



PE3415DF P-Channel Enhancement Mode Power MOSFET

PE3415DF Description

The PE3415DF uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

PE3415DF General Features

- $V_{DS} = -20V$, $I_D = -4A$

$R_{DS(ON)} < 45m\Omega$ @ $V_{GS} = -4.5V$

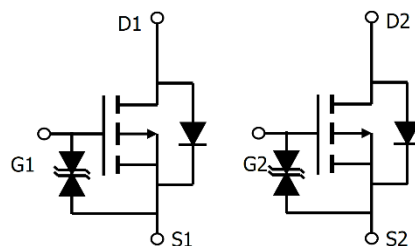
$R_{DS(ON)} < 100m\Omega$ @ $V_{GS} = -2.5V$

ESD Rating: $\geq 2000V$ HBM

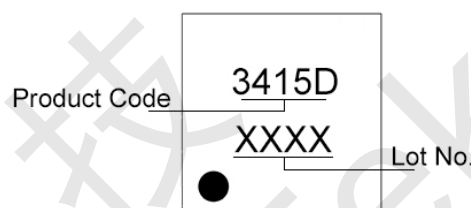
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

PE3415DF Application

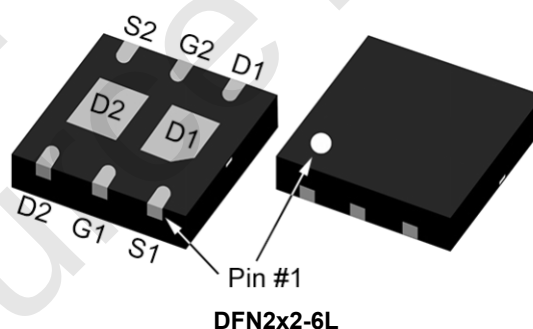
- PWM applications
- Load switch
- Power management



Schematic diagram



Marking and pin assignment



PE3415DF Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current-Continuous	I_D	-4	A
Drain Current-Continuous (TA=70°C)	I_D	-3.2	A
Pulsed Drain Current (Note 1)	I_{DM}	-30	A
Maximum Power Dissipation	P_D	1.1	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

PE3415DF Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	110	°C/W
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PE3415DF Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-20V, V_{GS}=0V$	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	± 10	μA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.45	-0.8	-1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_D=-4A$	-	35	45	m Ω
		$V_{GS}=-2.5V, I_D=-1A$	-	65	100	m Ω
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=-10V, V_{GS}=0V,$ $F=1KHz$	-	310	-	pF
Output Capacitance	C_{oss}		-	81	-	pF
Reverse Transfer Capacitance (Note 4)	C_{rss}		-	28	-	pF
Gate Resistance	R_g	$V_{DS}=0V, V_{GS}=0V, F=500KHz$	-	2.3	-	k Ω
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-10V, R_L=1\Omega,$ $V_{GS}=-4.5V, R_G=3\Omega$	-	13	-	nS
Turn-on Rise Time	t_r		-	11	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	20	-	nS
Turn-Off Fall Time	t_f		-	31	-	nS
Total Gate Charge	Q_g	$V_{DS}=-10V, I_D=-4A,$ $V_{GS}=-4.5V$	-	10	-	nC
Gate-Source Charge	Q_{gs}		-	1.1	-	nC
Gate-Drain Charge	Q_{gd}		-	2.4	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=-1A$	-	-	-1.2	V
Diode Forward Current (Note 2)	I_S		-	-	-4	A

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 product.



