



## 60V/50A N-Channel Advanced Power MOSFET

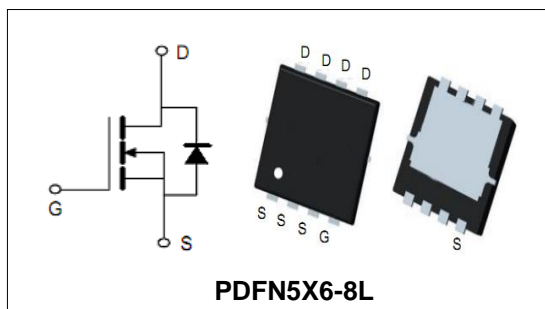
### Features

- Excellent package for heat dissipation
- High density cell design for low RDS(ON)

### Applications

- Load Switch
- Power management functions
- PWM Application

BVDSS	60	V
ID	50	A
RDSON@VGS=10V	9.5	mΩ
RDSON@VGS=4.5V	13	mΩ



### Order Information

Product	Package	Marking	Reel Size	Reel	Carton
PGN06N140	PDFN5X6-8L	PGN06N140	13inch	5000PCS	50000PCS

### Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
<b>Common Ratings (TC=25°C Unless Otherwise Noted)</b>				
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	60	V	
$V_{GS}$	Gate-Source Voltage	±20	V	
$T_J$	Maximum Junction Temperature	150	°C	
$T_{STG}$	Storage Temperature Range	-55 to 150	°C	
$I_S$	Diode Continuous Forward Current	TC =25°C	50	A
<b>Mounted on Large Heat Sink</b>				
$E_{AS}$	Avalanche Energy, Single Pulsed (Note1)	35	mJ	
$I_{DM}$	Pulse Drain Current Tested (Silicon Limit) (Note2)	TC =25°C	200	A
$I_D$	Continuous Drain current	TC =25°C	50	A
$P_D$	Maximum Power Dissipation	TC =25°C	48	W
$R_{θJc}$	Thermal Resistance Junction-to-Case (Note3)	2.6	°C/W	



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Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
<b>Static Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
V <sub>(BR)DSS</sub>	Drain- Source Breakdown Voltage	VGS=0V ID=250μA	60	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain current	VDS=60V,VGS=0V	--	--	1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
V <sub>GS(TH)</sub>	Gate Threshold Voltage	VDS=VGS,ID=250μA	1	1.9	3	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance (Note4)	VGS=10V, ID=25A	--	9.5	14	mΩ
		VGS=4.5V, ID=15A	--	13	19	
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated) (Note5)</b>						
C <sub>iss</sub>	Input Capacitance	VDS=30V, VGS=0V, F=1MHz	--	1140	--	pF
C <sub>oss</sub>	Output Capacitance		--	255	--	pF
C <sub>riss</sub>	Reverse Transfer Capacitance		--	20	--	pF
Q <sub>g</sub>	Total Gate Charge	VDS=30V, ID=20A, VGS=10V	--	28.7	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	4.8	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	5.2	--	nC
<b>Switching Characteristics (Note5)</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	VDD=30V, ID=20A, VGS=10V RGEN=1.6Ω	--	7.7	--	nS
t <sub>r</sub>	Turn-on Rise Time		--	6.2	--	nS
t <sub>d(off)</sub>	Turn-off Delay Time		--	20	--	nS
t <sub>f</sub>	Turn-off Fall Time		--	7	--	nS
<b>Source- Drain Diode Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
V <sub>SD</sub>	Forward on voltage	IS=30A,VGS=0V	--	--	1.2	V

Note:

- Limited by T<sub>Jmax</sub>, starting T<sub>J</sub> = 25° C, R<sub>G</sub> = 4.5Ω, V<sub>D</sub> =20V, V<sub>GS</sub> =10V. Part not recommended for use above this value.
- Repetitive Rating: Pulse width limited by maximum junction temperature.
- Surface Mounted on FR4 Board, t ≤ 10 sec.
- Pulse Test: pulse width ≤ 300 us, duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.



