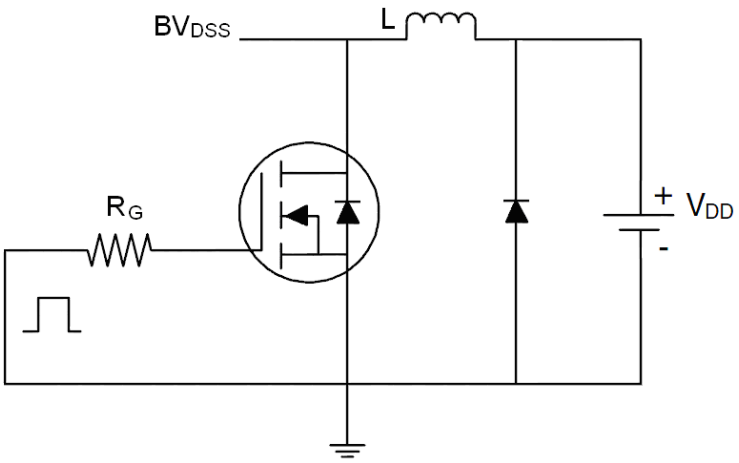
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.0	1.75	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=14A	-	8.5	9.8	mΩ
		V_{GS}=4.5V, I_D=18A	-	11	13.5	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=14A	35	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=30V,V_{GS}=0V, F=1.0MHz	-	4000	-	PF
Output Capacitance	C_{oss}		-	680	-	PF
Reverse Transfer Capacitance	C_{rss}		-	23	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=30V, R_L=1.7Ω V_{GS}=10V,R_G=3Ω	-	11	-	nS
Turn-on Rise Time	t_r		-	5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	56	-	nS
Turn-Off Fall Time	t_f		-	12	-	nS
Total Gate Charge	Q_g	V_{DS}=30V,I_D=14A, V_{GS}=10V	-	67	-	nC
Gate-Source Charge	Q_{gs}		-	12	-	nC
Gate-Drain Charge	Q_{gd}		-	8.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=14A	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	14	A
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F = I_S di/dt = 100A/μs (Note3)	-	48	-	nS
Reverse Recovery Charge	Qrr		-	60	-	nC

Notes:

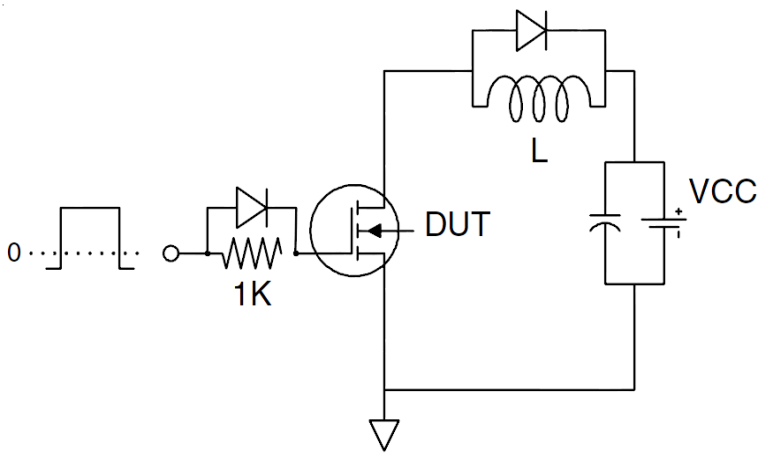
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition : Tj=25℃,V_{DD}=50V,V_G=10V,L=0.5mH,Rg=25Ω

