



## 40V/50A N-Channel Advanced Power MOSFET

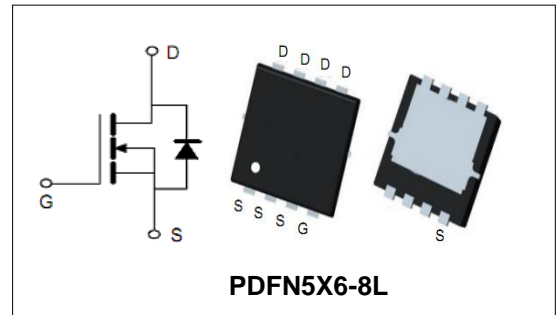
### Features

- 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	
<b>Common Ratings (TC=25°C Unless Otherwise Noted)</b>				
$V_{(BR)DSS}$	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
<b>Mounted on Large Heat Sink</b>				
$E_{AS}$	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	



## 40V/50A N-Channel Advanced Power MOSFET

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	40	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain current(Tc=25°C)	VDS=40V,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	1.8	2.5	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance (Note4)	VGS=10V, ID=20A	--	5.5	7	mΩ
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance (Note4)	VGS=4.5V, ID=20A	--	7.5	10	mΩ
<b>Dynamic Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated) (Note5)</b>						
C <sub>iss</sub>	Input Capacitance	VDS=20V,	--	863	--	pF
C <sub>oss</sub>	Output Capacitance	VGS=0V,	--	309	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	F=1MHz	--	5.8	--	pF
Q <sub>g</sub>	Total Gate Charge	VDS=20V,	--	14.7	--	nC
Q <sub>gs</sub>	Gate-Source Charge	ID=20A,	--	2.1	--	nC
Q <sub>gd</sub>	Gate-Drain Charge	VGS=10V	--	2.5	--	nC
R <sub>G</sub>	Reverse Transfer Capacitance	F=1MHz	--	3.1	--	Ω
<b>Switching Characteristics (Note5)</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	VDS=20V,	--	5.8	--	nS
t <sub>r</sub>	Turn-on Rise Time	RL=1Ω,	--	49	--	nS
t <sub>d(off)</sub>	Turn-off Delay Time	RG=1.6Ω,	--	17	--	nS
t <sub>f</sub>	Turn-off Fall Time	VGS=10V	--	4.9	--	nS
<b>Source- Drain Diode Characteristics @ T<sub>J</sub> = 25°C (unless otherwise stated)</b>						
V <sub>SD</sub>	Forward on voltage	IS=20A,VGS=0V	--	--	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	VDD=20V	--	28.2	--	ns
Q <sub>rr</sub>	Reverse Recovery Charge	ID=20A, Di/dt=100A/us	--	15	--	nc

Note:

- Limited by T<sub>Jmax</sub>, starting T<sub>J</sub> = 25° C, R<sub>G</sub> =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.



40V/50A N-Channel Advanced Power MOSFET

Typical Performance Characteristics

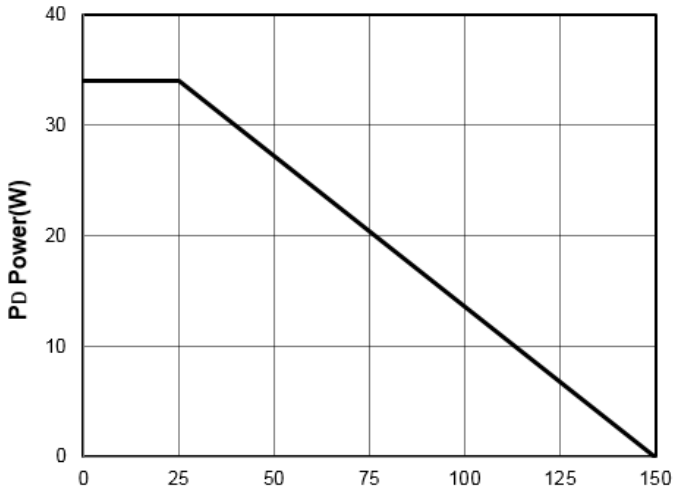


Figure1: T<sub>j</sub> Junction Temperature (°C)

