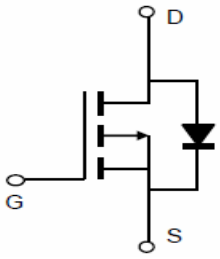
EFM20P7A

P-Channel Advanced Power MOSFET

• Product Summary

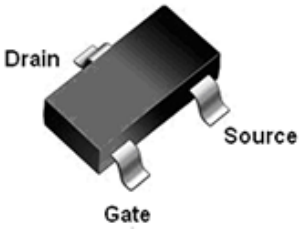
Part #	V_{DS}	$R_{DS(on).typ}$ ($@V_{GS}$=4.5V)	$R_{DS(on).typ}$ ($@V_{GS}$=2.5V)	I_D
EFM20P7A	-20V	13mΩ	18mΩ	-7A



P-Channel MOSFET

• Description

■ The EFM20P7A uses advanced trench technology to provide
■ excellent $R_{DS(ON)}$, low gate charge and operation with gate
■ voltages as low as 2.5V. This device is suitable for use as a
■ load switch or in PWM applications.



SOT23-3L

•Application

■ PWM applications
■ Load switch
■ Power management
■ Halogen-free

•Ordering Information:

Part NO.	EFM20P7A
Marking	20P7A
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

•Absolute Maximum Ratings (T_C=25℃)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	-7	A
Drain Current-Pulsed (Note 1)	I_{DM}	-24	A
Maximum Power Dissipation	P_D	1.8	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

•Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	69	℃/W

● Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250uA	-20	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V V_{GS}=0V	--	--	-1	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V V_{DS}=0V	--	--	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} I_D=250uA	-0.4	-0.8	-1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V I_D=-7A	--	13	16	mΩ
		V_{GS}=-2.5V I_D=-6A	--	18	24	mΩ
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-6V V_{GS}=0V F=1.0MHz	--	1730	--	PF
Output Capacitance	C_{oss}		--	320	--	PF
Reverse Transfer Capacitance	C_{rss}		--	210	--	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-6V I_D=-6A V_{GS}=-4.5V R_G=6Ω,	--	20	--	nS
Turn-on Rise Time	t_r		--	35	--	nS
Turn-Off Delay Time	$t_{d(off)}$		--	90	--	nS
Turn-Off Fall Time	t_f		--	70	--	nS
Total Gate Charge	Q_g	V_{DS}=-6V I_D=-6A V_{GS}=-4.5V	--	19.5	--	nC
Gate-Source Charge	Q_{gs}		--	4.1	--	nC
Gate-Drain Charge	Q_{gd}		--	5.2	--	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V I_S=-1.2A	--	-0.84	-1.2	V
Diode Forward Current (Note 2)	I_S		--	--	-6	A

Notes:

① Pulse width limited by maximum allowable junction temperature

②Pulse test ; Pulse width≤300μs, duty cycle≤2%.