Test Circuit

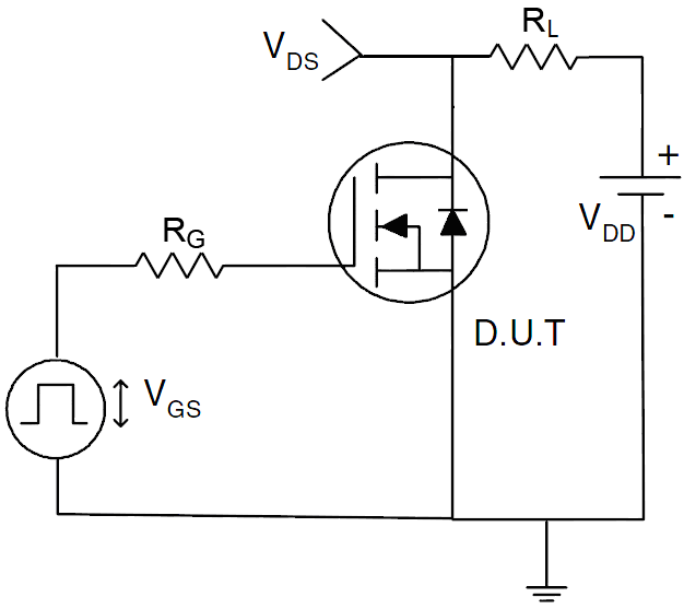
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