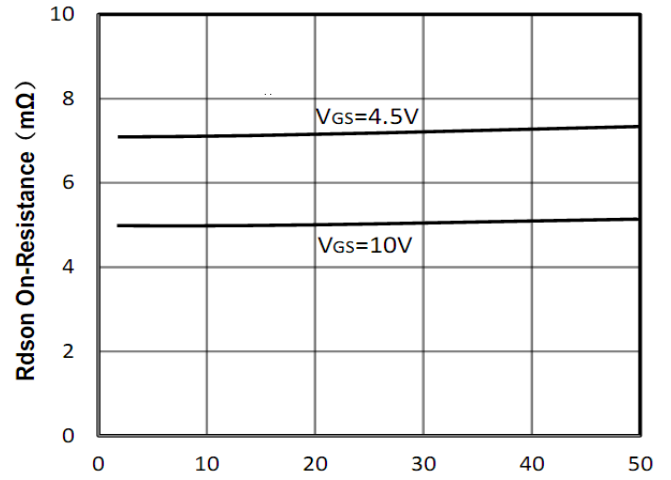


Figure2: I<sub>d</sub> Drain Current (A)

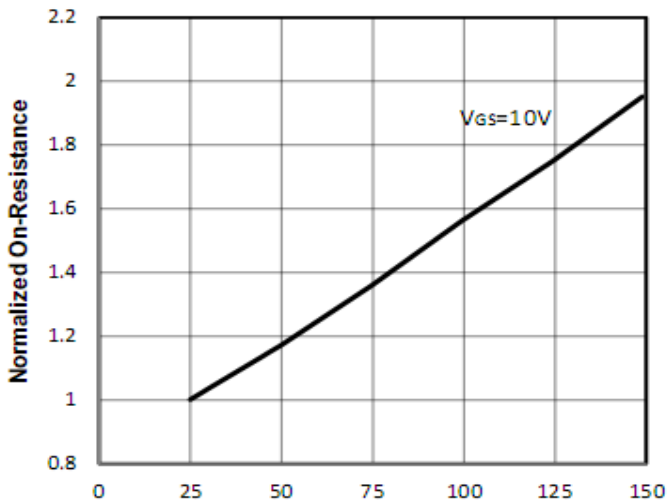


Figure3: T<sub>j</sub> Junction Temperature (°C)

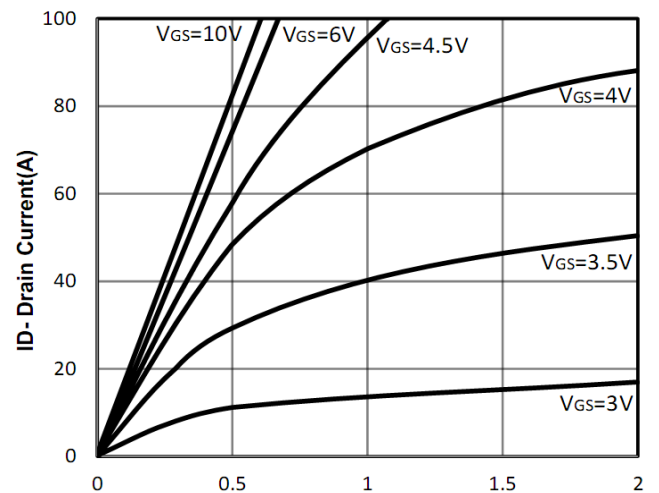


Figure4: V<sub>ds</sub> Drain-Source Voltage (V)

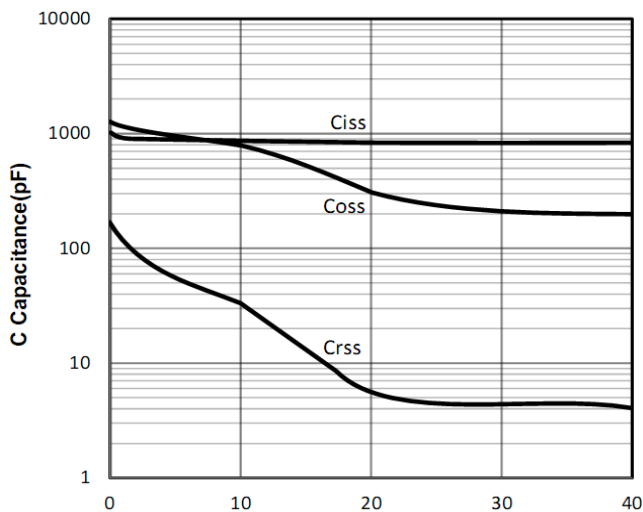


Figure5: V<sub>ds</sub> Drain-Source Voltage (V)