• Typical Characteristics

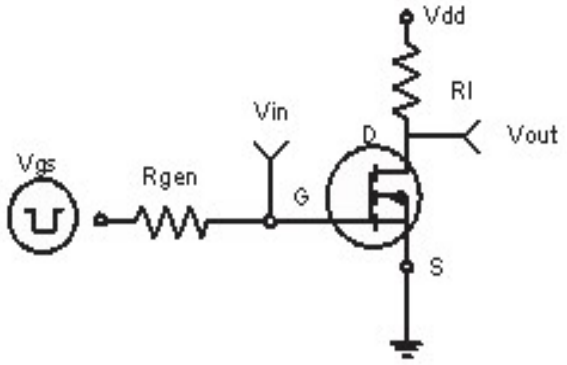


Figure 1:Switching Test Circuit

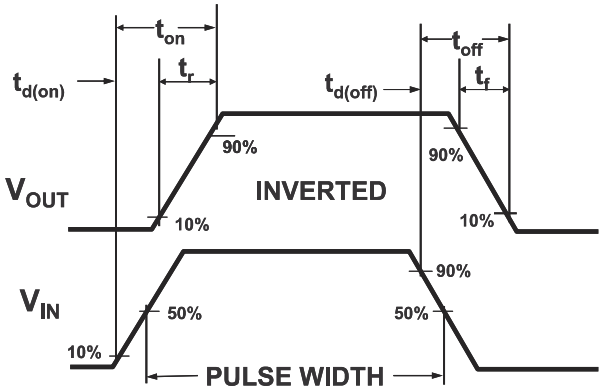


Figure 2:Switching Waveforms

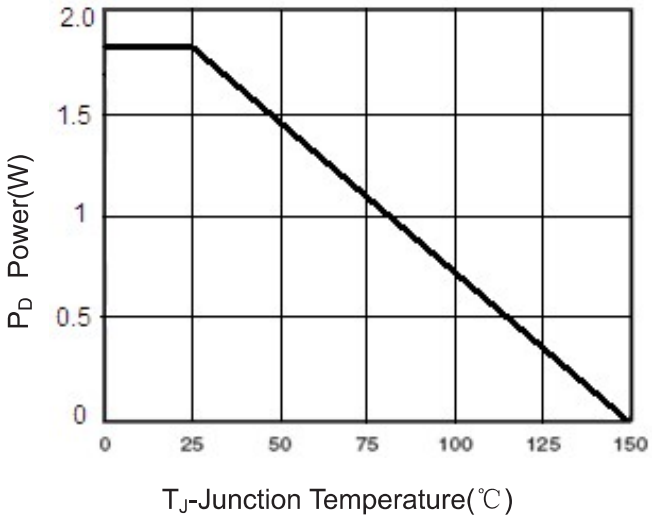


Figure 3 Power Dissipation

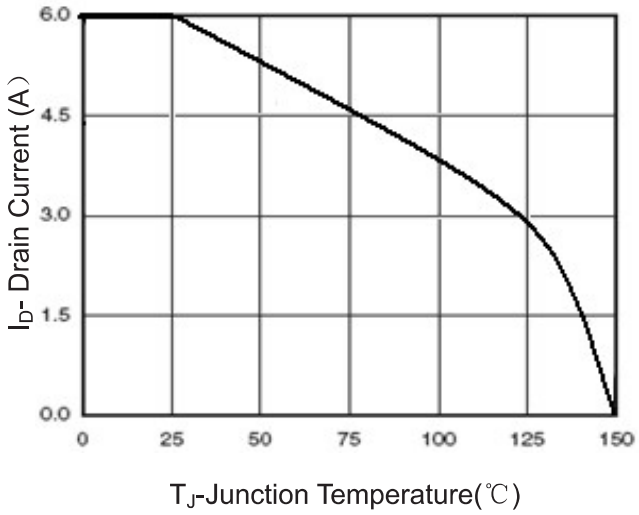