PE3415DF Typical Electrical and Thermal Characteristics

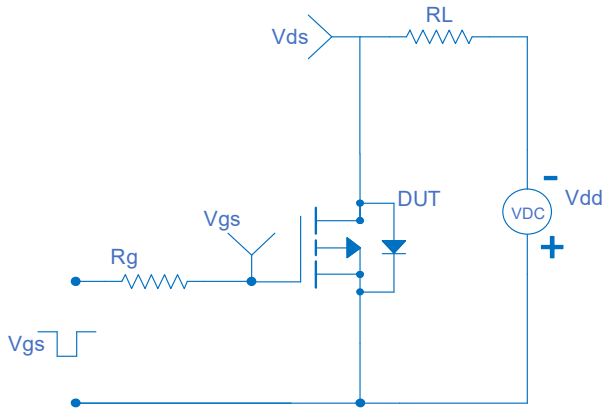


Figure 1 Switching Test Circuit

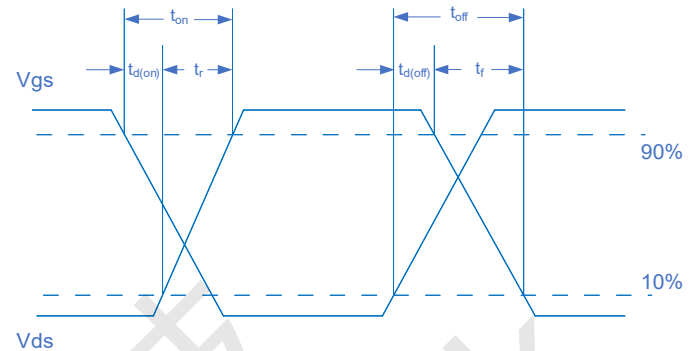


Figure 2 Switching Waveform

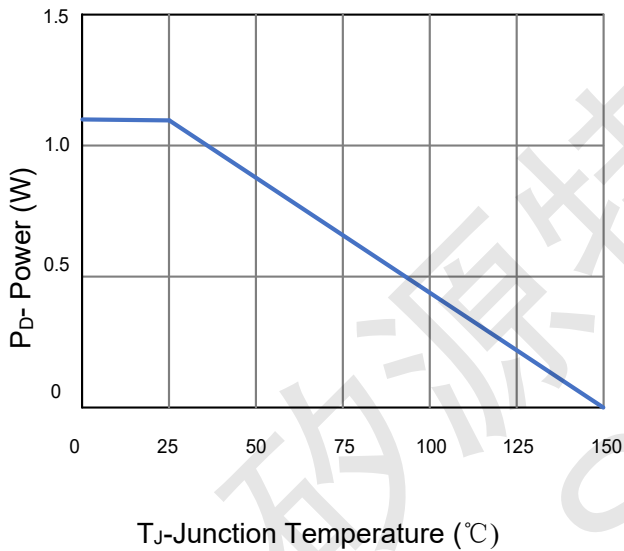


Figure 3 Power De-rating