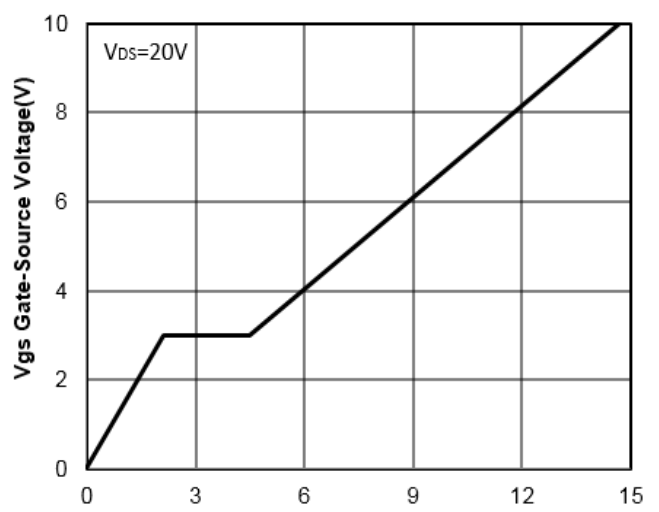


Figure6: Q<sub>g</sub> Gate Charge (nC)



40V/50A N-Channel Advanced Power MOSFET

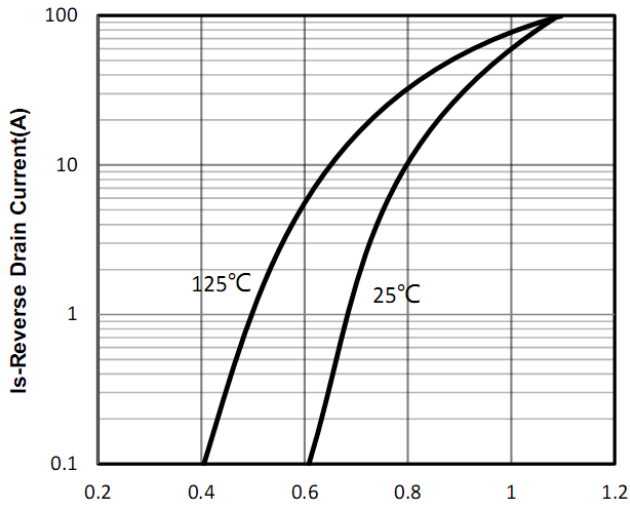


Figure7: Vsd Source-Drain Voltage (V)

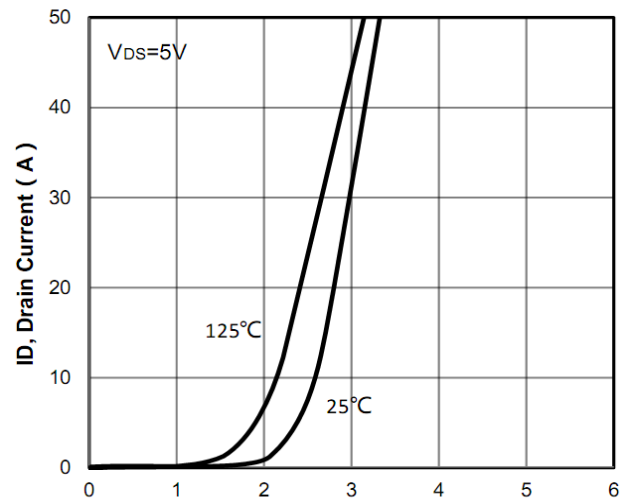


Figure8: Vgs Gate-Source Voltage (V)

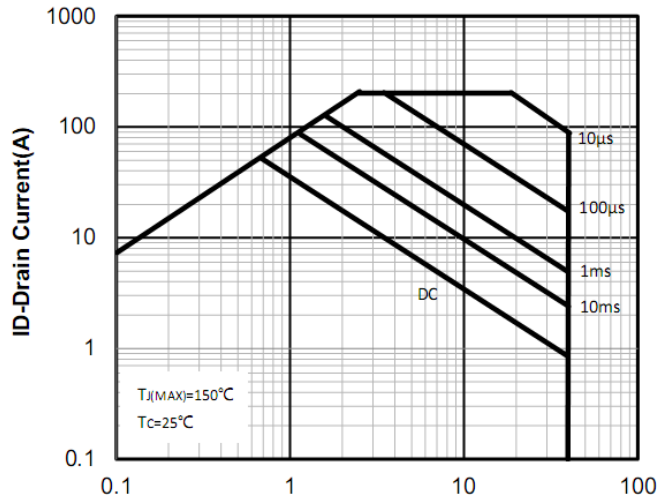


Figure9: Vsd Drain -Source Voltage (V)

