N-Channel Enhancement Mode Power MOSFET

Description

The G300N04LA uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

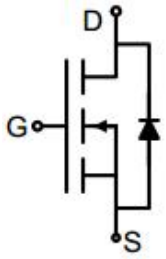
AEC-Q101 Qualified

General Features

- V_{DS} 40V
- I_D (at V_{GS} = 10V) 8A
- $R_{DS(ON)}$ (at V_{GS} = 10V) < 35mΩ
- $R_{DS(ON)}$ (at V_{GS} = 4.5V) < 45mΩ
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



SOT-23-3

Ordering Information

Device	Package	Marking	Packaging
G300N04LA	SOT-23-3	G300N04A	3000pcs/Reel

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	40	V
Continuous Drain Current	T_C = 25ºC	I_D	8	A
	T_C = 100ºC		5.7	
Pulsed Drain Current (note1)		I_{DM}	32	A
Gate-Source Voltage		V_{GS}	±20	V
Power Dissipation		P_D	2.5	W
Single pulse avalanche energy （note2）		E_{AS}	9	mJ
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 To 175	ºC

Thermal Resistance

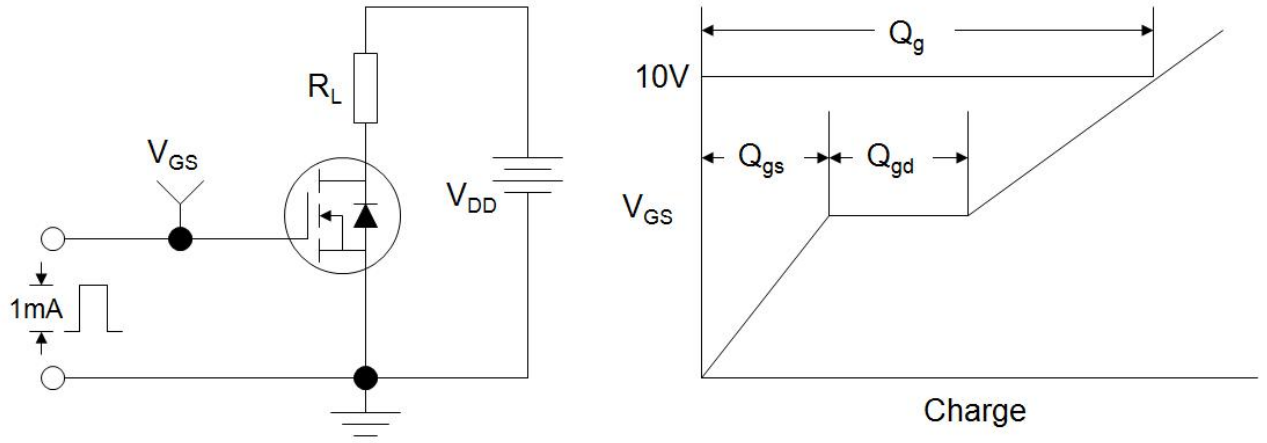
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient, t≤10s	R_{thJA}	60	ºC/W

Specifications T_J = 25ºC, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	40	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40V, V_{GS} = 0V	--	--	1	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.9	2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 2A	--	28	35	mΩ
		V_{GS} = 4.5V, I_D = 2A	--	40	45	
Forward Transconductance	g_{FS}	V_{GS} = 5V, I_D = 2A	--	30	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 20V, f = 1.0MHz	--	550	--	pF
Output Capacitance	C_{oss}		--	45	--	
Reverse Transfer Capacitance	C_{rss}		--	35	--	
Total Gate Charge	Q_g	V_{DD} = 20V, I_D = 2A, V_{GS} = 10V	--	10	--	nC
Gate-Source Charge	Q_{gs}		--	1.4	--	
Gate-Drain Charge	Q_{gd}		--	1.6	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 20V, I_D = 2A, R_G = 1Ω	--	9	--	ns
Turn-on Rise Time	t_r		--	10	--	
Turn-off Delay Time	$t_{d(off)}$		--	14	--	
Turn-off Fall Time	t_f		--	7	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	8	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 2A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Qrr	I_F = 2A, V_{GS} = 0V di/dt=100A/us	--	26	--	nC
Reverse Recovery Time	Trr		--	37	--	ns

