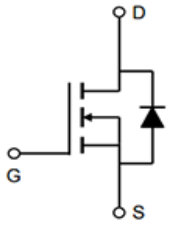
EFM5N10L

N-Channel Advanced Power MOSFET

• Product Summary

Part #	V_{DS}	$R_{DS(on).typ}$ ($@V_{GS}$=10V)	$R_{DS(on).typ}$ ($@V_{GS}$=4.5V)	I_D
EFM5N10L	100V	115mΩ	130mΩ	5A



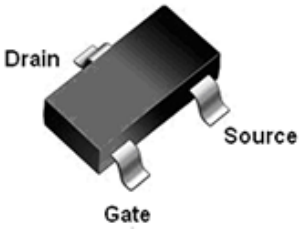
N- Channel MOSFET

• Features

- *Low $R_{DS(on)}$ @V_{GS}=10V*
- *4.5V Logic Level Control*
- *N Channel SOT23-3L Package*
- *Pb−Free, RoHS Compliant*

•Application

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



SOT23-3L

RoHS

HF

•Ordering Information:

Part NO.	EFM5N10L
Marking	5N10
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

•Absolute Maximum Ratings (T_C=25℃)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	5	A
Drain Current-Pulsed (Note 1)	I_{DM}	21	A
Maximum Power Dissipation	P_D	5	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

•Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	41.7	℃/W

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

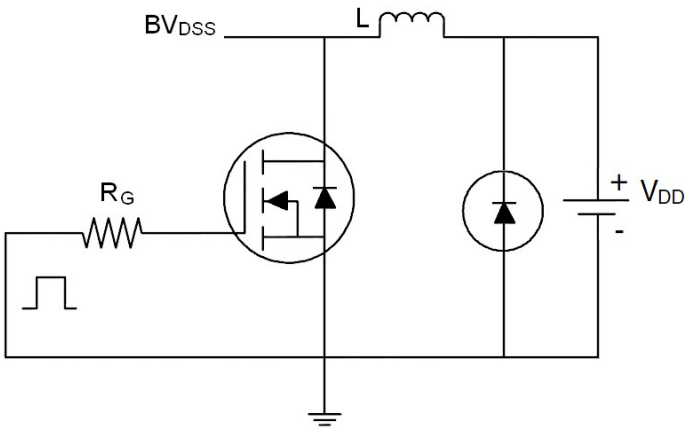
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250uA	100	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=100VV_{GS}=0V	--	--	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V V_{DS}=0V	--	--	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} I_D=250uA	1.0	1.8	3.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V I_D=5A	--	115	125	mΩ
		V_{GS}=4.5V I_D=4A	--	130	145	mΩ
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=50V V_{GS}=0V F=1.0MHz	--	210	--	PF
Output Capacitance	C_{oss}		--	30	--	PF
Reverse Transfer Capacitance	C_{rss}		--	14	--	PF
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=2.9A	--	8	--	S
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=50V I_D=5A V_{GS}=10V R_G=2.5Ω,	--	15	--	nS
Turn-on Rise Time	t_r		--	3.4	--	nS
Turn-Off Delay Time	$t_{d(off)}$		--	21	--	nS
Turn-Off Fall Time	t_f		--	3.1	--	nS
Total Gate Charge	Q_g	V_{DS}=50V I_D=5A V_{GS}=10V	--	4.5	--	nC
Gate-Source Charge	Q_{gs}		--	1.5	--	nC
Gate-Drain Charge	Q_{gd}		--	1.2	--	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V I_S=5A	--	0.79	1.2	V
Diode Forward Current (Note 2)	I_S		--	--	5	A

Notes:

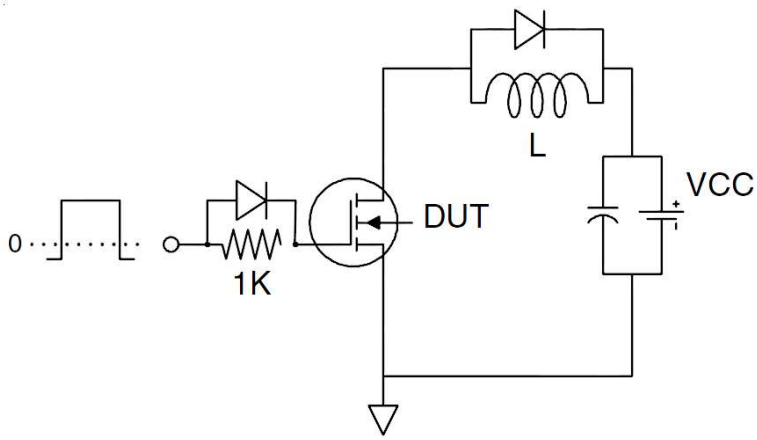
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