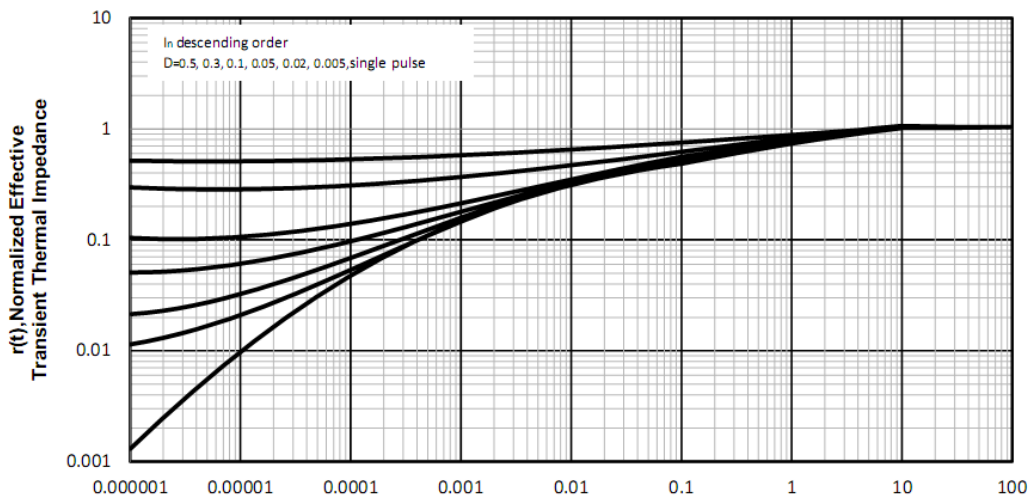
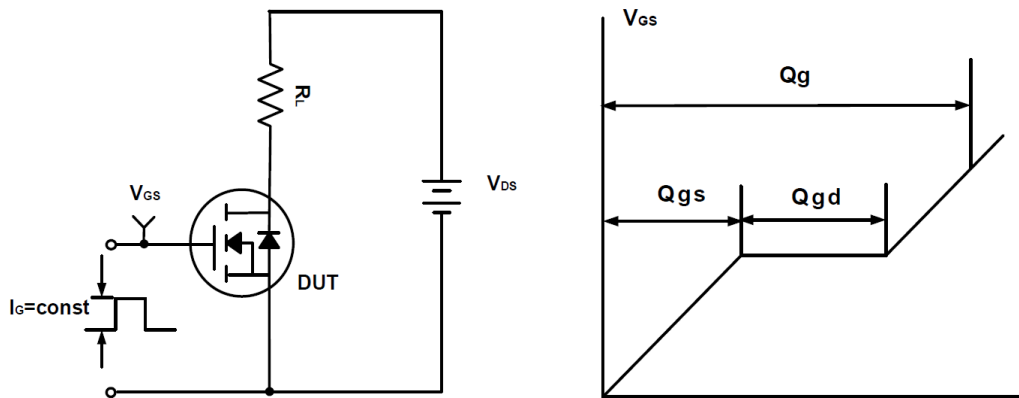
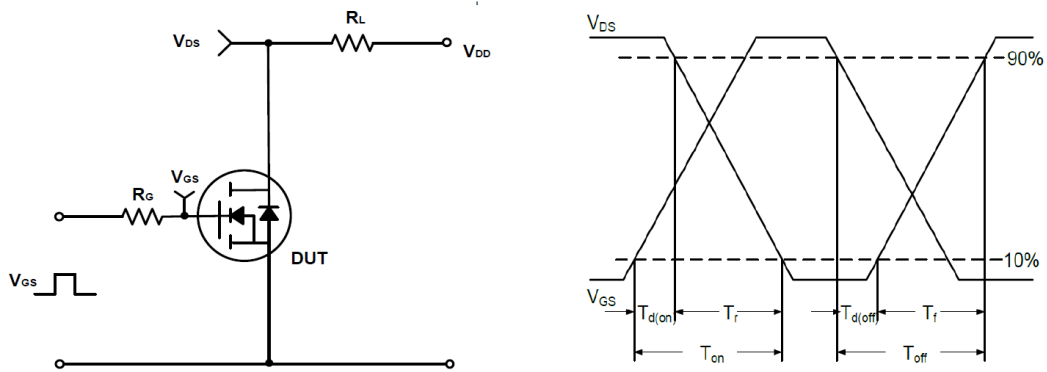
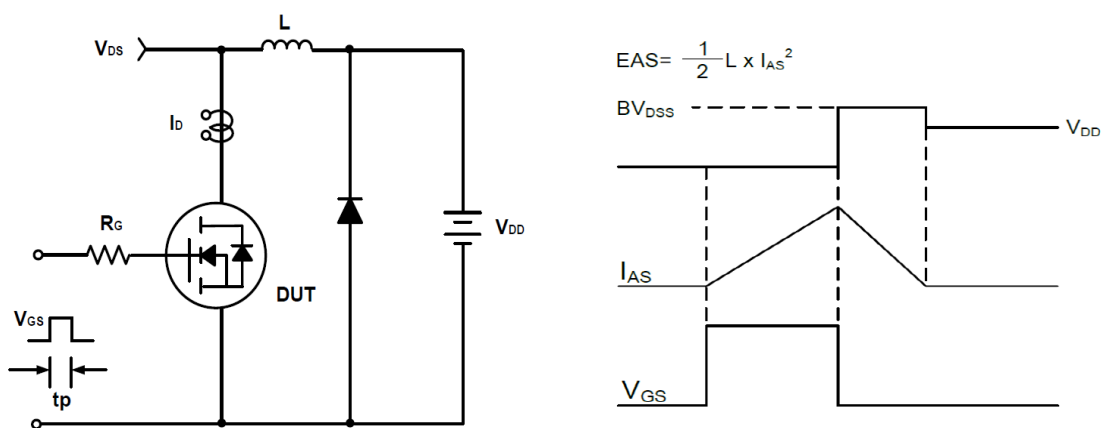