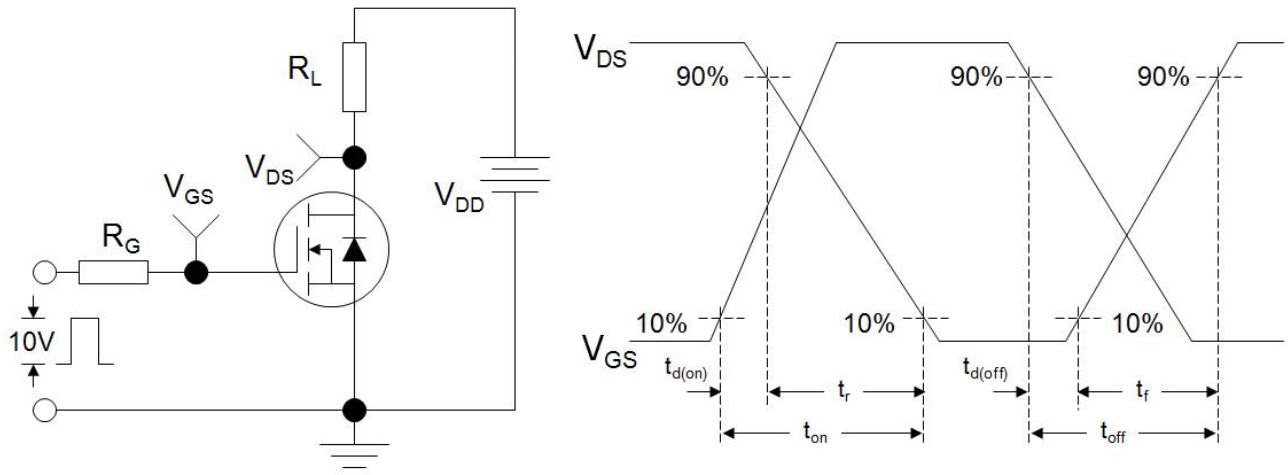
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : Tj=25℃ ,VDD=40V,VGS=10V,L=0.5mH,Rg=25Ω
   The table shows the minimum avalanche energy, which is 25mJ when the device is tested until failure
3. Identical low side and high side switch with identical R_G

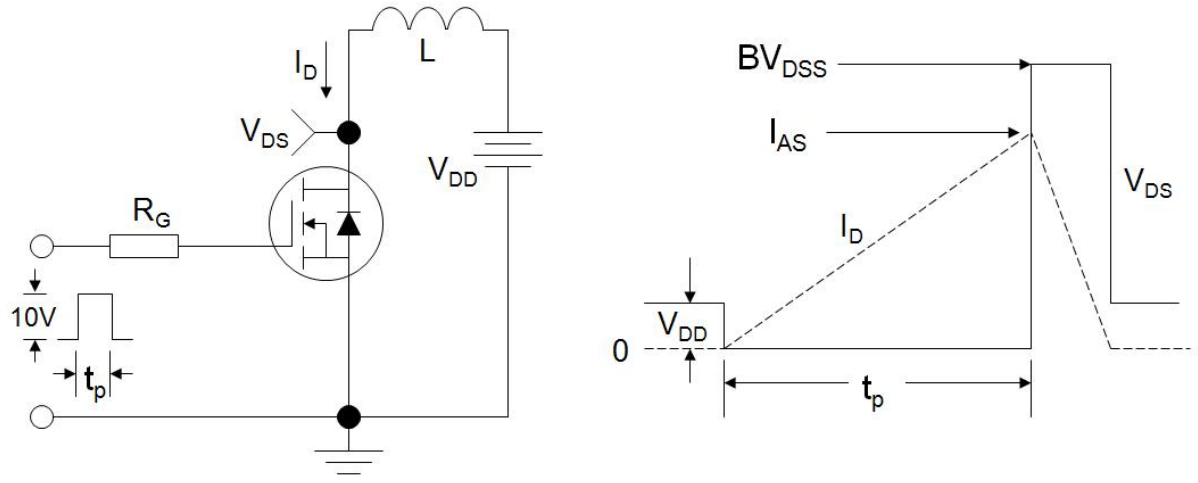
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