• Test Circuit

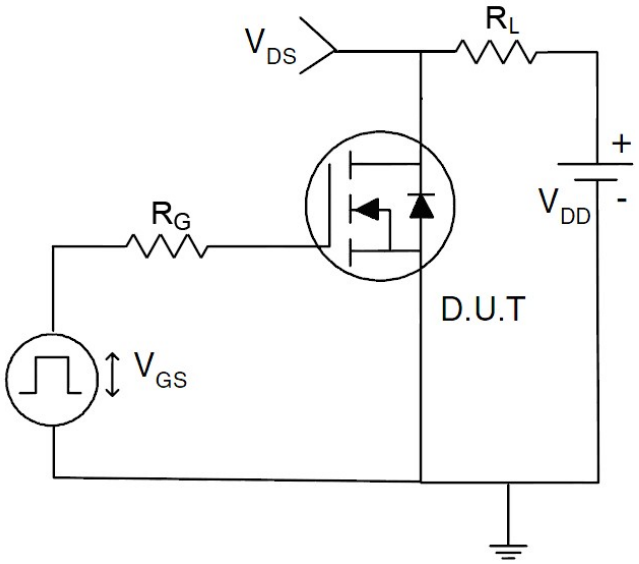
1）E_{AS} test circuit



2）Gate charge test circuit



3）Switch Time Test Circuit



• Typical Characteristics

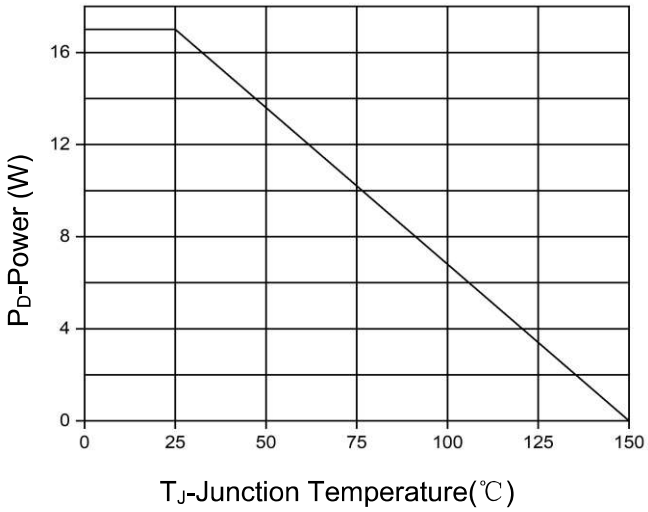


Figure 1. Power Dissipation

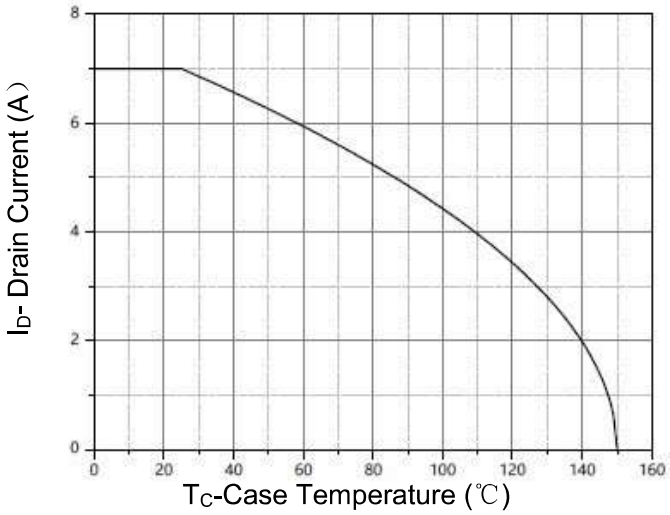