Typical Electrical and Thermal Characteristics

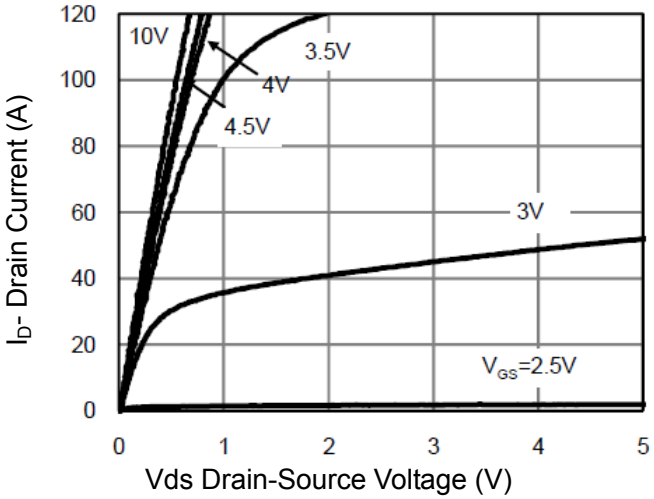


Figure 1 Output Characteristics

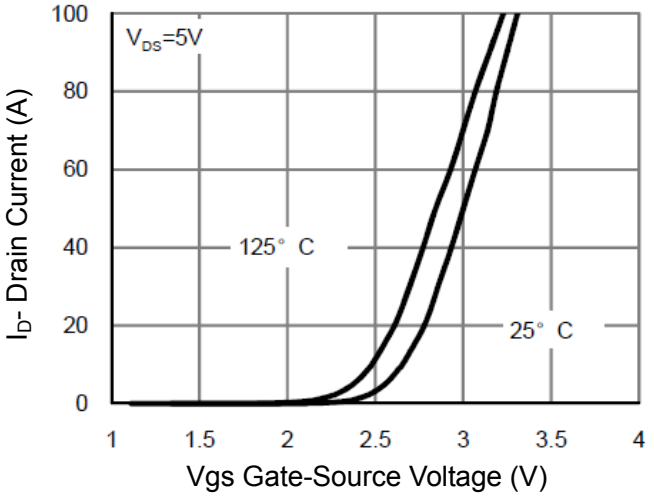


Figure 2 Transfer Characteristics

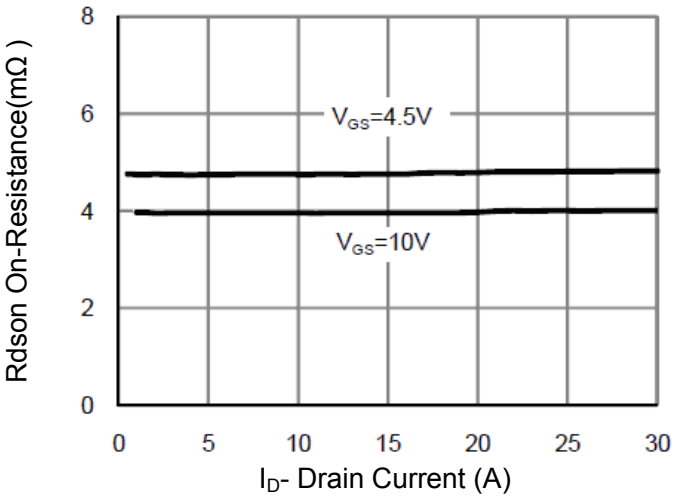


Figure 3 Rdson- Drain Current

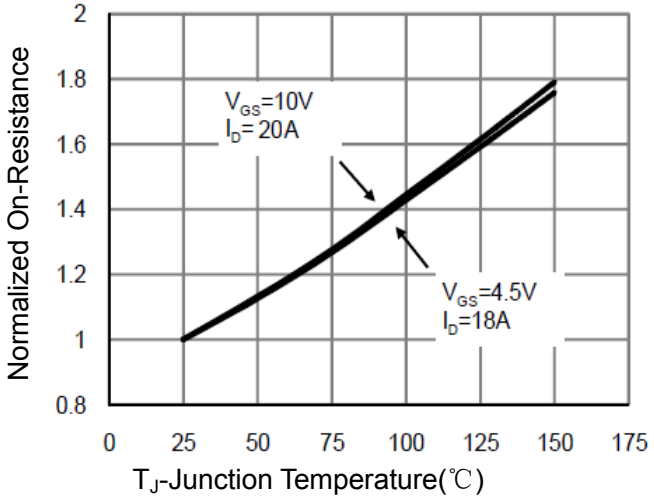


Figure 4 Rdson-Junction Temperature