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Typical Characteristics

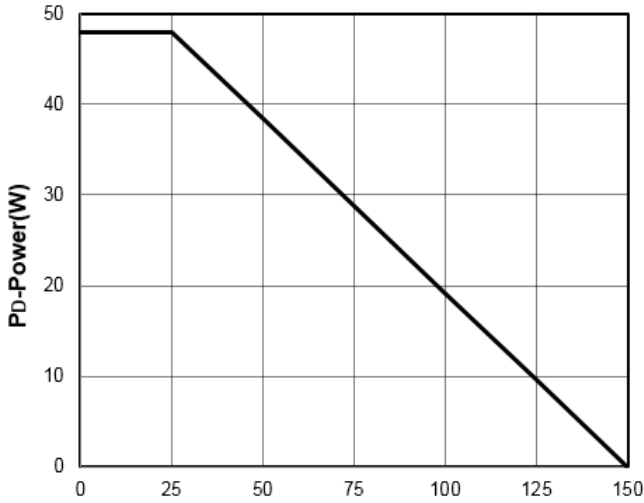


Figure1: T<sub>J</sub>-Junction Temperature (°C)

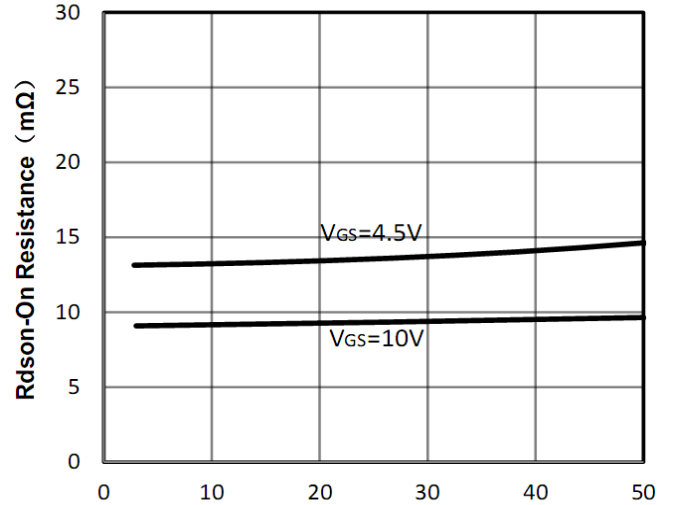


Figure2: I<sub>D</sub>-Drain Current (A)

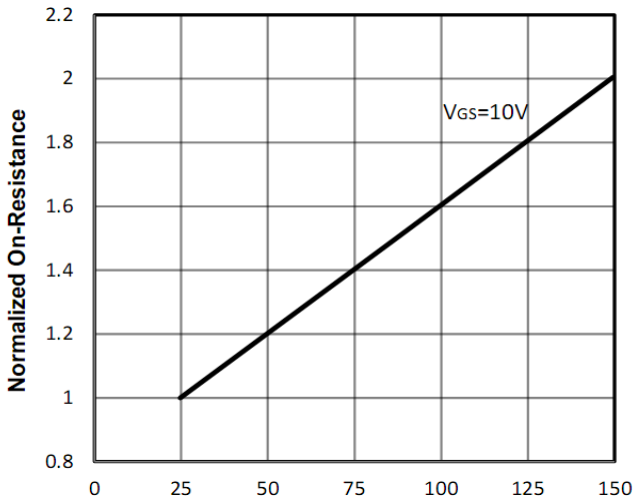


Figure3: T<sub>J</sub>-Junction Temperature (°C)