Figure 2. Drain Current

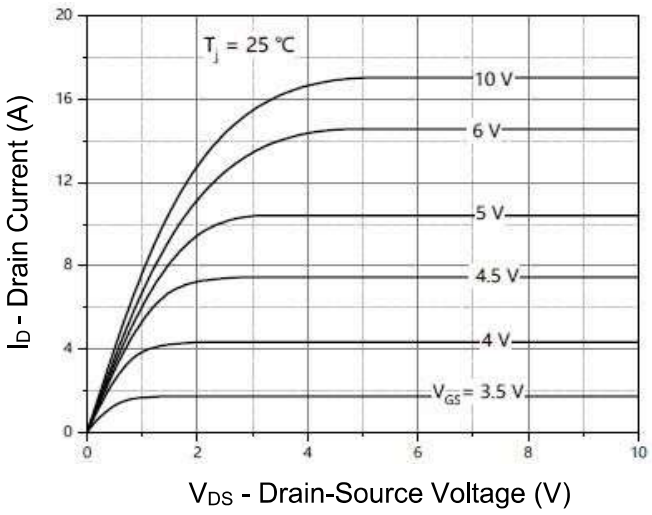


Figure 3. Output characteristics

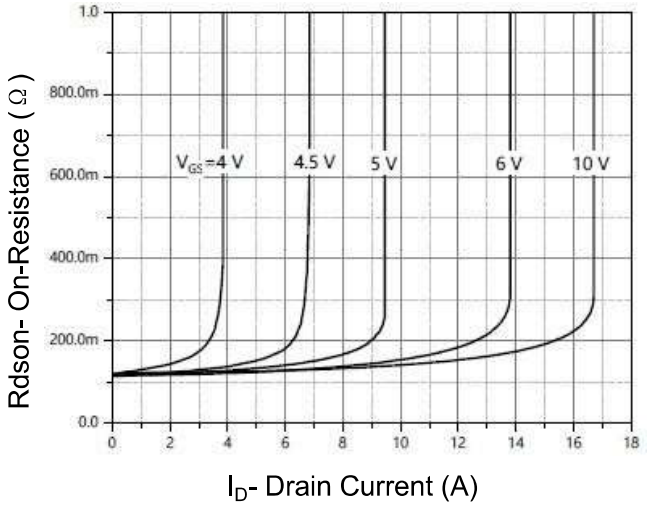


Figure 4. Drain-Source On-state resistance

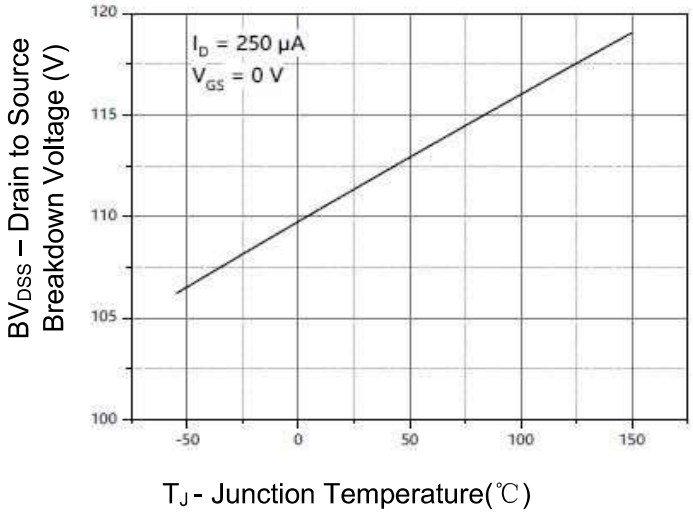


Figure 5. Drain-source breakdown voltage

