



40V/50A N-Channel Advanced Power MOSFET

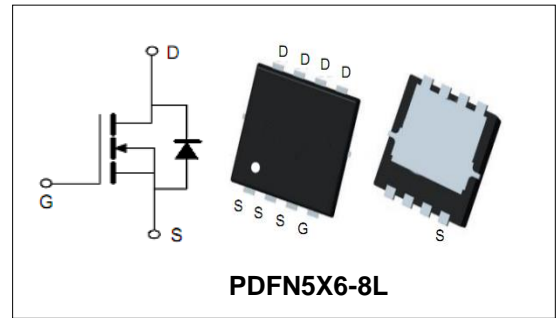
Features

- Fast switching capability
- Robust design with better EAS performance
- Ultra-low on-resistance

BVDSS	40	V
ID	50	A
RDSON@VGS=10V	5.5	mΩ
RDSON@VGS=4.5V	7.5	mΩ

Applications

- Battery Management System
- Motor Drivers
- DC-DC Converter



Order Information

Product	Package	Marking	Reel Size	Reel	Carton
PGN04N070	PDFN5X6-8L	PGN04N070	13inch	5000PCS	50000PCS

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
Common Ratings (TC=25°C Unless Otherwise Noted)				
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	40	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
Mounted on Large Heat Sink				
E_{AS}	Single Pulse Avalanche Energy (Note1)	45.5	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	34	W
$R_{θJC}$	Thermal Resistance Junction-to-Case (Note3)	3.68	° C/W	



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Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
V _{(BR)DSS}	Drain- Source Breakdown Voltage	VGS=0V ID=250μA	40	--	--	V
I _{DSS}	Zero Gate Voltage Drain current(Tc=25°C)	VDS=40V,VGS=0V	--	--	1	μA
I _{GSS}	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
V _{GS(TH)}	Gate Threshold Voltage	VDS=VGS,ID=250μA	1	1.8	2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance (Note4)	VGS=10V, ID=20A	--	5.5	7	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance (Note4)	VGS=4.5V, ID=20A	--	7.5	10	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated) (Note5)						
C _{iss}	Input Capacitance	VDS=20V,	--	863	--	pF
C _{oss}	Output Capacitance	VGS=0V,	--	309	--	pF
C _{rss}	Reverse Transfer Capacitance	F=1MHz	--	5.8	--	pF
Q _g	Total Gate Charge	VDS=20V,	--	14.7	--	nC
Q _{gs}	Gate-Source Charge	ID=20A,	--	2.1	--	nC
Q _{gd}	Gate-Drain Charge	VGS=10V	--	2.5	--	nC
R _G	Reverse Transfer Capacitance	F=1MHz	--	3.1	--	Ω
Switching Characteristics (Note5)						
t _{d(on)}	Turn-on Delay Time	VDS=20V,	--	5.8	--	nS
t _r	Turn-on Rise Time	RL=1Ω,	--	49	--	nS
t _{d(off)}	Turn-off Delay Time	RG=1.6Ω,	--	17	--	nS
t _f	Turn-off Fall Time	VGS=10V	--	4.9	--	nS
Source- Drain Diode Characteristics @ T_J = 25°C (unless otherwise stated)						
V _{SD}	Forward on voltage	IS=20A,VGS=0V	--	--	1.2	V
t _{rr}	Reverse Recovery Time	VDD=20V	--	28.2	--	ns
Q _{rr}	Reverse Recovery Charge	ID=20A, Di/dt=100A/us	--	15	--	nc

Note:

- Limited by T_{Jmax}, starting T_J = 25° C, R_G =25Ω, VDS =20V, VGS =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 Performance Characteristics

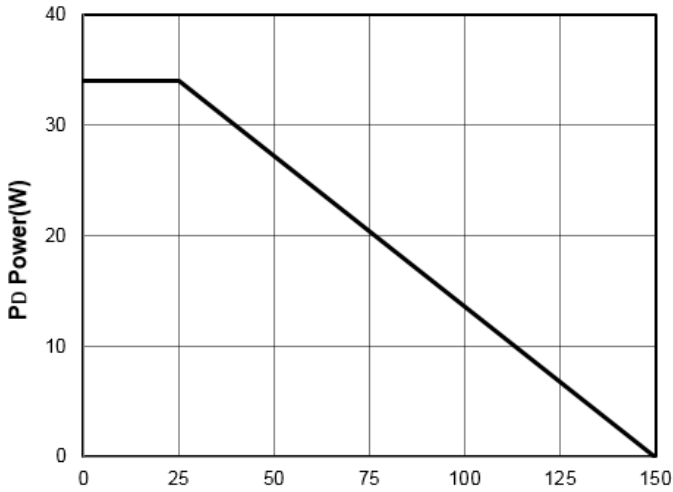


Figure1: T_j Junction Temperature (°C)