Figure 4 Drain Current

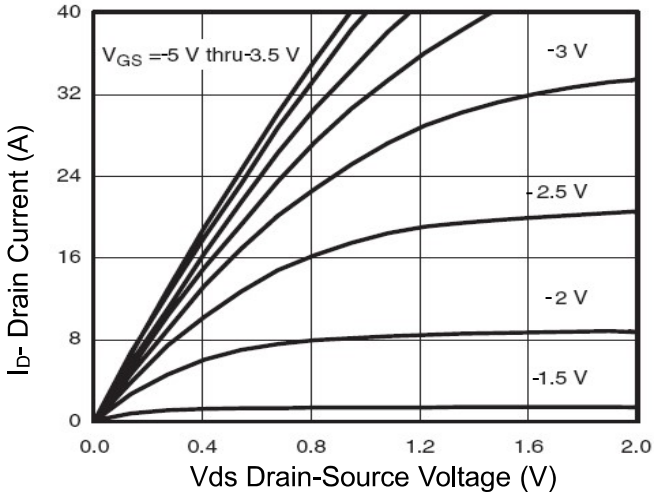


Figure 5 Output Characteristics

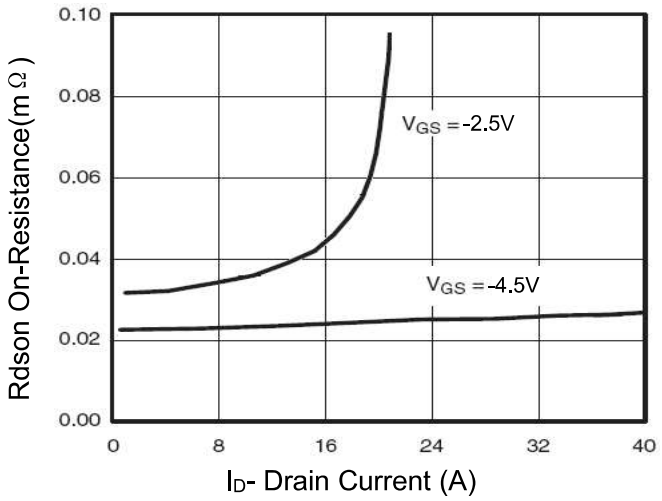


Figure 6 Drain-Source On-Resistance

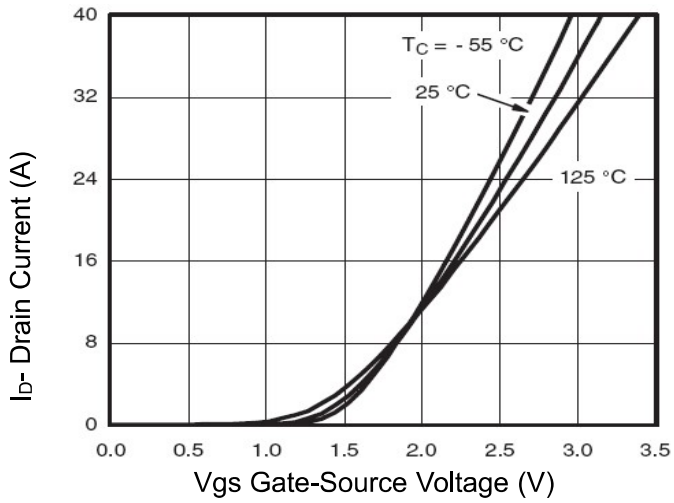


Figure 7 Transfer Characteristics

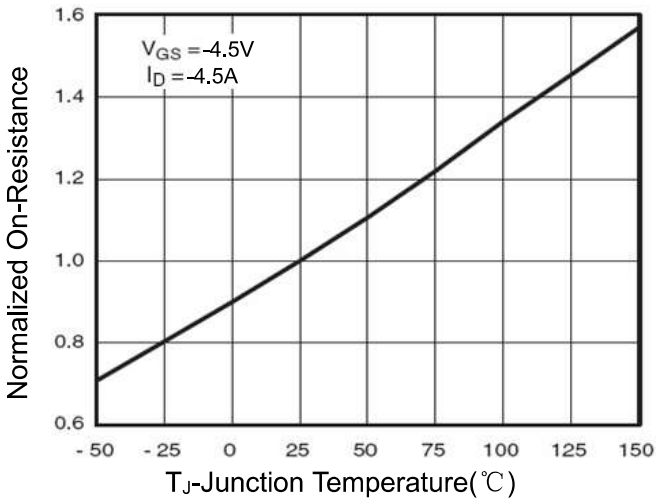