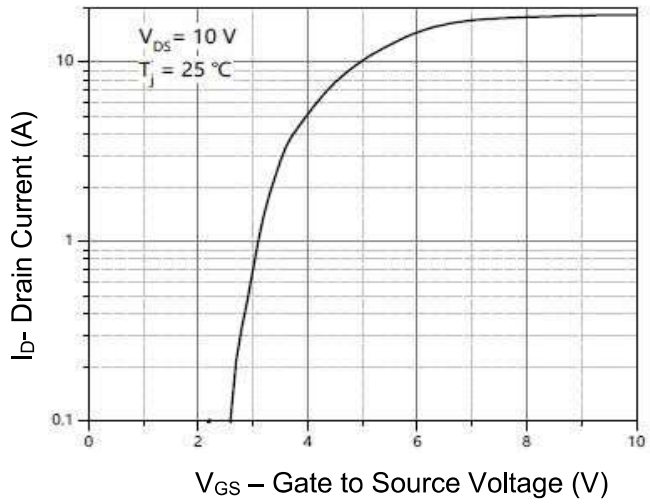


Figure 6. Transfer Characteristics

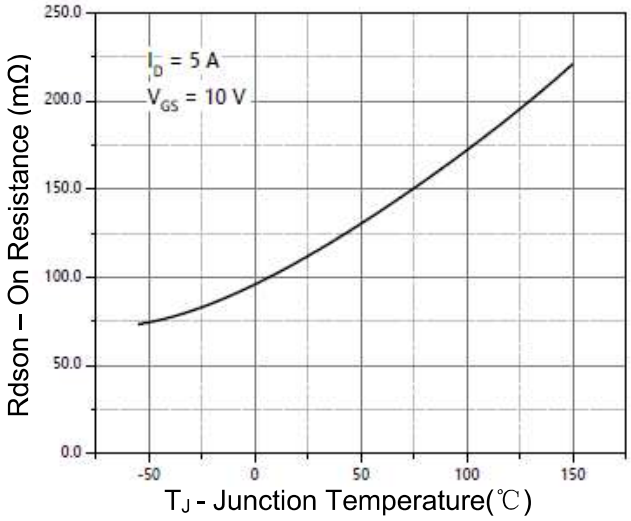


Figure 7. Drain-Source On-State Resistance

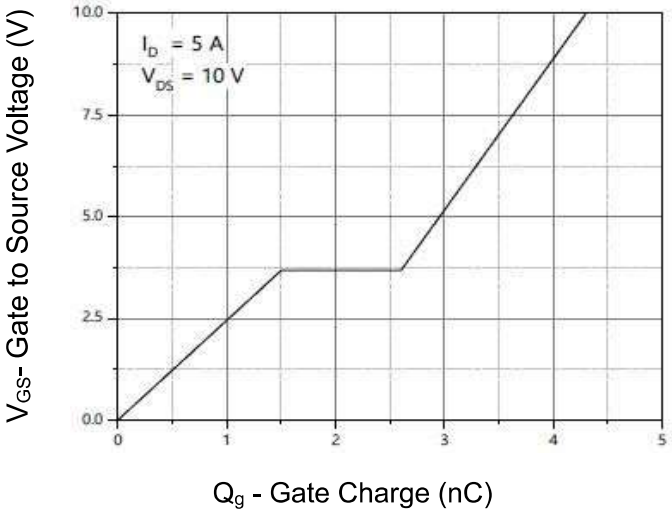


Figure 8. Gate Charge

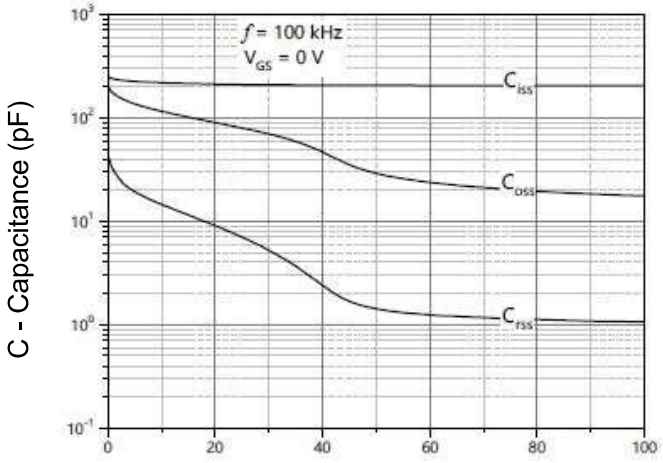


