



PE4070K N-Channel Enhancement Mode Power MOSFET

PE4070K Description

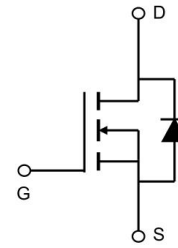
The PE4070K uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

PE4070K General Features

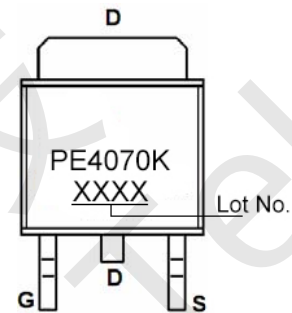
- $V_{DS} = 40V$, $I_D = 70A$
 $R_{DS(ON)} < 7m\Omega$ @ $V_{GS} = 10V$
 $R_{DS(ON)} < 8.5m\Omega$ @ $V_{GS} = 4.5V$
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

PE4070K Application

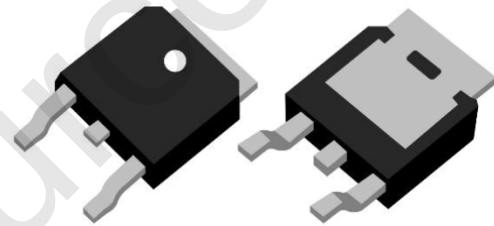
- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply



Schematic diagram



Marking and pin assignment



TO-252-2L

PE4070K Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	70	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_D(100^\circ C)$	48	A
Pulsed Drain Current	I_{DM}	210	A
Maximum Power Dissipation	P_D	55	W
Single Avalanche Energy($L = 0.5mH$)	E_{AS}	306	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

PE4070K Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	2.3	$^\circ C/W$
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PE4070K Electrical Characteristics ($T_c=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=38V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.7	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=20A$	-	4.5	7	m Ω
		$V_{GS}=4.5V, I_D=20A$	-	5.5	8.5	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=10V, I_D=20A$	15	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{iss}	$V_{DS}=20V, V_{GS}=0V,$ $F=1.0MHz$	-	2347	-	PF
Output Capacitance	C_{oss}		-	273	-	PF
Reverse Transfer Capacitance	C_{rss}		-	163	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=20V, I_D=2A, R_L=1\Omega$ $V_{GS}=10V, R_G=3\Omega$	-	6.4	-	nS
Turn-on Rise Time	t_r		-	17.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	29.6	-	nS
Turn-Off Fall Time	t_f		-	16.8	-	nS
Total Gate Charge	Q_g	$V_{DS}=20V, I_D=20A,$ $V_{GS}=10V$	-	46		nC
Gate-Source Charge	Q_{gs}		-	4.7		nC
Gate-Drain Charge	Q_{gd}		-	11		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=10A$	-		1.2	V

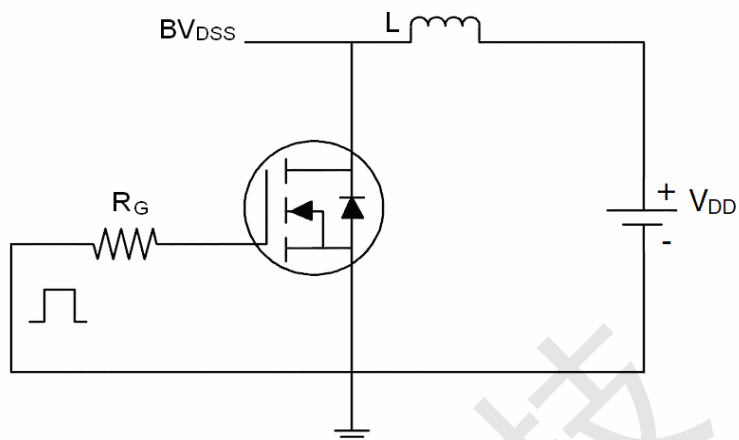
Notes:

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

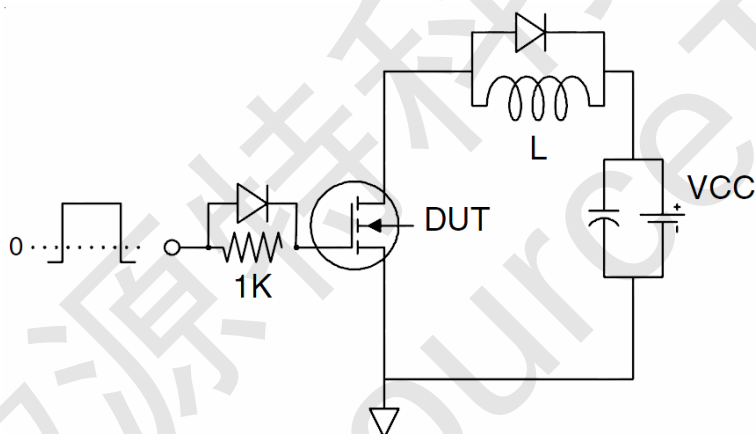


PE4070K Test circuit

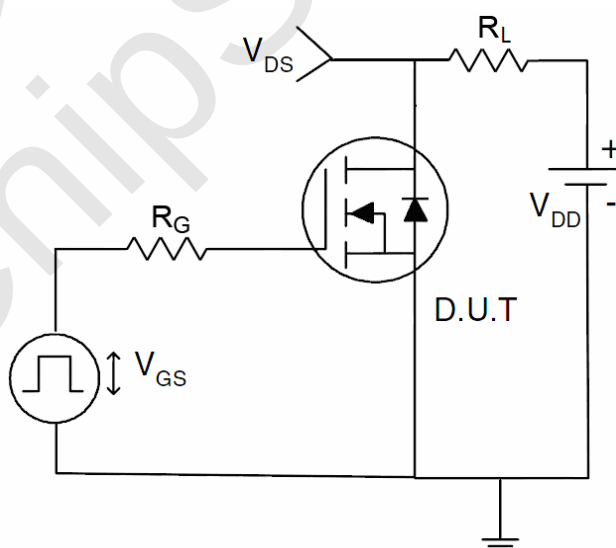
1) E_{AS} Test Circuit



2) Gate Charge Test Circuit



3) Switch Time Test Circuit





PE4070K Typical Electrical and Thermal Characteristics (Curves)