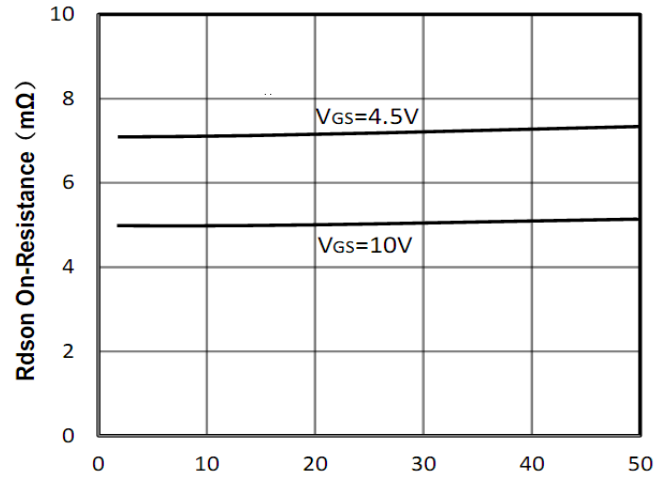


Figure2: I_d Drain Current (A)

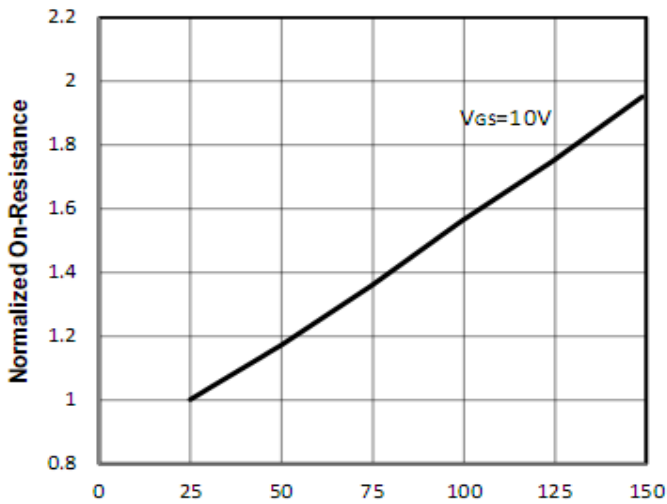


Figure3: T_j Junction Temperature (°C)

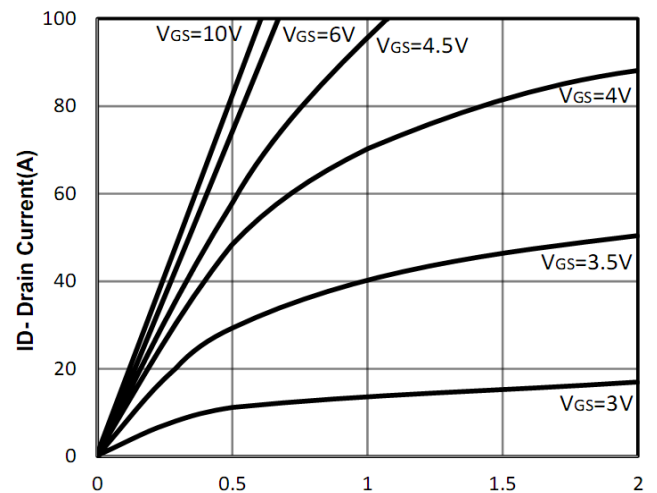


Figure4: V_{ds} Drain-Source Voltage (V)

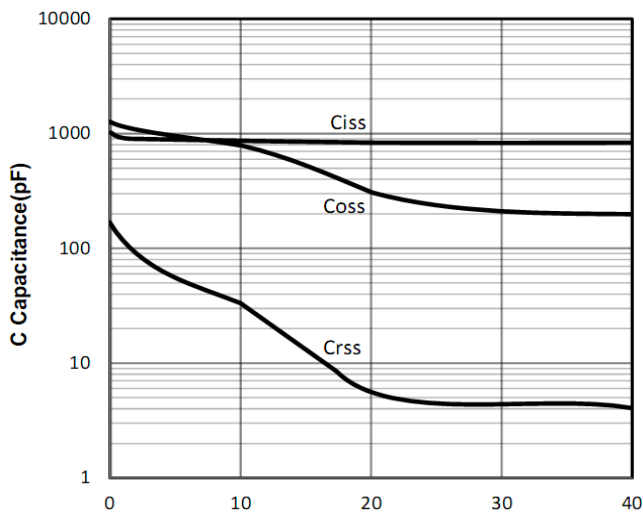


Figure5: V_{ds} Drain-Source Voltage (V)