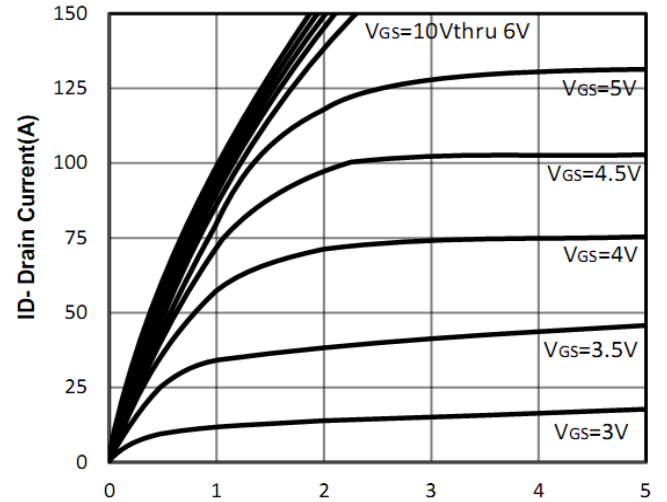


Figure4: V<sub>DS</sub>-Drain Source Voltage (V)

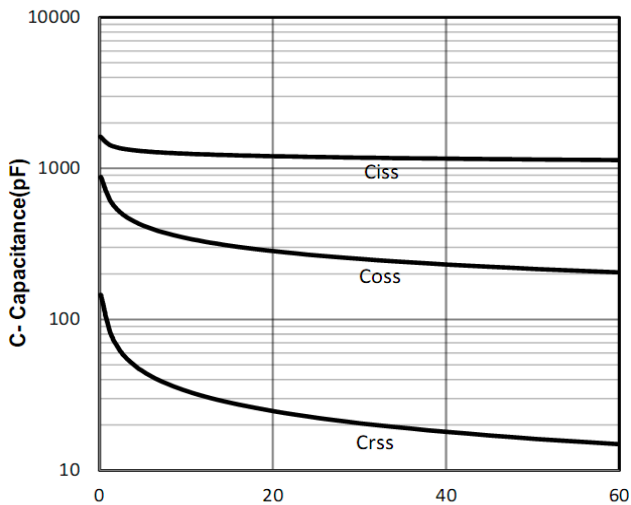


Figure5: V<sub>DS</sub>-Drain Source Voltage (V)

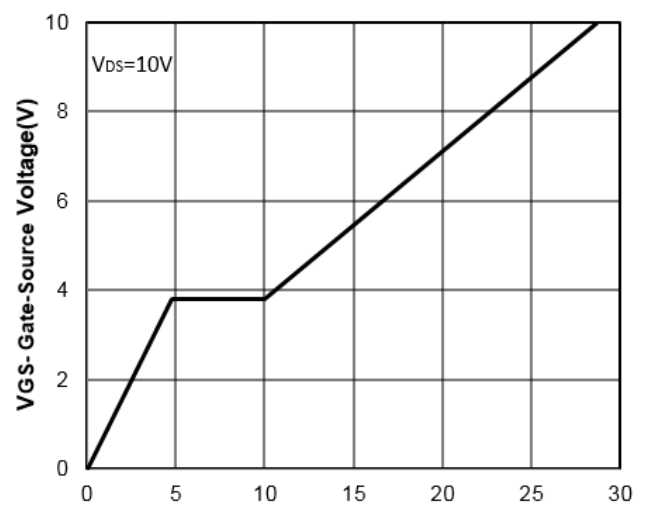


Figure6: Q<sub>g</sub>-Gate Charge (nC)



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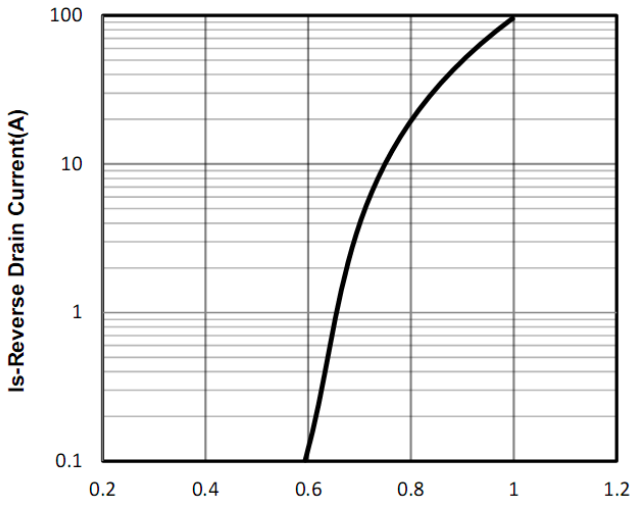