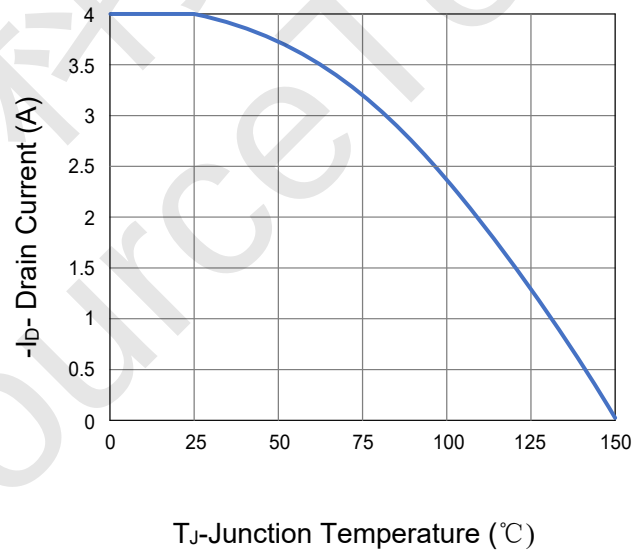


Figure 4 Drain Current

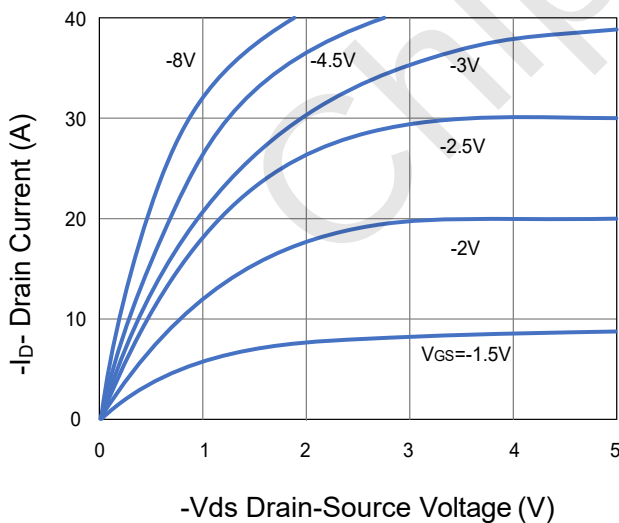


Figure 5 Output Characteristics

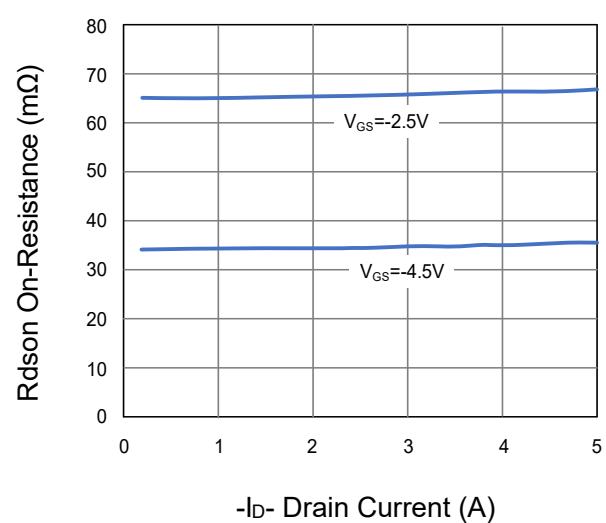


Figure 6 Rdson vs Drain Current

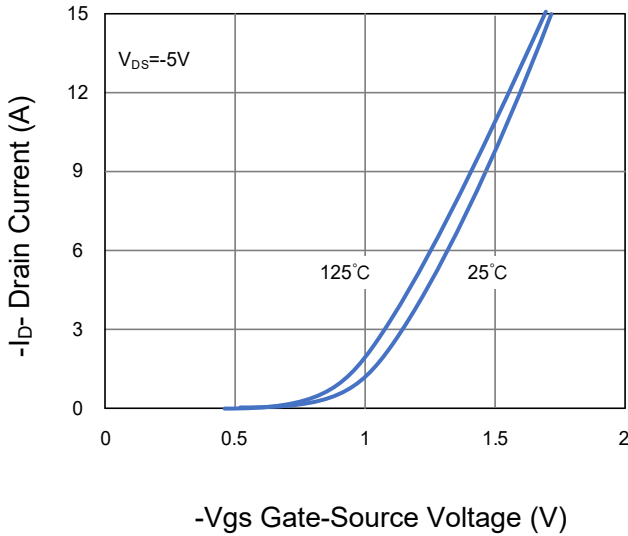


Figure 7 Transfer Characteristics