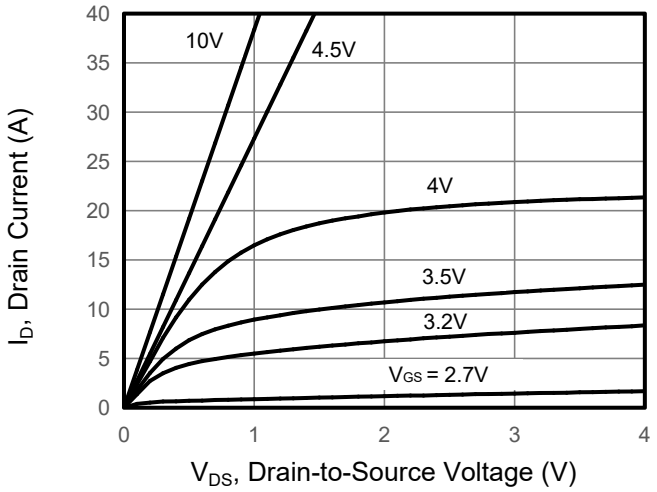


Figure 2. Transfer Characteristics

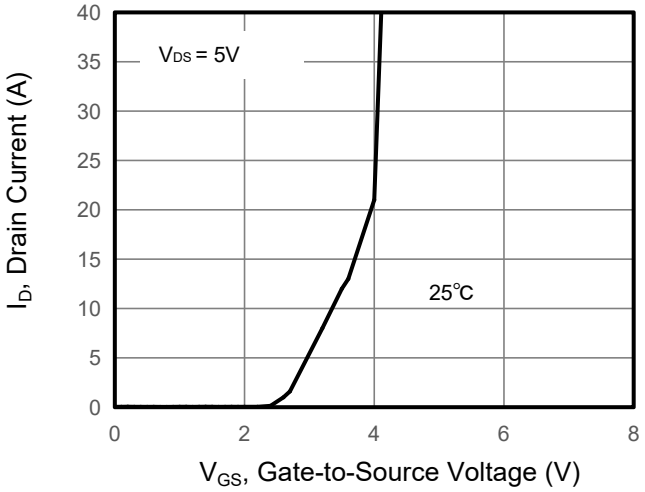


Figure 3. Drain Source On Resistance

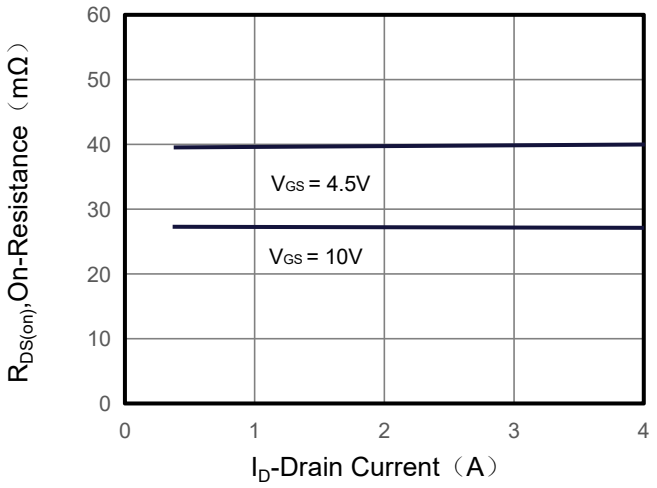