Figure7: Vsd -Source Drain Voltage (V)

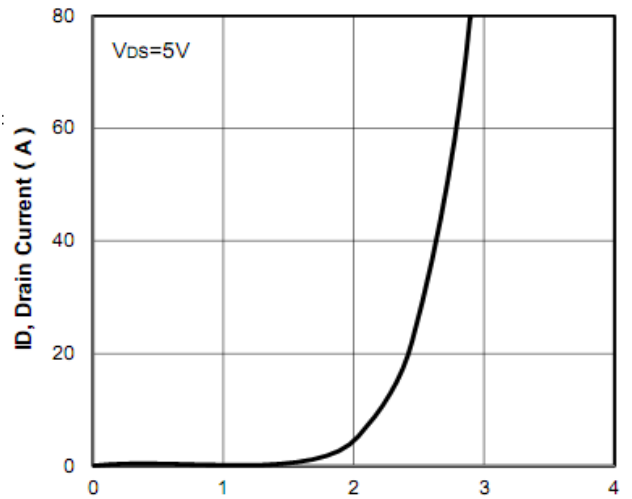


Figure8: Vgs -Gate Source Voltage (V)

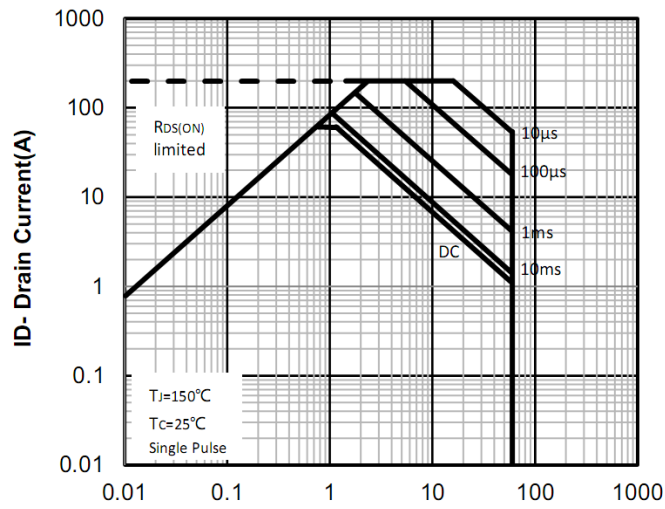


Figure9: VDS -Drain Source Voltage (V)

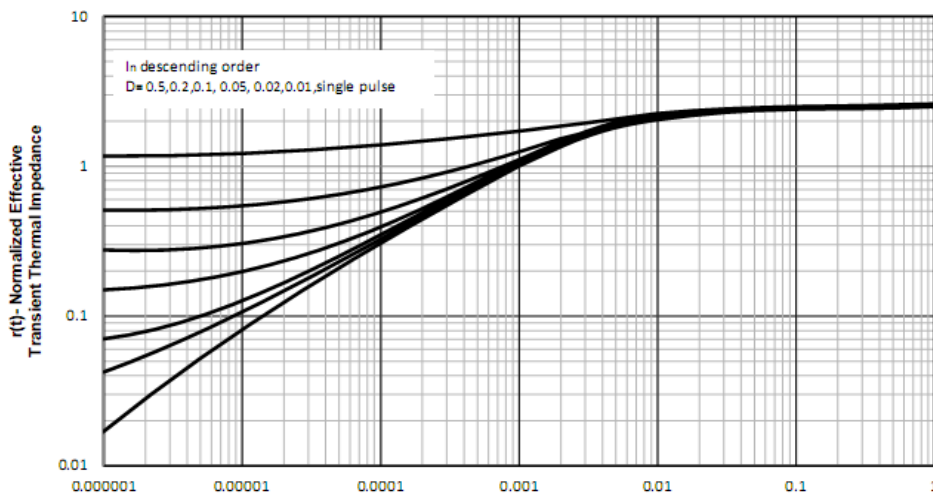


Figure10: Square Wave Pulse Duration (sec)

