

Features

- Low On-Resistance
- Operated at low logic level gate drive
- JESD22-A114-B ESD rating of class 2 per human body model

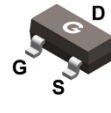
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Typical Applications

- Load / Power switching
- Interfacing switching
- Battery management for ultra small portable electronics
- Logic level shift

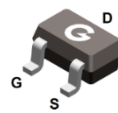
Mechanical Data

- Case: SOT-23, SOT-323, SOT-523, DFN1006-3, SOT-723
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



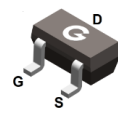
BL1012

SOT-23



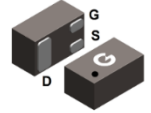
BL1012W

SOT-323



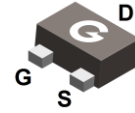
BL1012T

SOT-523



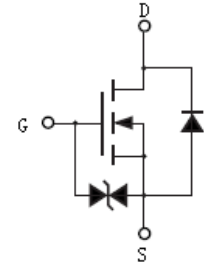
BL1012L

DFN1006-3



BL1012M

SOT-723



Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
BL1012	SOT-23	3000 pcs / Tape & Reel	1012
BL1012W	SOT-323	3000 pcs / Tape & Reel	1012
BL1012T	SOT-523	3000 pcs / Tape & Reel	1012
BL1012L	DFN1006-3	10000 pcs / Tape & Reel	1012
BL1012M	SOT-723	10000 pcs / Tape & Reel	1012

Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-to-Source Voltage		V _{DSS}	20	V
Gate-to-Source Voltage		V _{GSS}	±10	V
Continuous Drain Current (T _A = 25°C)	SOT-23 / SOT-323	I _D	1	A
Continuous Drain Current (T _A = 25°C)	SOT-523 / SOT-723 / DFN1006-3		0.64	A
Continuous Drain Current (T _A = 85°C)	SOT-23 / SOT-323		0.64	A
Continuous Drain Current (T _A = 85°C)	SOT-523 / SOT-723 / DFN1006-3		0.45	A
Pulsed Drain Current (t _p = 10μs, T _A = 25°C)		I _{DM}	4	A

Thermal Characteristics

Parameter		Symbol	Value	Unit
Power Dissipation *1	SOT-23	P_D	0.35	W
	SOT-323		0.29	
	SOT-523		0.28	
	DFN1006-3		0.15	
	SOT-723		0.15	
Thermal Resistance Junction-to-Air *1	SOT-23	$R_{\theta JA}$	357	°C/W
	SOT-323		431	
	SOT-523		447	
	DFN1006-3		834	
	SOT-723		834	
Thermal Resistance Junction-to-Lead *1	SOT-23	$R_{\theta JL}$	214	°C/W
	SOT-323		258	
	SOT-523		268	
	DFN1006-3		500	
	SOT-723		500	
Thermal Resistance Junction-to-Case *1	SOT-23	$R_{\theta JC}$	180	°C/W
	SOT-323		217	
	SOT-523		225	
	DFN1006-3		421	
	SOT-723		421	
Operating Junction Temperature Range		T_J	-55 ~ +150	°C
Storage Temperature Range		T_{STG}	-55 ~ +150	°C

Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 20V, V _{GS} = 0V	-	-	100	nA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±10V, V _{DS} = 0V	-	-	±10	μA
On Characteristics						
R _{DS(ON)}	Drain-Source On-resistance*2	V _{GS} =4.5V, I _D =0.5A	-	250	396	mΩ
		V _{GS} =2.5V, I _D =0.2A	-	300	456	
		V _{GS} =1.8V, I _D =0.1A	-	370	546	
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250uA	0.4	0.67	1.0	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	115	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V V _{DS} = 10V f = 1.0MHz	-	67	-	pF
C _{OSS}	Output Capacitance		-	19	-	
C _{RSS}	Reverse Transfer Capacitance		-	6	-	
Switching Characteristics						
Q _G	Total Gate-Charge	V _{GS} = 4.5V V _{DS} = 10V I _D = 0.5A	-	2.35	-	nC
Q _{GS}	Gate to Source Charge		-	0.22	-	
Q _{GD}	Gate to Drain (Miller) Charge		-	0.21	-	
t _{d(ON)}	Turn-on Delay Time*3	V _{GS} = 4V V _{DD} = 10V I _D = 0.15A R _G = 10Ω	-	2.8	-	ns
t _r	Turn-on Rise Time*3		-	20	-	
t _{d(OFF)}	Turn-Off Delay Time*3		-	23	-	
t _f	Turn-Off Fall Time*3		-	23	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _S = 0.5A, V _{GS} = 0 V	-	0.85	1.2	V

Notes:

- 1、 The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper
- 2、 Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
- 3、 Guaranteed by design, not subject to production

Ratings and Characteristics Curves (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