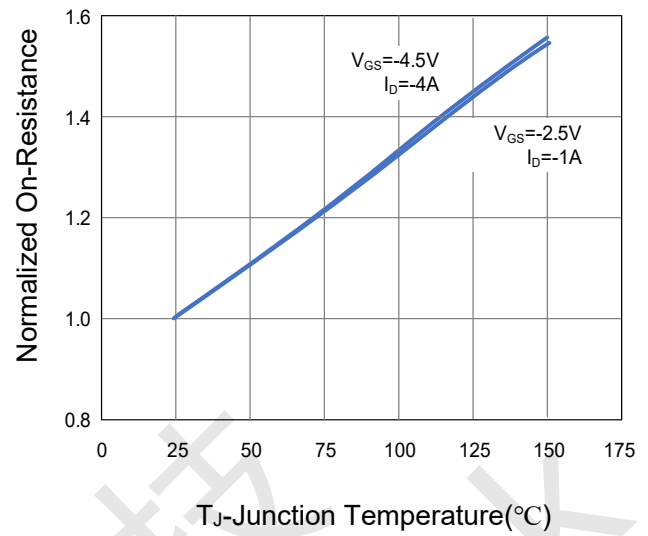


Figure 8 Rdson vs Junction Temperature

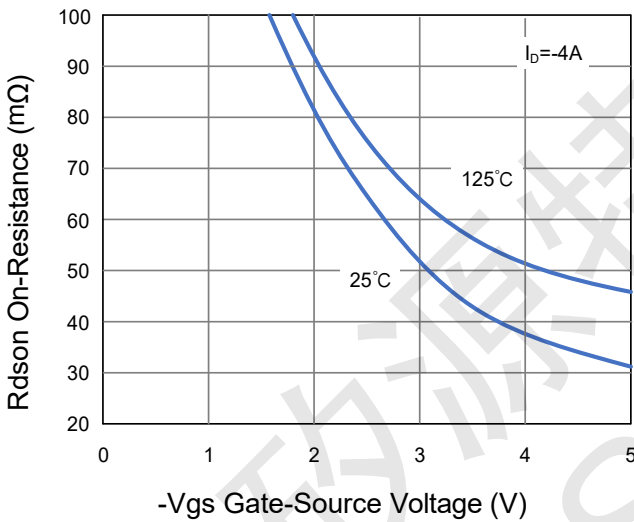


Figure 9 Rdson vs Vgs

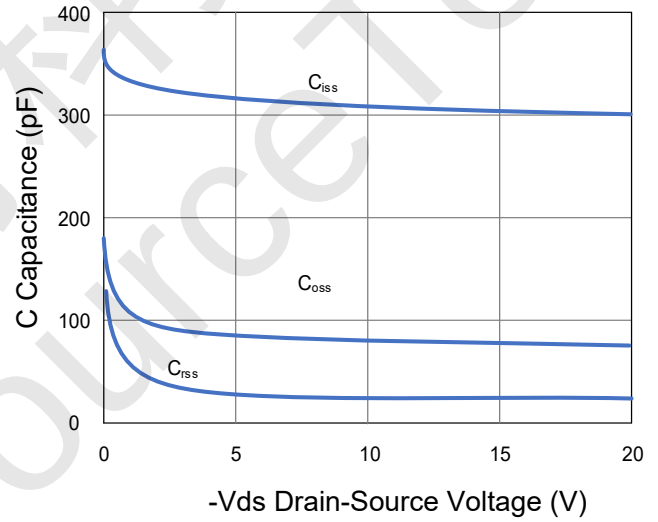


Figure 10 Capacitance vs Vds

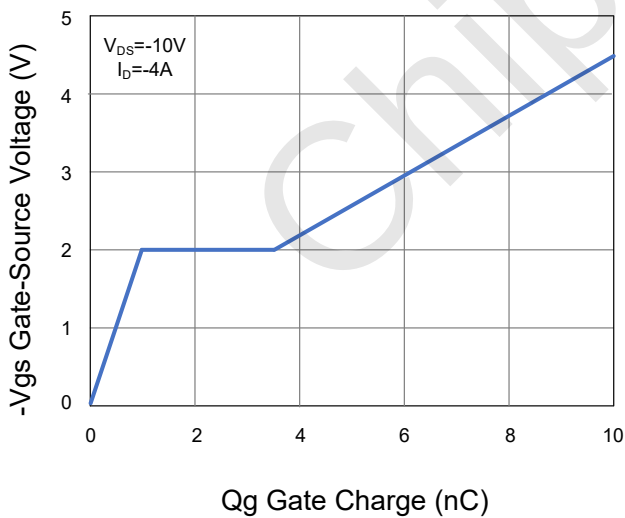


Figure 11 Gate Charge