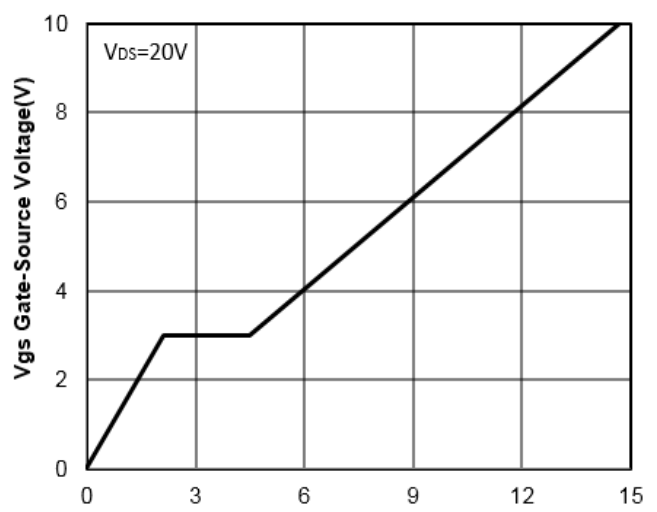


Figure6: Q_g Gate Charge (nC)



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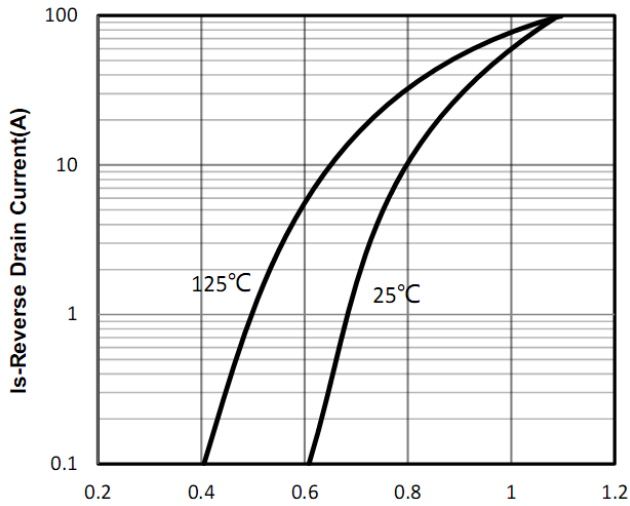


Figure7: Vsd Source-Drain Voltage (V)

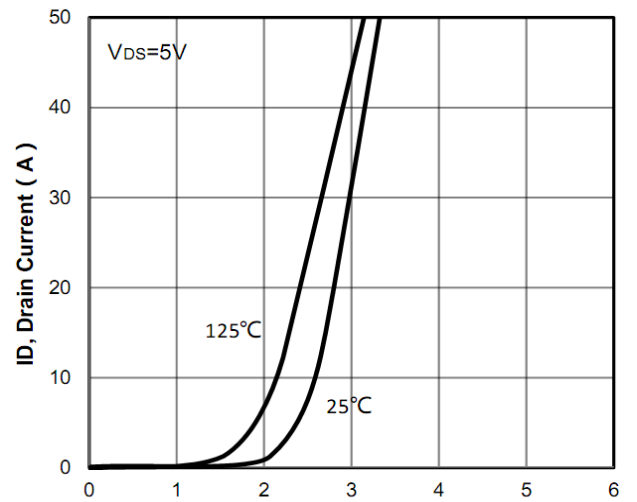


Figure8: Vgs Gate-Source Voltage (V)

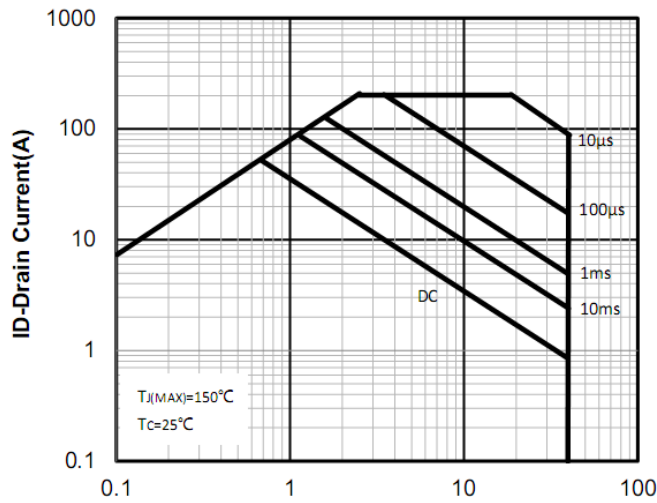


Figure9: Vsd Drain -Source Voltage (V)