Figure 8 Drain-Source On-Resistance

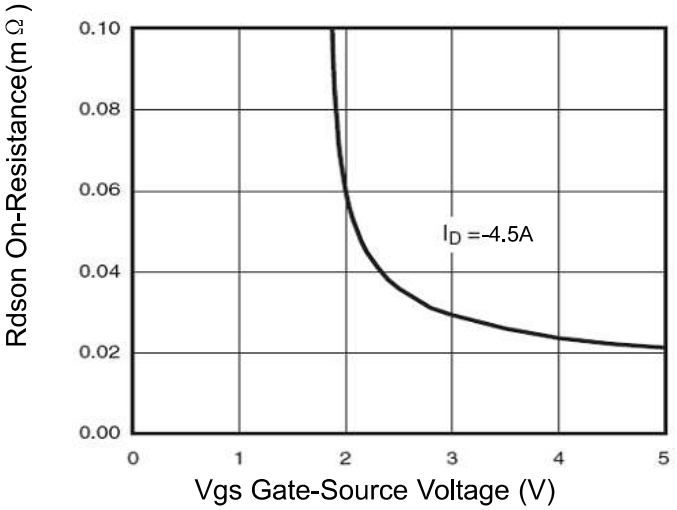


Figure 9 Rdson vs Vgs

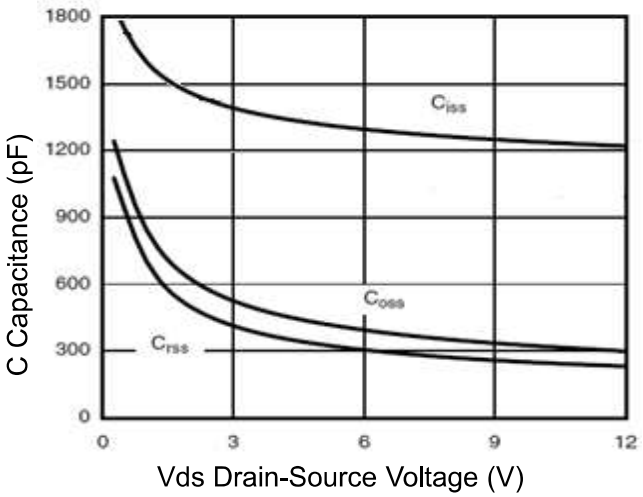


Figure 10 Capacitance vs Vds

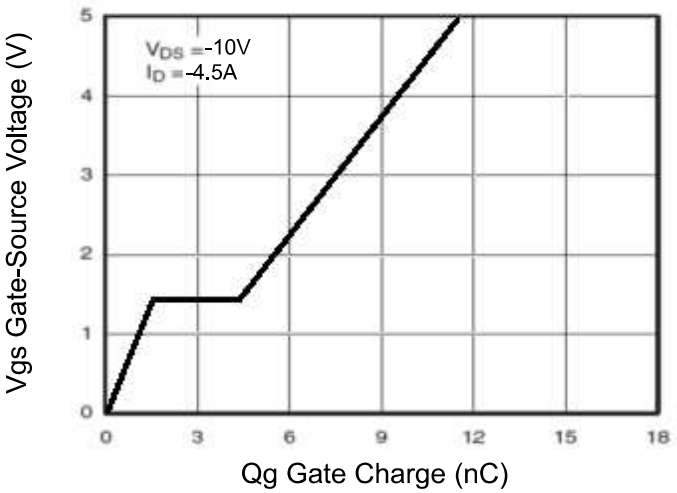


Figure 11 Gate Charge

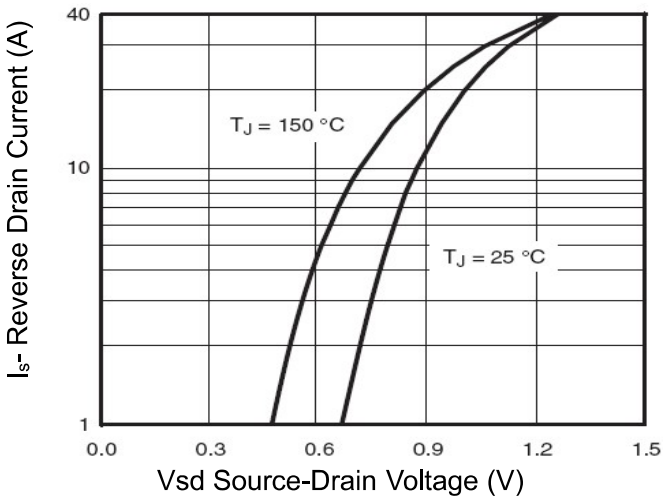