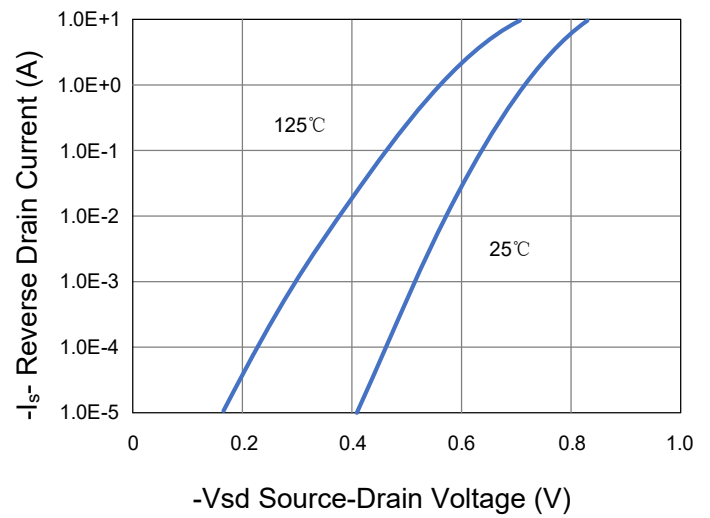


Figure 12 Source- Drain Diode Forward

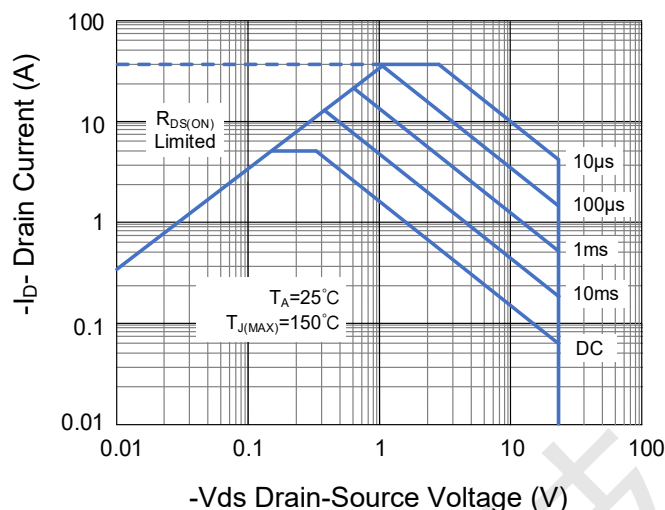


Figure 13 Safe Operation Area

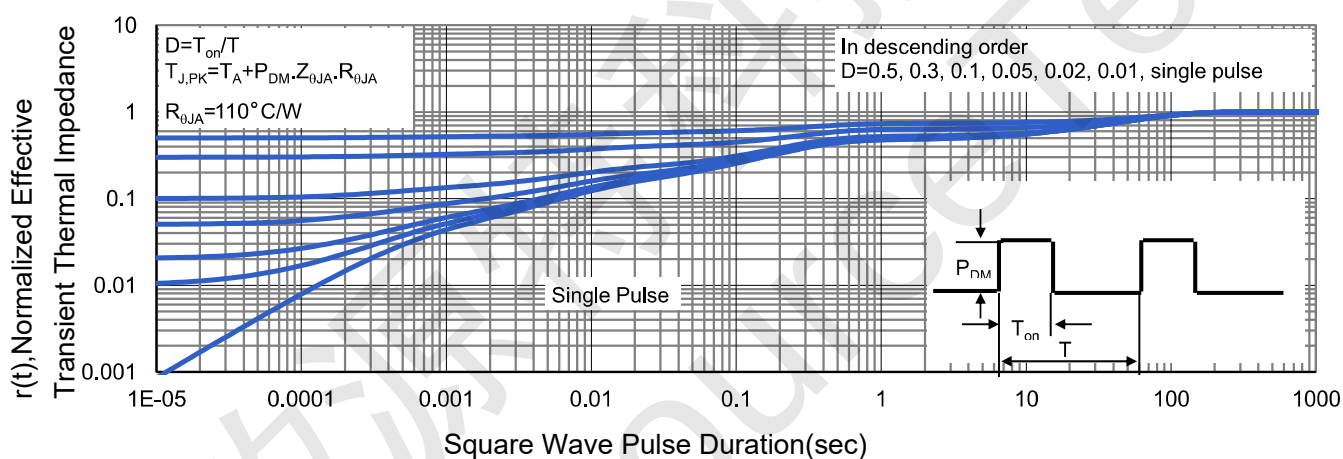
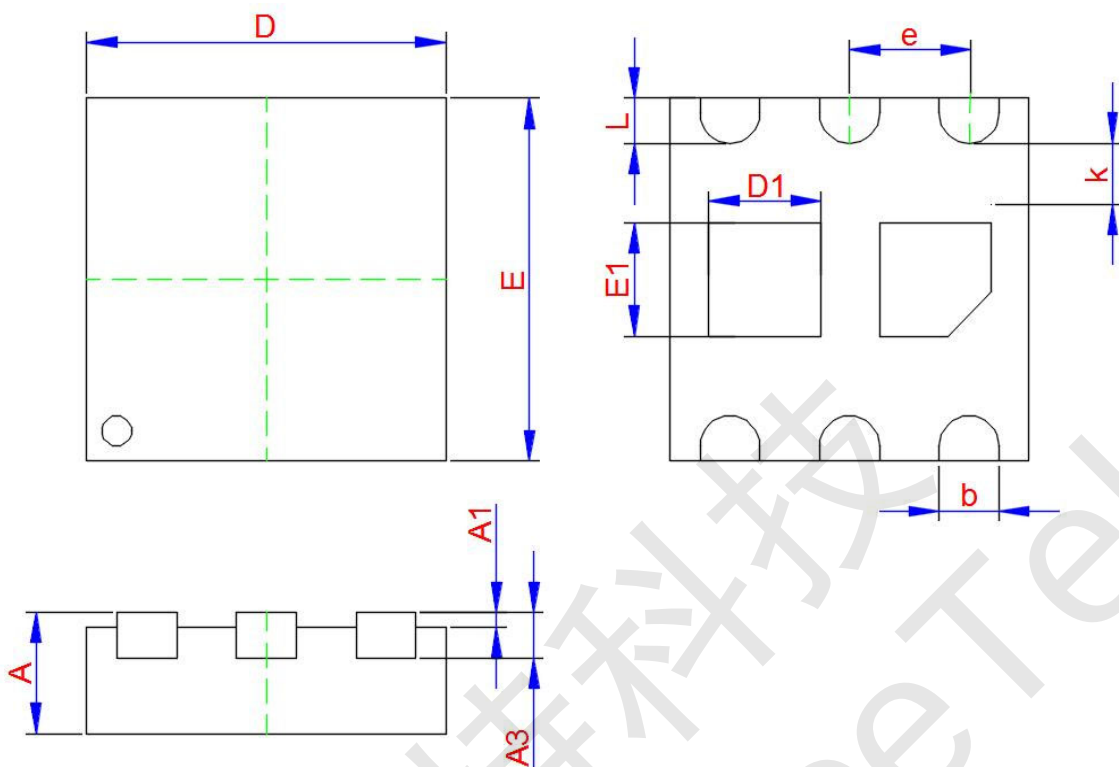


Figure 14 Normalized Maximum Transient Thermal Impedance



PE3415DF DFN2x2-6L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.700	0.750	0.800
A1	-	0.020	0.050
A3	0.170	0.200	0.230
D	1.950	2.000	2.050
E	1.950	2.000	2.050
D1	0.500	0.550	0.600
E1	0.850	0.900	0.950
b	0.200	0.250	0.300
L	0.275	0.300	0.325
k	0.200MIN.		
e	0.650TYP.		