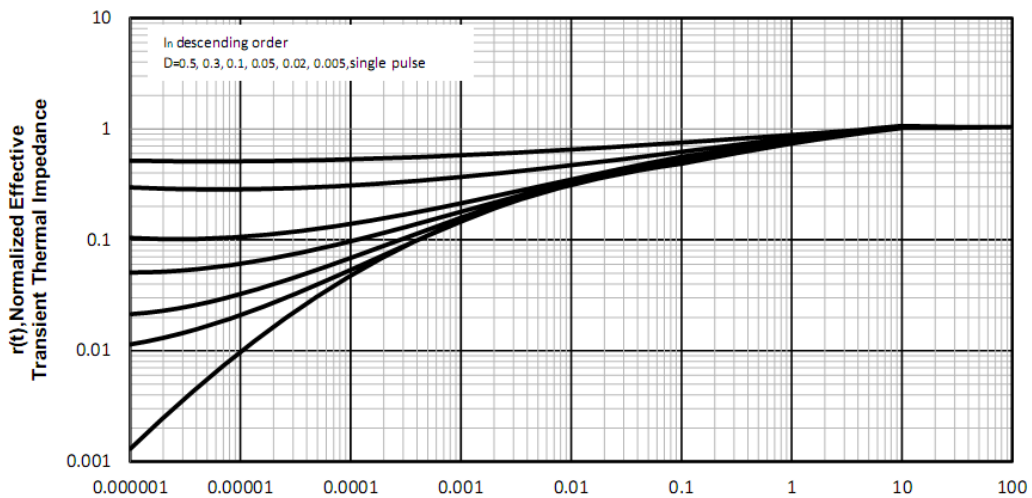
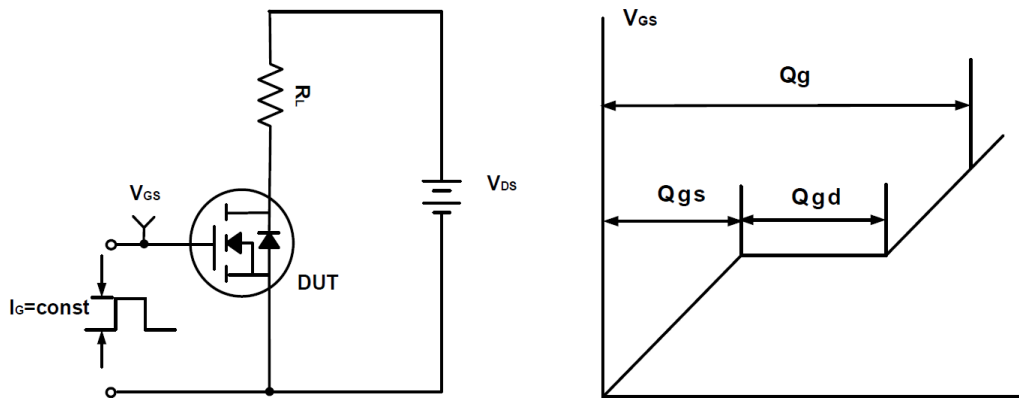
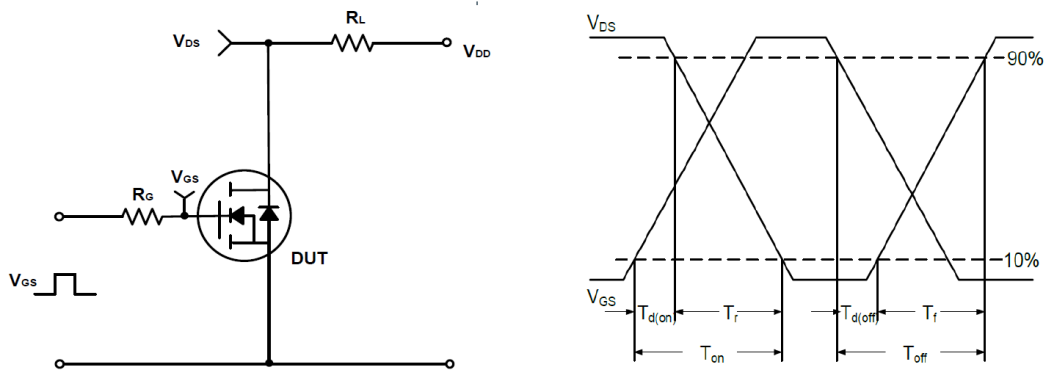
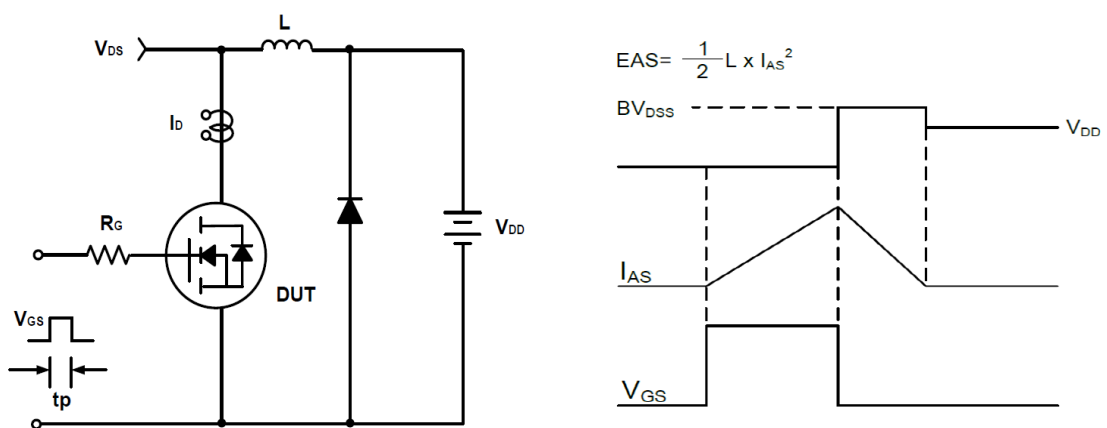