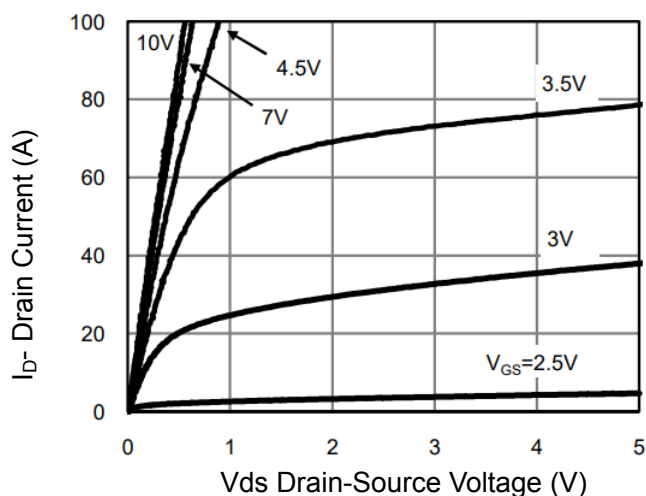


Figure 1 Output Characteristics

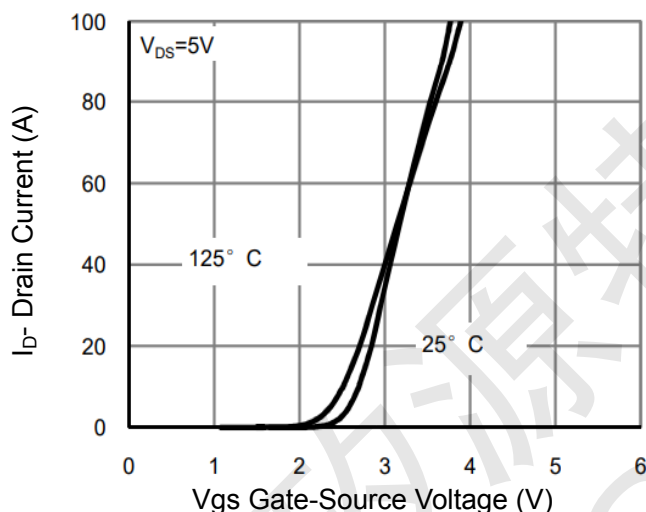


Figure 2 Transfer Characteristics

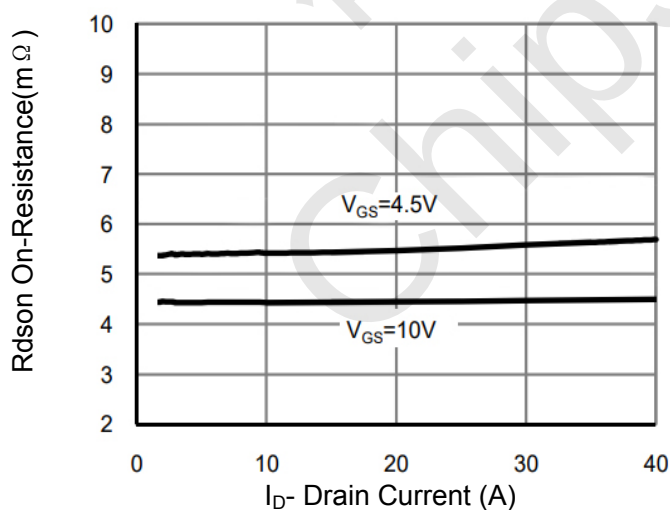


Figure 3 Rdson- Drain Current

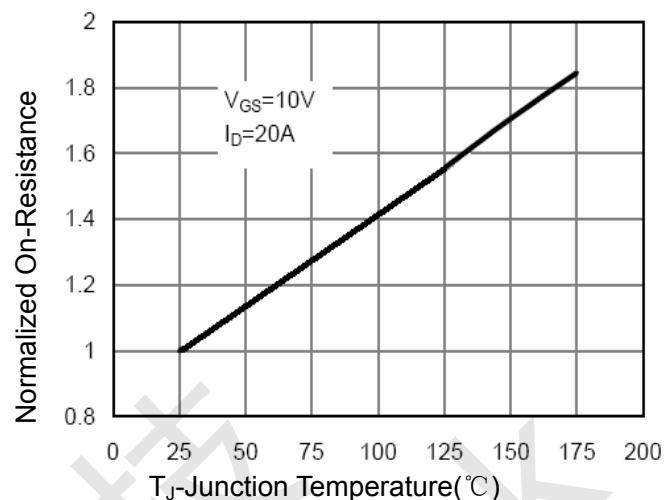


Figure 4 Rdson-Junction Temperature

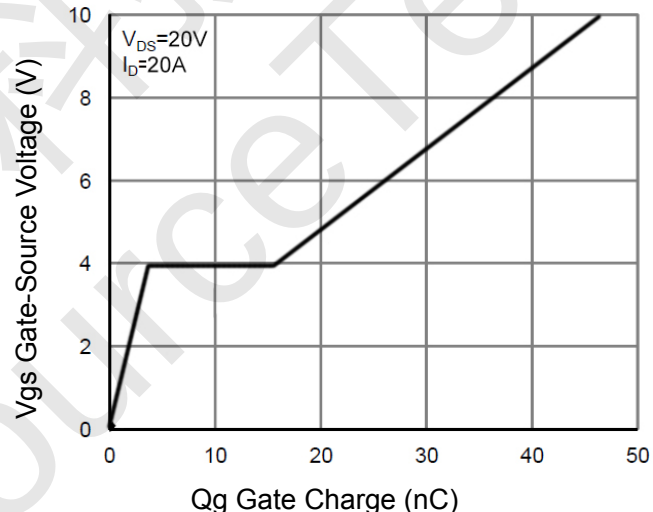