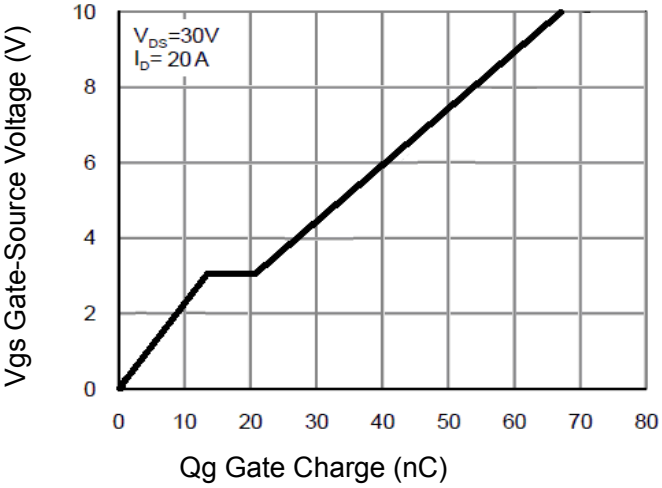


Figure 5 Gate Charge

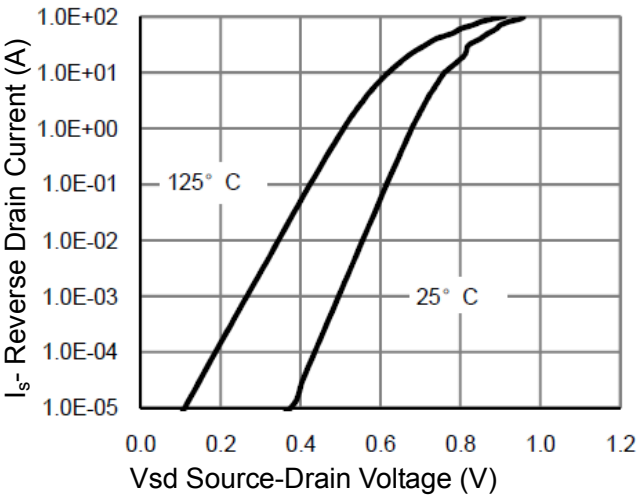


Figure 6 Source- Drain Diode Forward

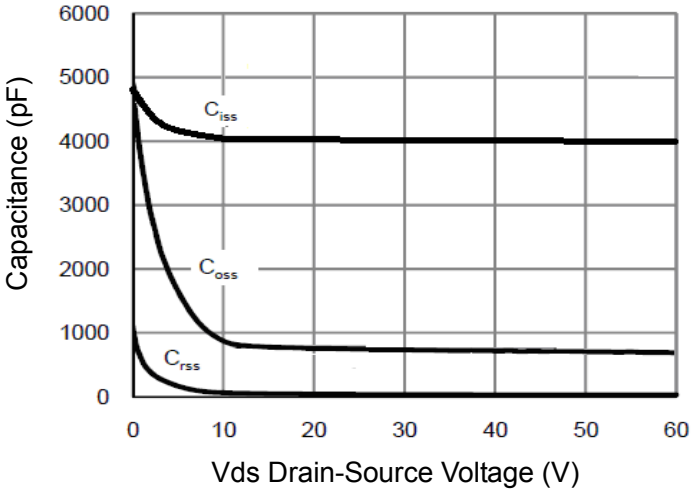


Figure 7 Capacitance vs Vds

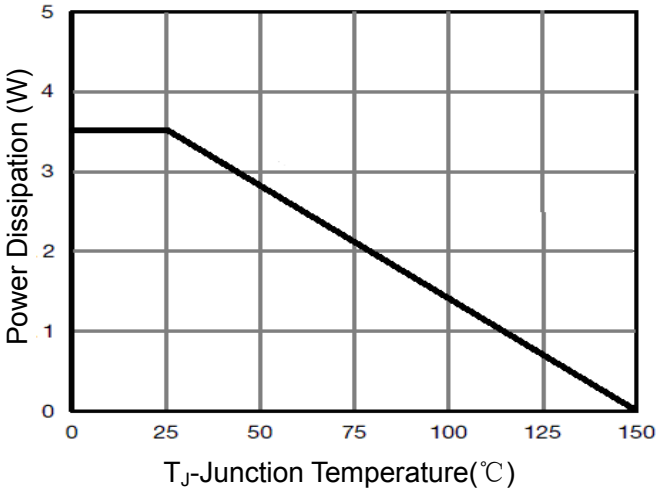


Figure 9 Power De-rating

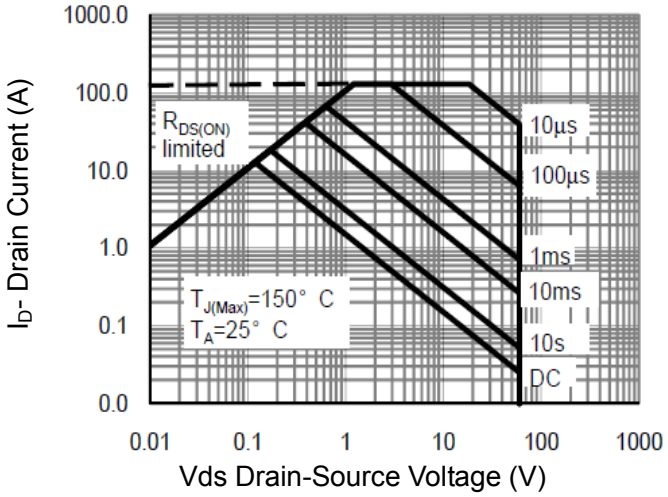