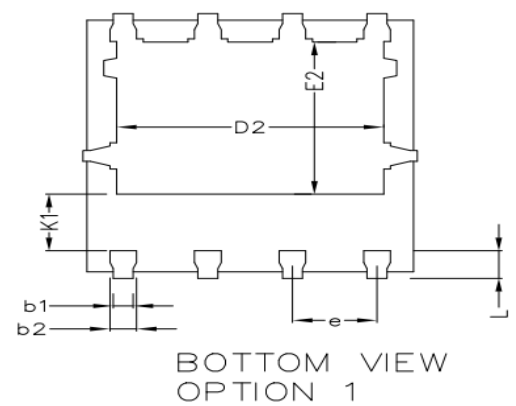
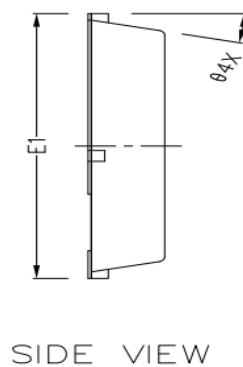
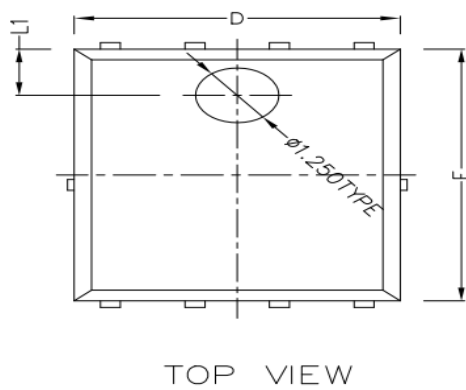
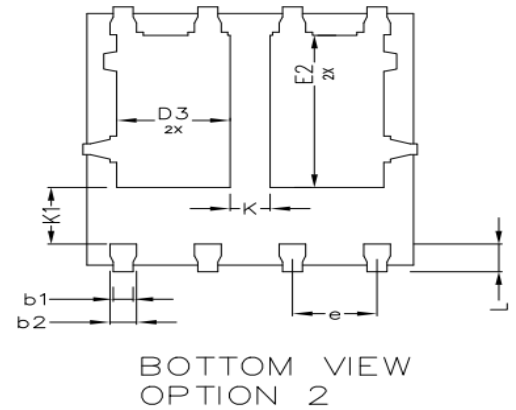
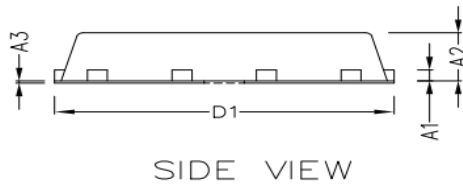
Figure10: Square Wave Pulse Duration (sec)

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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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PDFN5X6-8L Package Outline Dimensions (Units: mm)



COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	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	0.530	0.630	0.730
L1	1.00REF		
θ	13° TYPE		
K	0.600 REF		
K1	1.235 REF		