Figure 5 Gate Charge

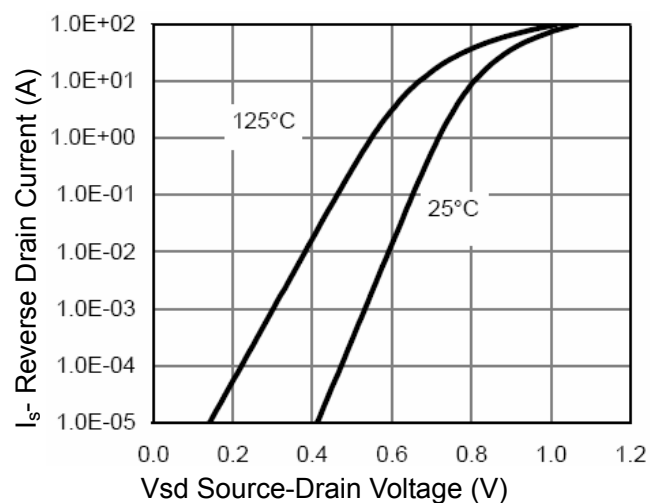


Figure 6 Source- Drain Diode Forward

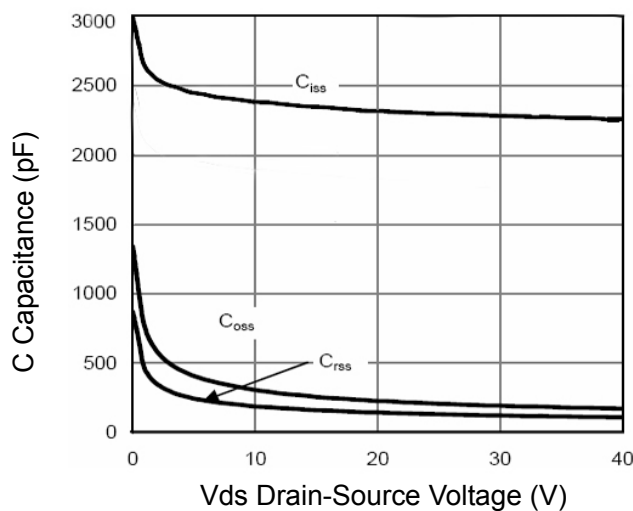


Figure 7 Capacitance vs Vds

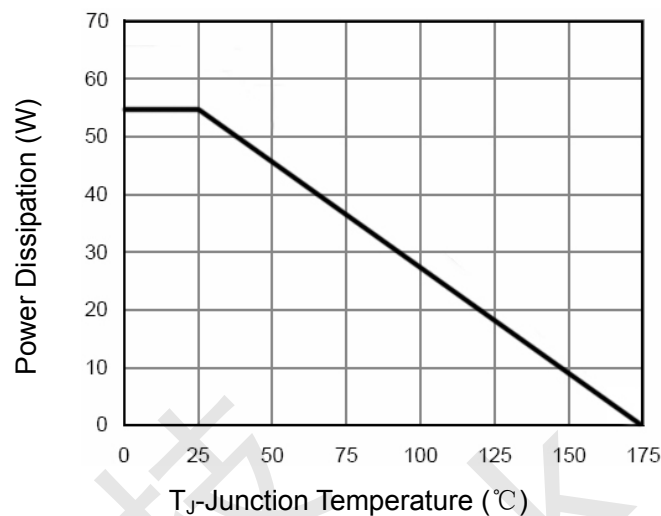


Figure 9 Power De-rating

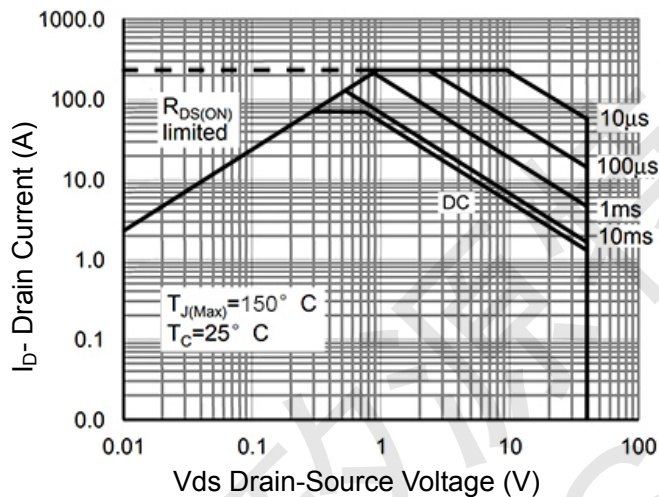


Figure 8 Safe Operation Area