Figure 4. Gate Charge

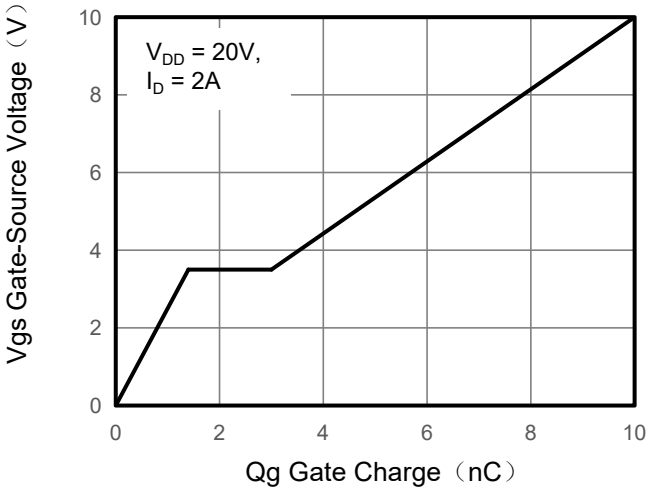


Figure 5. Capacitance

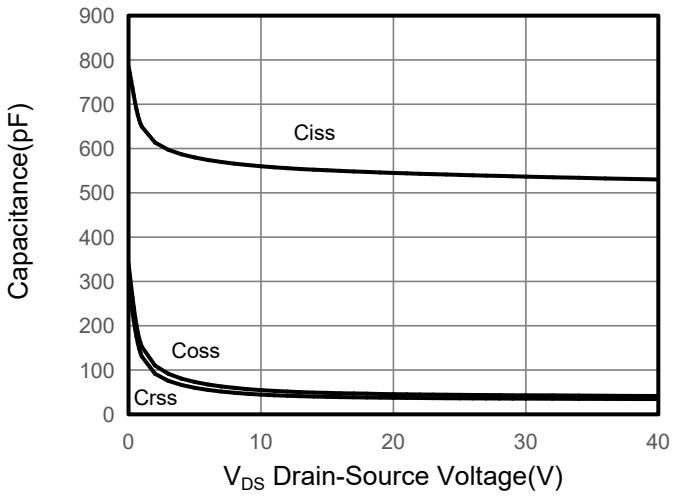
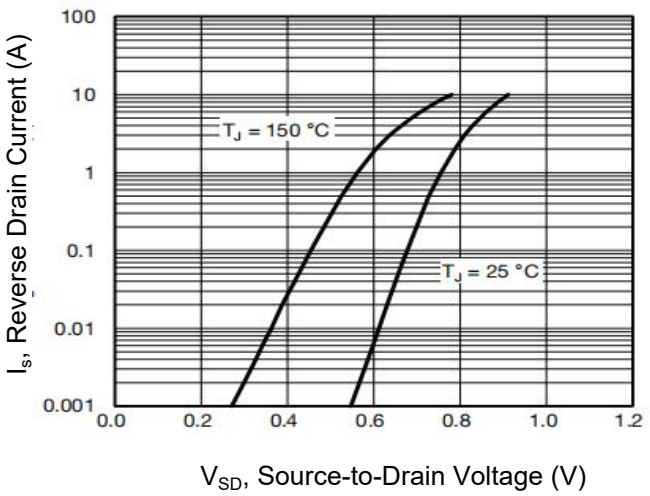