Figure 8 Safe Operation Area

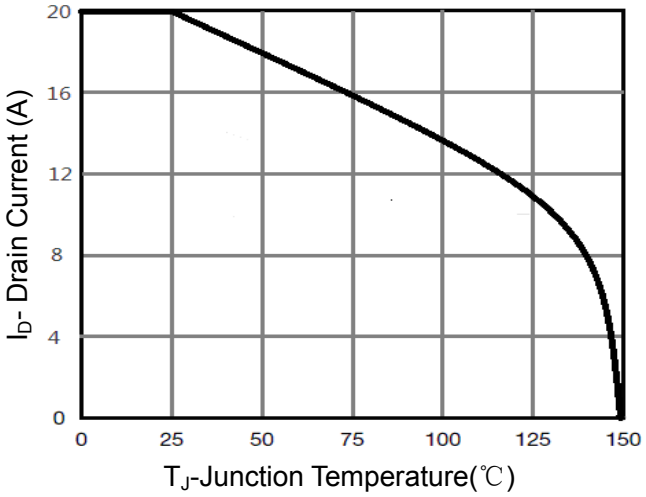


Figure 10 Current De-rating

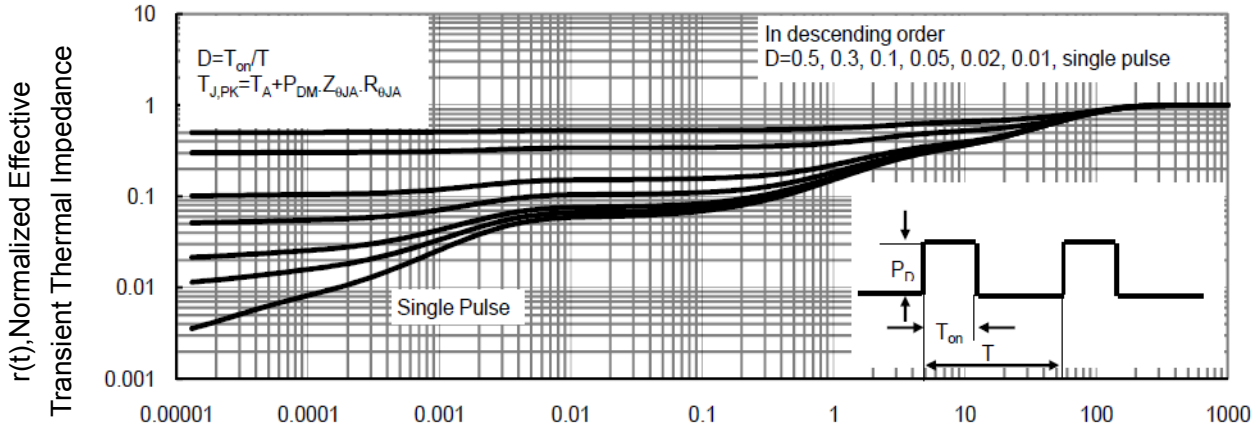
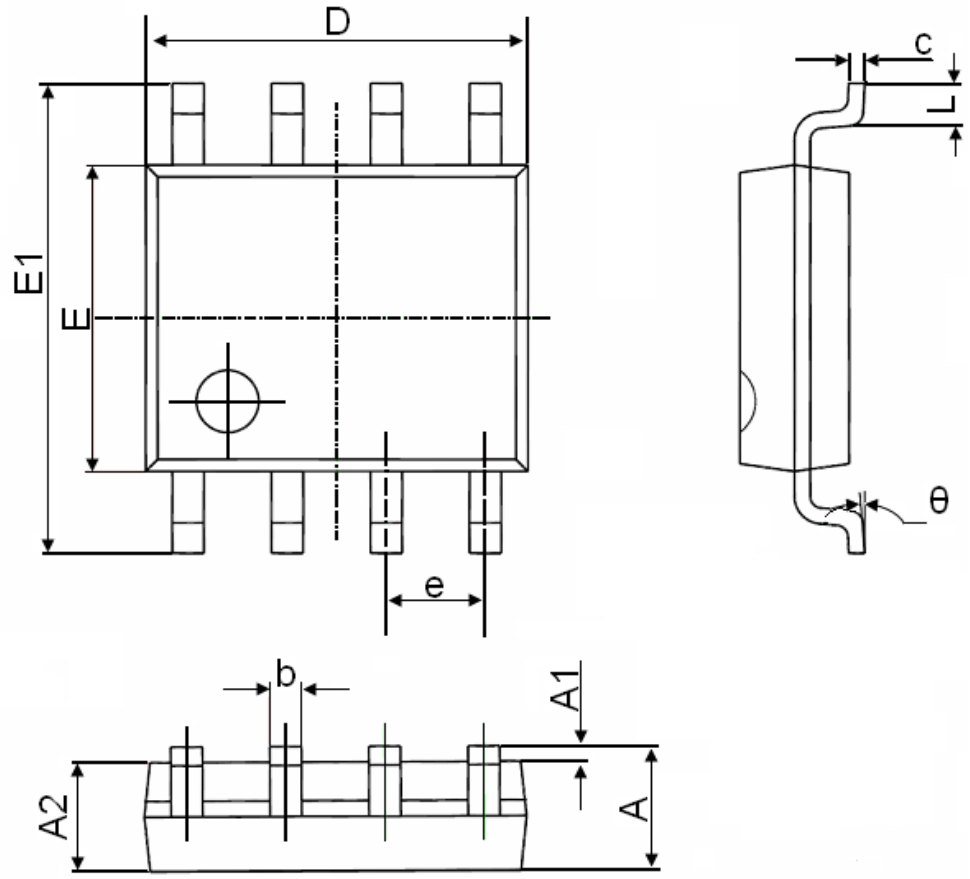


Figure 11 Normalized Maximum Transient Thermal Impedance

SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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