Figure 12 Source- Drain Diode Forward

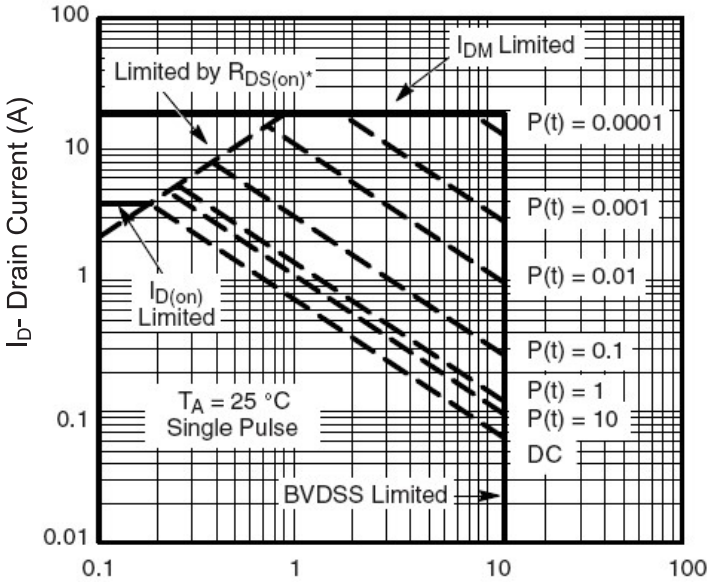


Figure 13 Safe Operation Area

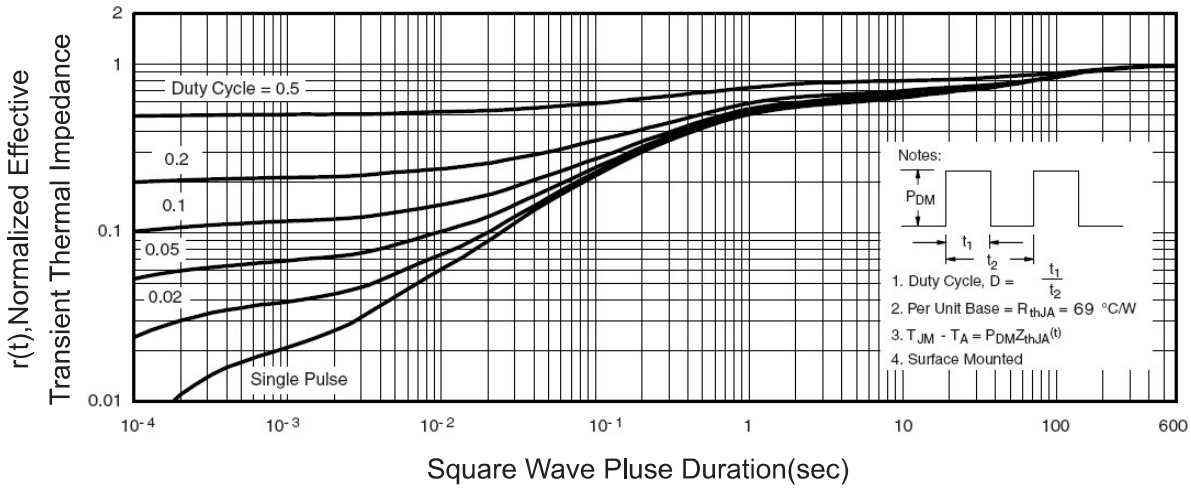
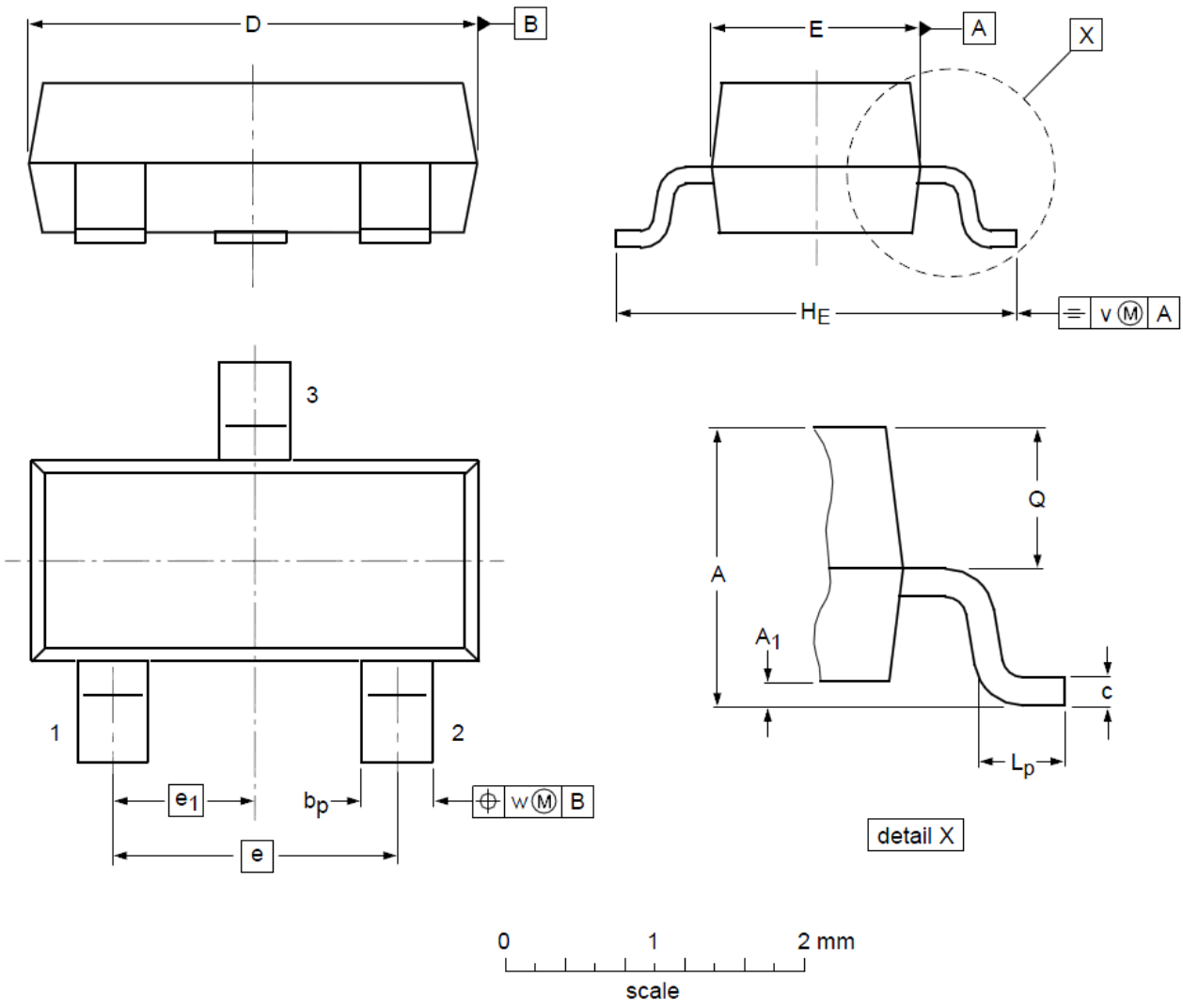


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT23-3L Package Outline Dimensions



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	1.00	1.17	1.30	**A_1**	0.01	0.05	0.10
b_p	0.35	0.39	0.50	**c**	0.10	0.20	0.26
D	2.70	2.90	3.10	**E**	1.30	1.58	1.70
e	--	1.90	--	**e_1**	--	0.95	--
H_E	2.50	2.78	3.00	**L_p**	0.20	0.32	0.60
Q	0.23	0.27	0.33	**v**	--	0.20	--
w	--	0.20	--				