Figure 6. Source-Drain Diode Forward



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

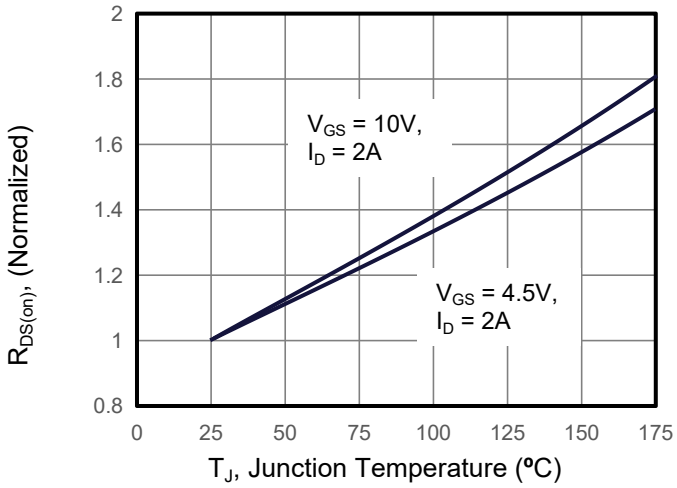


Figure 8. Safe Operation Area

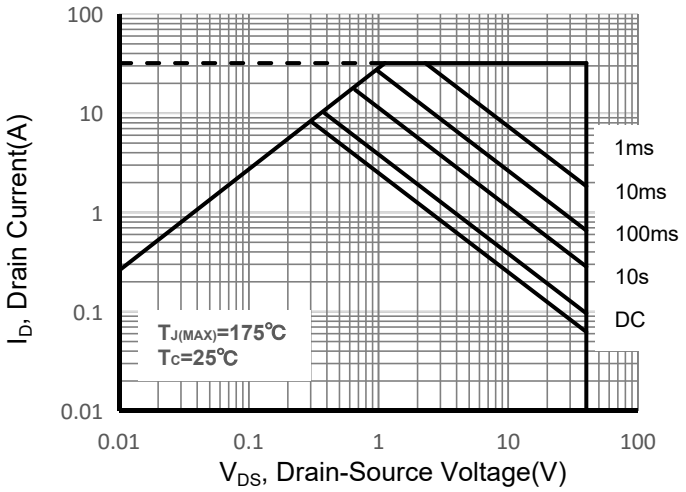


Figure 9. Maximum Continuous Drain Current vs Case Temperature

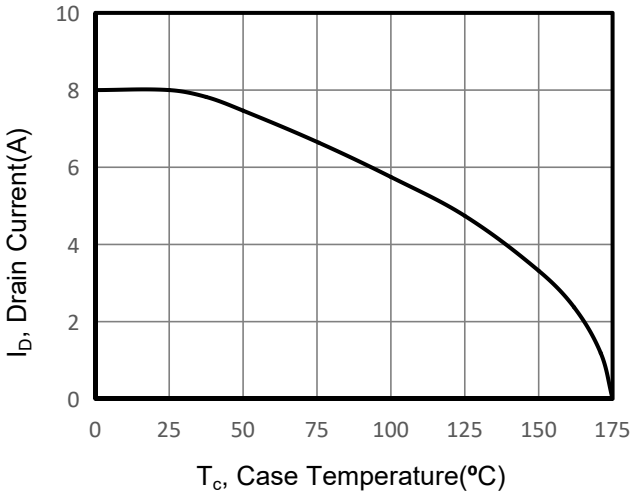
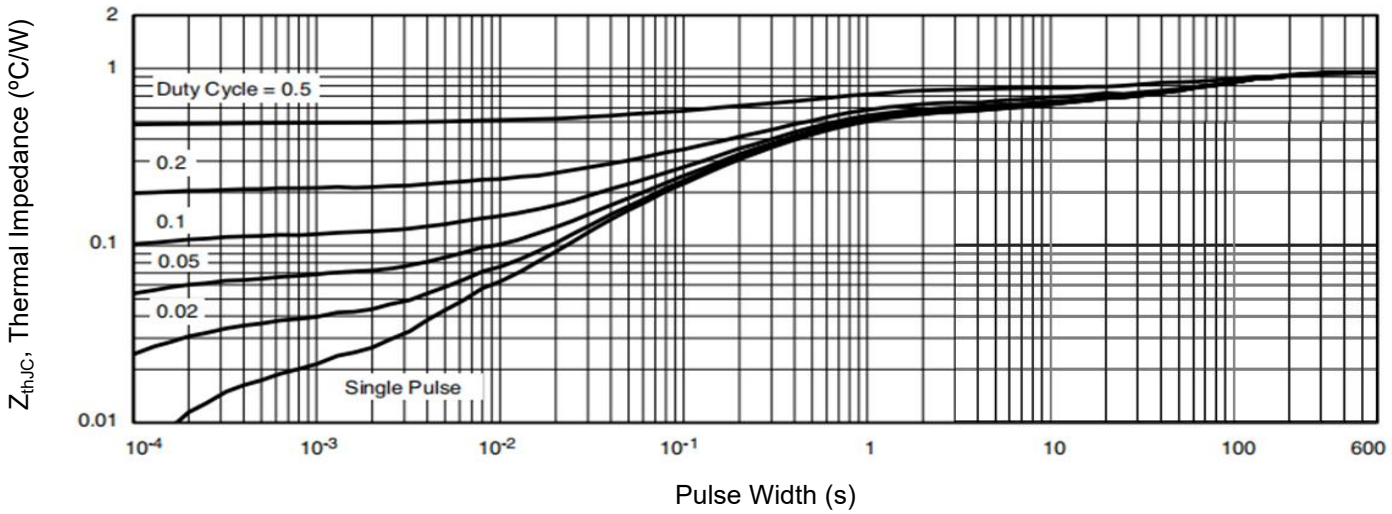