Figure 9 . Capacitance vs Vds

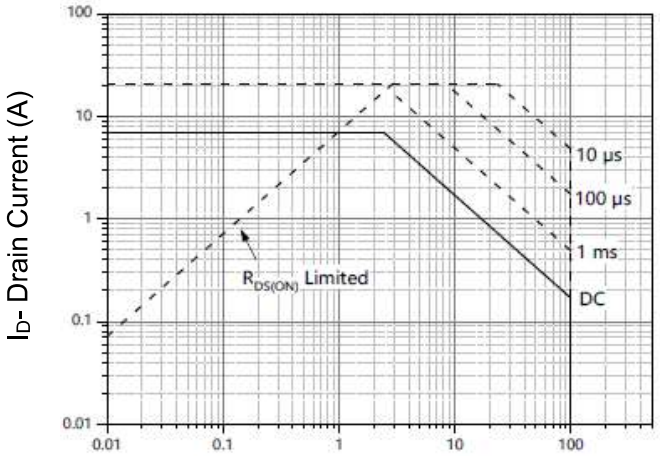


Figure 10. Safe Operation Area

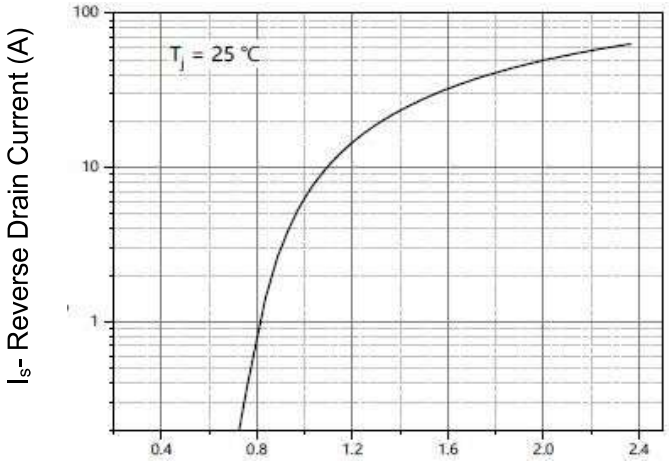
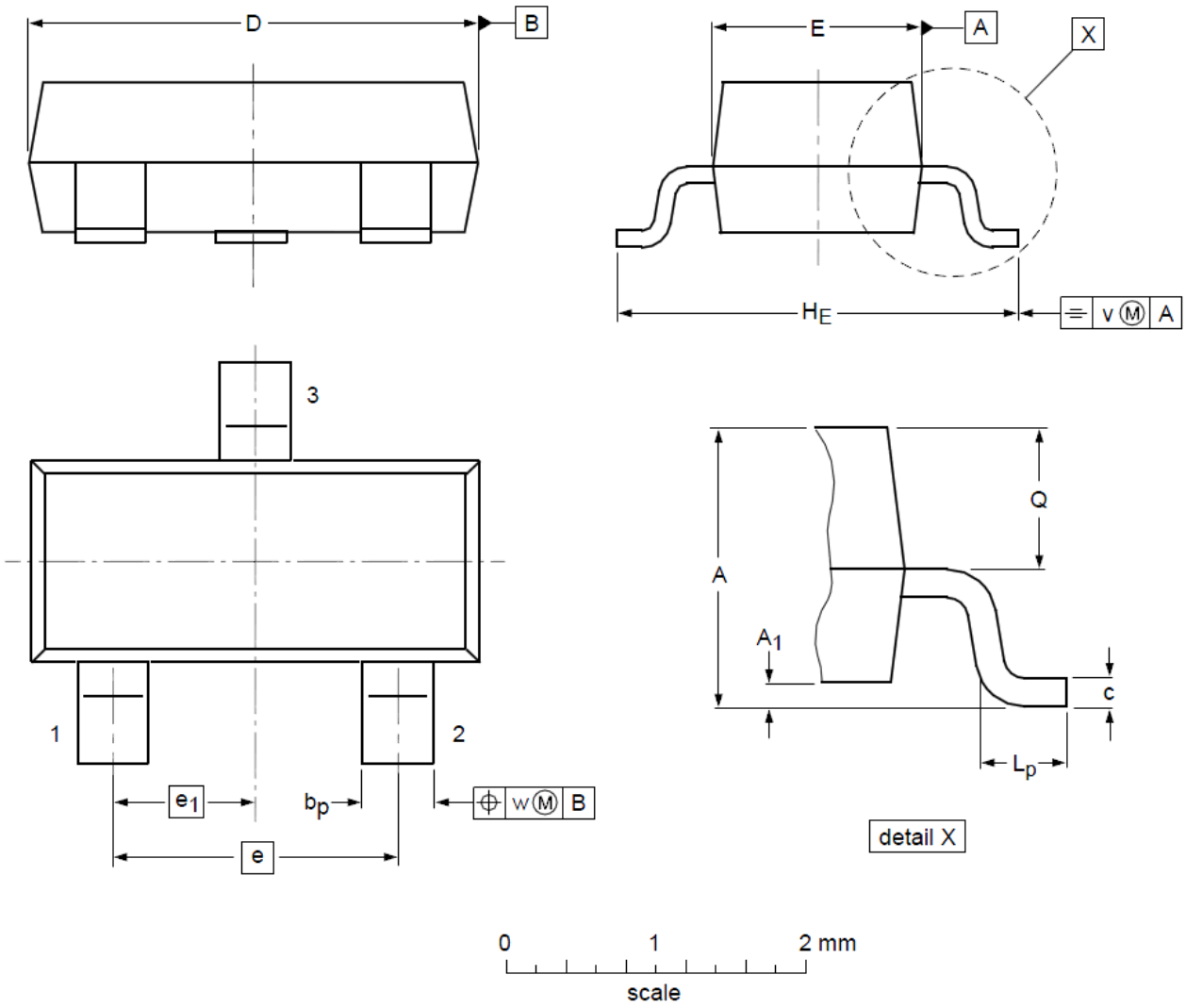


Figure 11. Source- Drain Diode Forward

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	--				