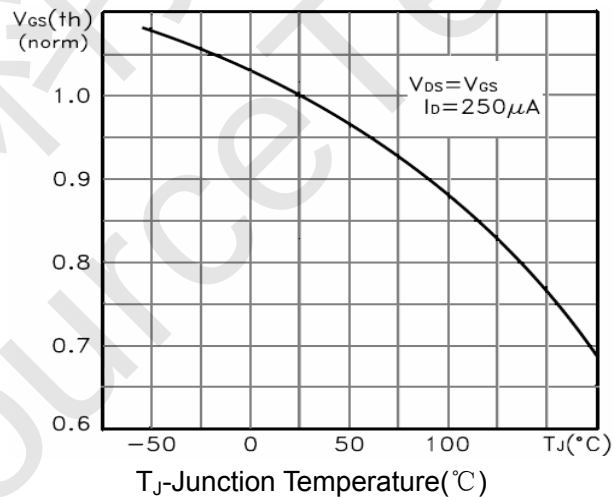


Figure 10 V_{GS(th)} vs Junction Temperature

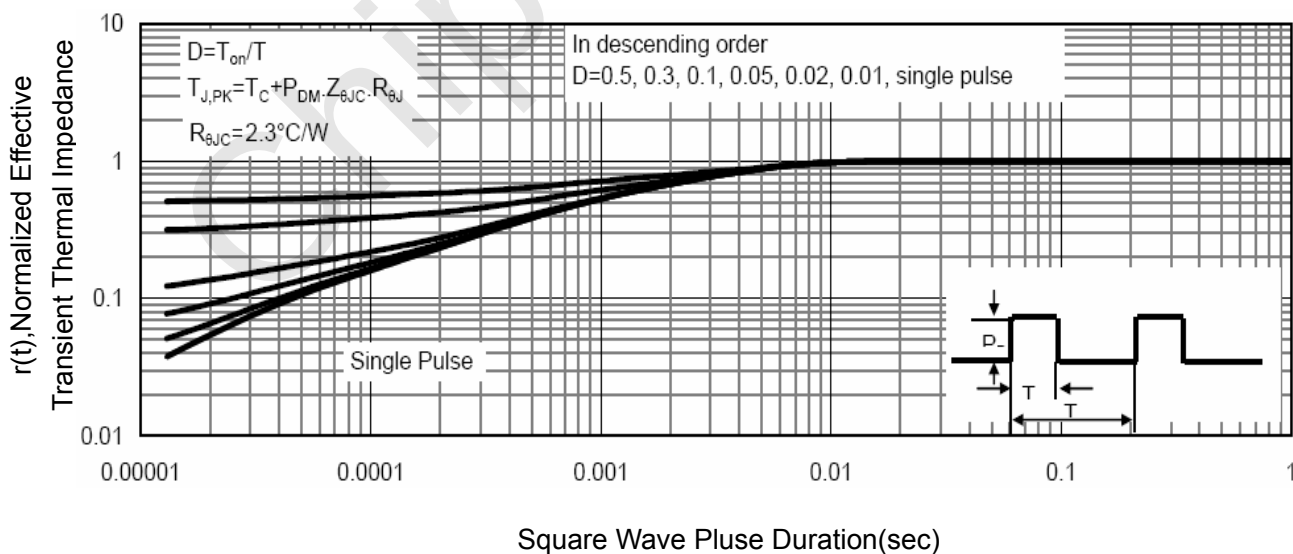
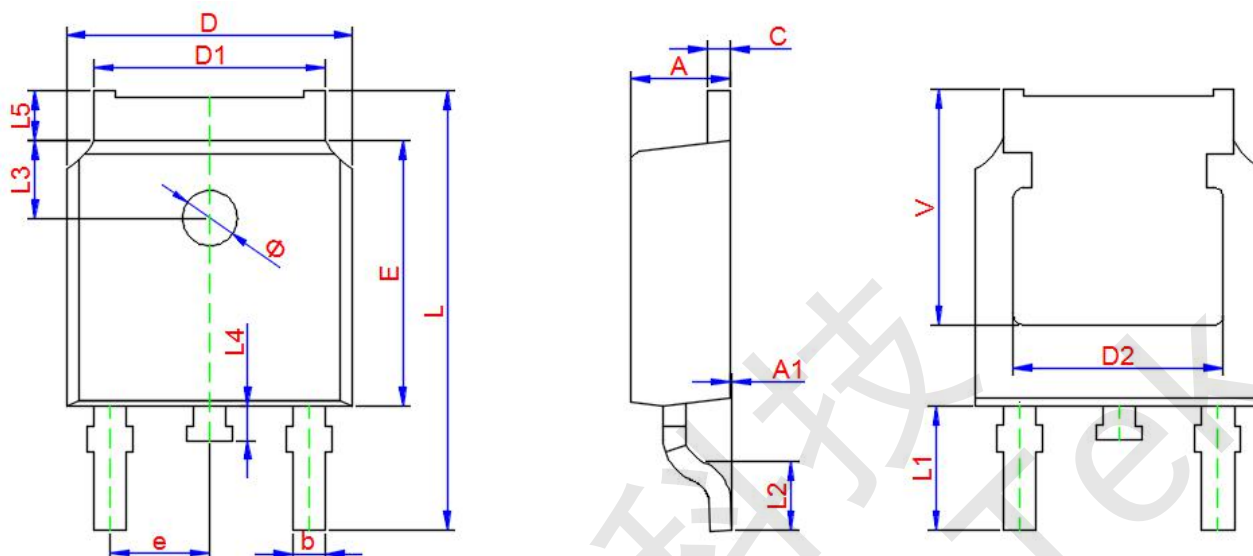


Figure 11 Normalized Maximum Transient Thermal Impedance



PE4070K TO-252 Package Information



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	2.200	2.300	2.400
A1	0.000	--	0.127
b	0.660	0.760	0.860
D	6.500	6.600	6.700
D1	5.100	5.330	5.460
C	0.450	0.500	0.600
D2	4.830 TYP.		
E	6.000	6.100	6.200
e	2.186	2.286	2.386
L	9.800	10.100	10.400
L1	2.900 TYP.		
L2	1.400	1.500	1.600
L3	1.800 TYP.		
L4	0.600	0.800	1.000
L5	0.900	--	1.250
Φ	1.100.	--	1.300
θ	0°	--	8°
V	5.350 TYP.		