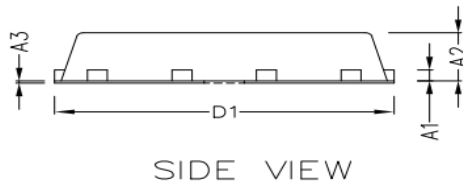
Figure10: Square Wave Pulse Duration (sec)

**40V/50A N-Channel Advanced Power MOSFET**
**Test Circuit and Waveform:**

**Figure A Gate Charge Test Circuit & Waveforms**

**Figure B Switching Test Circuit & Waveforms**

**Figure C Unclamped Inductive Switching Circuit & Waveforms**

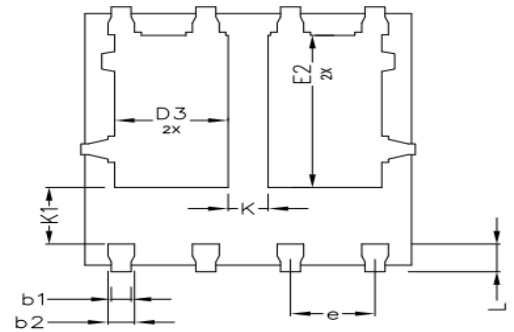


40V/50A N-Channel Advanced Power MOSFET

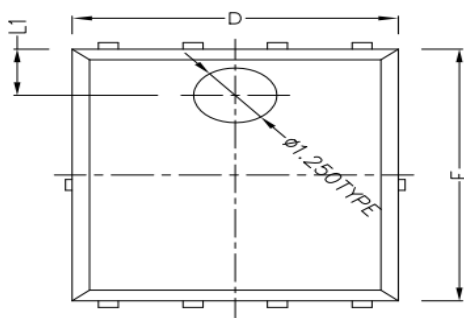
PDFN5X6-8L Package Outline Dimensions (Units: mm)



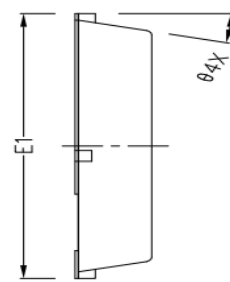
SIDE VIEW



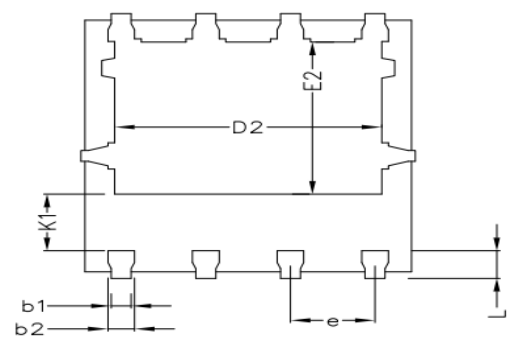
BOTTOM VIEW  
OPTION 2



TOP VIEW



SIDE VIEW



BOTTOM VIEW  
OPTION 1

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		
$\theta$	13° TYPE		
K	0.600 REF		
K1	1.235 REF		