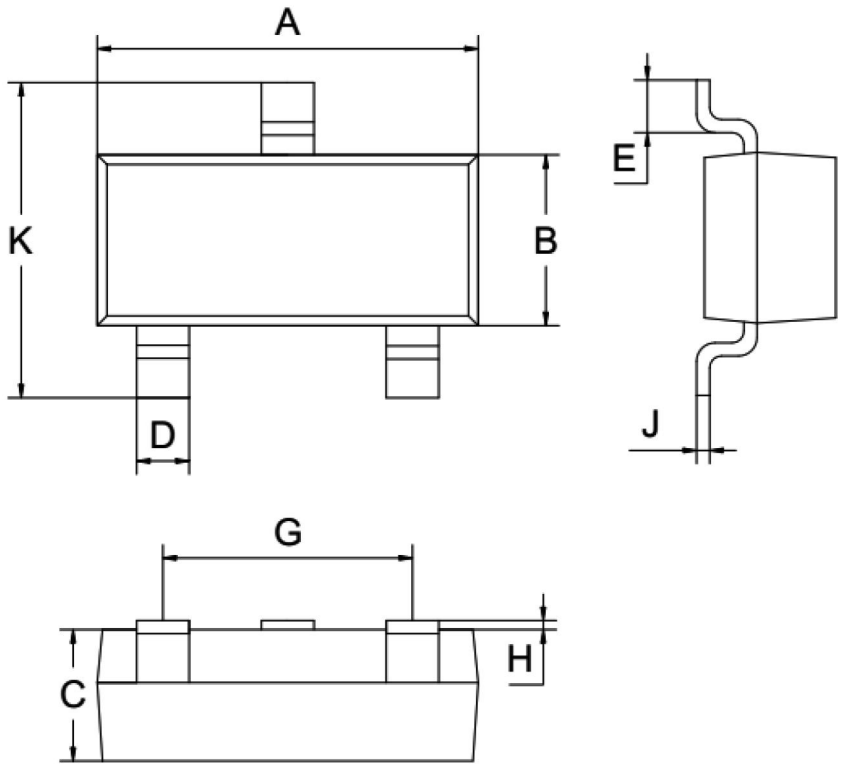


Figure 10. Normalized Maximum Transient Thermal Impedance



SOT-23-3 Package Information



Symbol	Dimensions in Millimeters		
	MIN.	NOM.	MAX.
A	2.80	2.90	3.00
B	1.50	1.60	1.70
C	1.00	1.10	1.20
D	0.30	0.40	0.50
E	0.25	0.40	0.55
G	1.90		
H	0.00	-	0.10
J	0.047	0.127	0.207
K	2.60	2.80	3.00
All Dimensions in mm			