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### Test Circuit and Waveform:

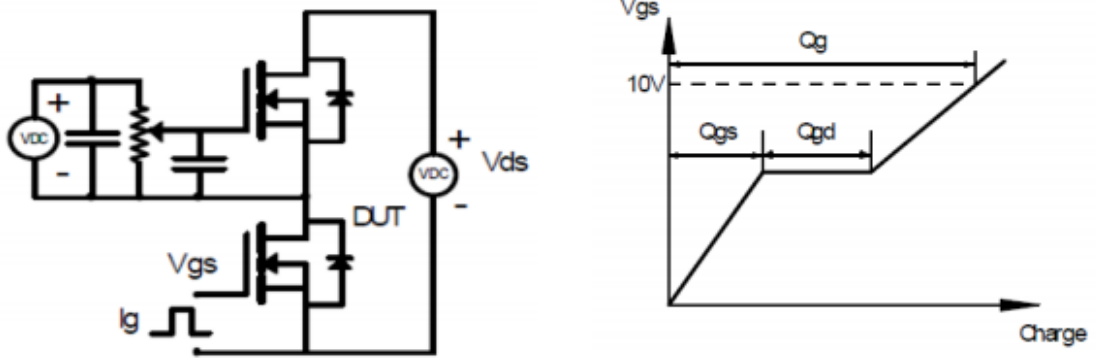


Figure A Gate Charge Test Circuit & Waveforms

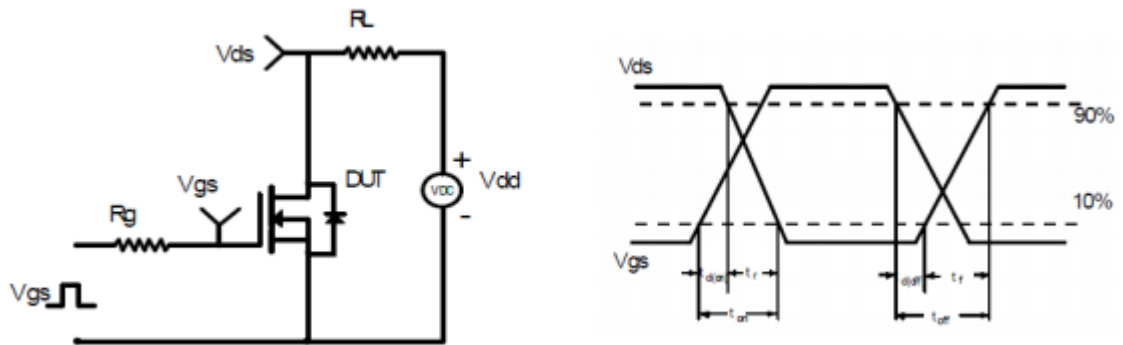


Figure B Switching Test Circuit & Waveforms

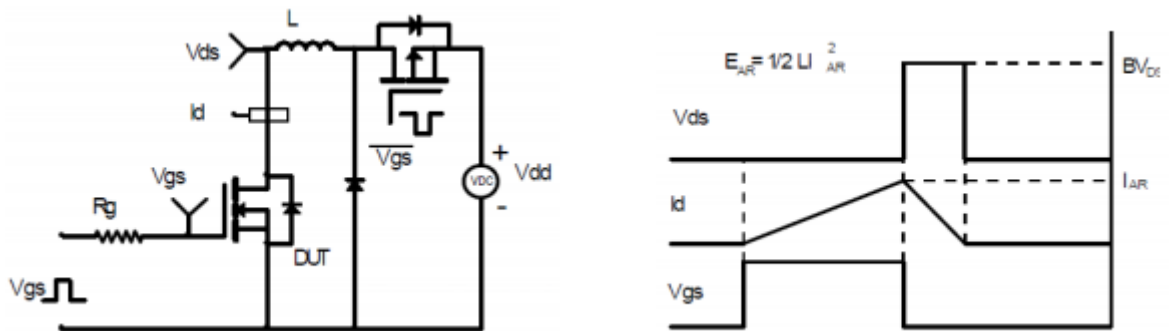
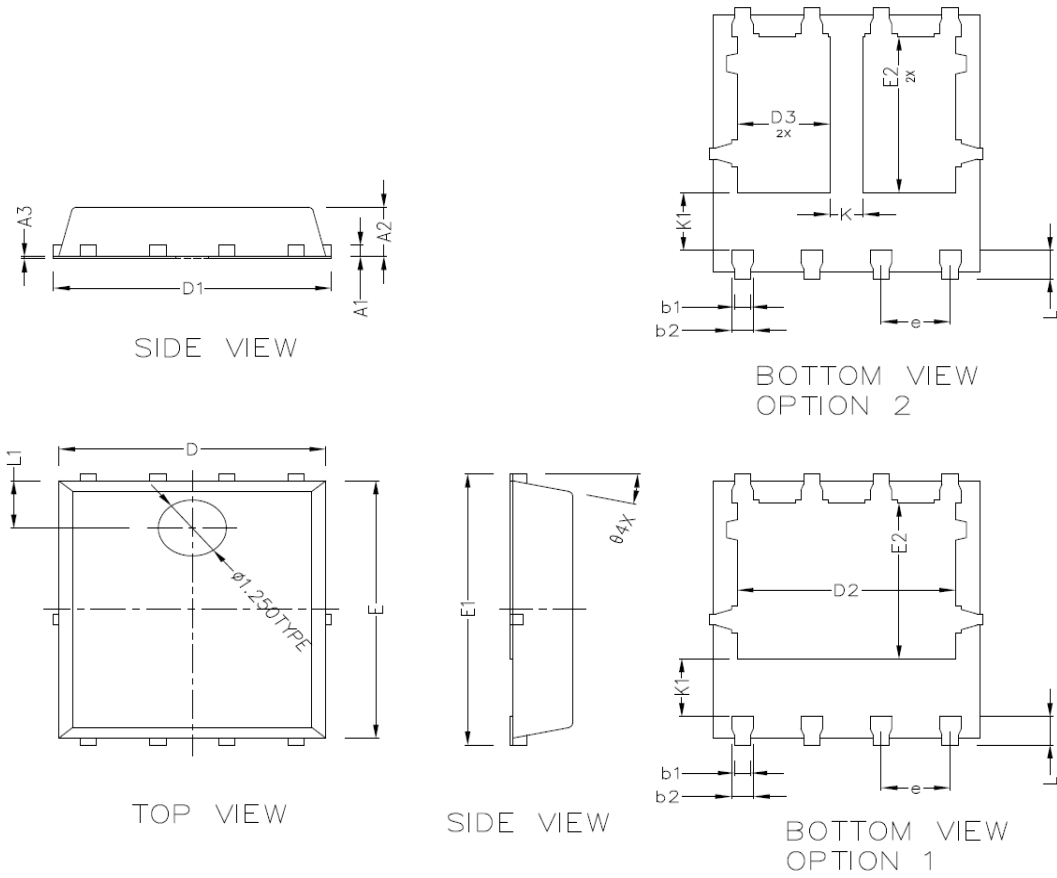


Figure C Unclamped Inductive Switching Circuit & Waveforms



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PDFN5X6-8 Package Outline Dimensions (Units: mm)



COMMON DIMENSIONS (UNITS OF MEASURE IS)			
	MIN	NORMAL	MAX
A1	0.254 BSC		
A2	1.000	1.100	1.200
A3	0.005	-	0.020
b1	0.250	0.300	0.350
b2	0.350	0.400	0.450
D	4.800	4.900	5.000
D1	5.000	5.100	5.200
D2	3.910	4.010	4.110
D3	1.605	1.705	1.805
E	5.650	5.750	5.850
E1	5.950	6.050	6.150
E2	3.375	3.475	3.575
e	1.270 TYPE		
L	0.630	0.630	0.730
L1	1.00REF		
$\phi$	1.3' TYPE		
K	0.600 REF		
K1	1.236 REF		