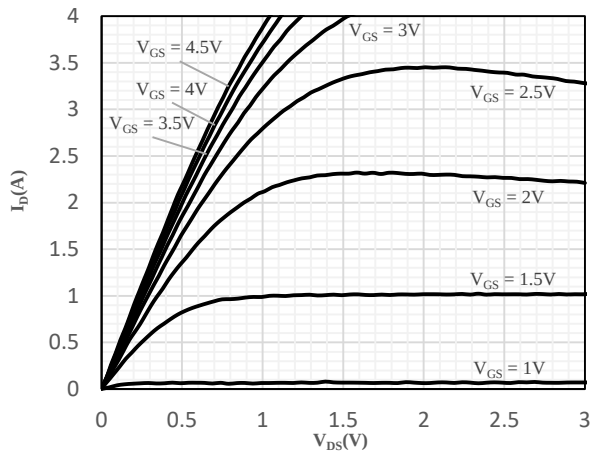


Fig 1 Typical Output Characteristics

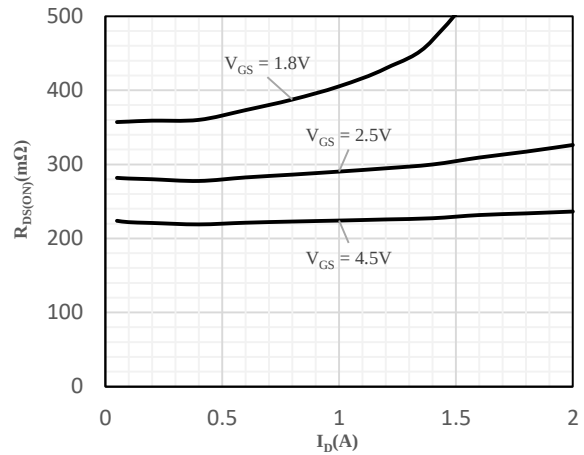


Fig 2 On-Resistance vs. Drain Current and Gate Voltage

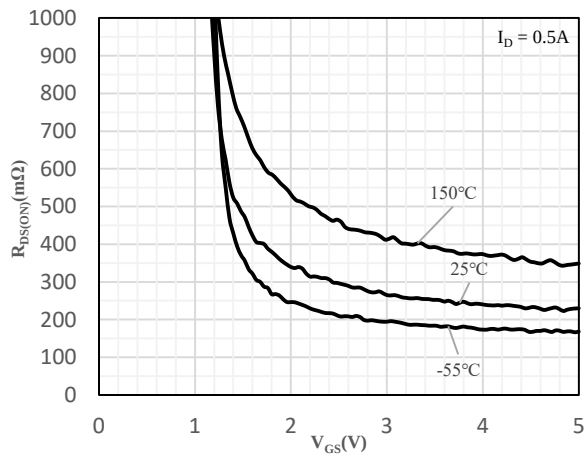


Fig 3 On-Resistance vs. Gate-Source Voltage

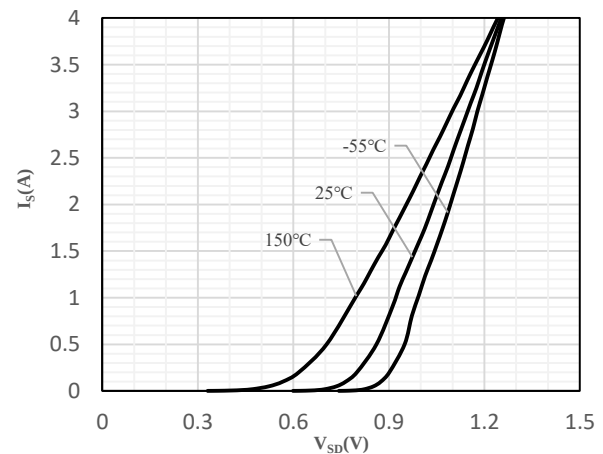


Fig 4 Body-Diode Characteristics

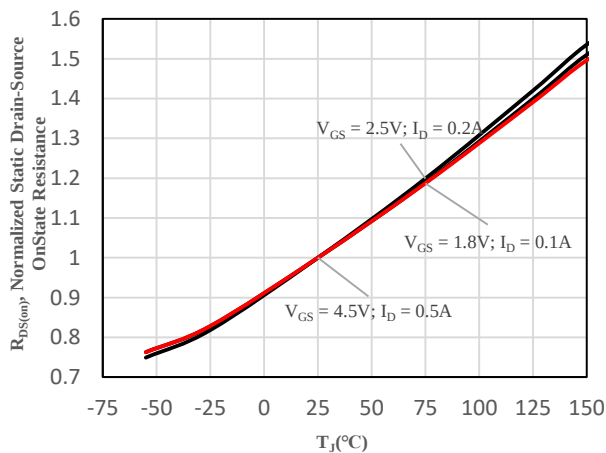


Fig 5 Normalized On-Resistance vs. Junction Temperature

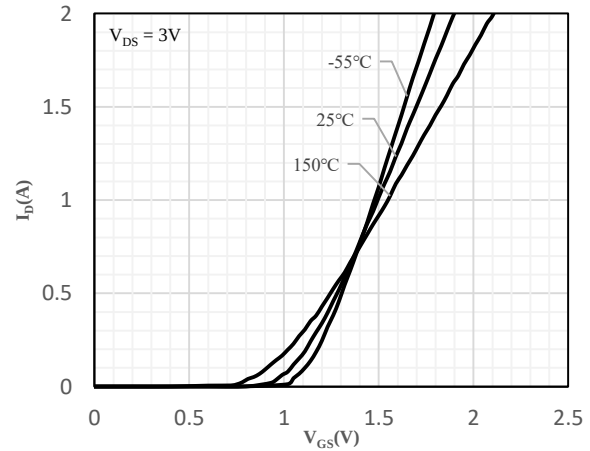


Fig 6 Transfer Characteristics

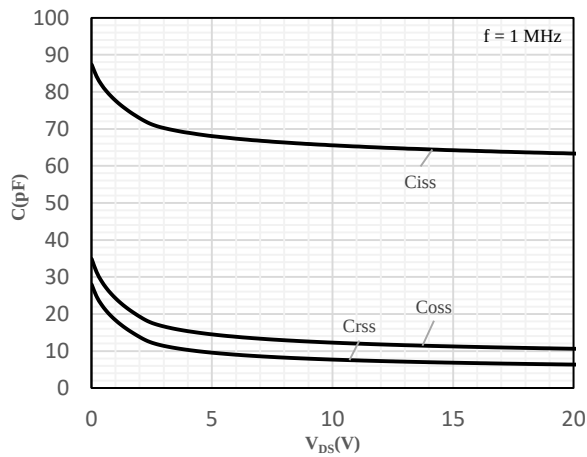


Fig 7 Capacitance Characteristics

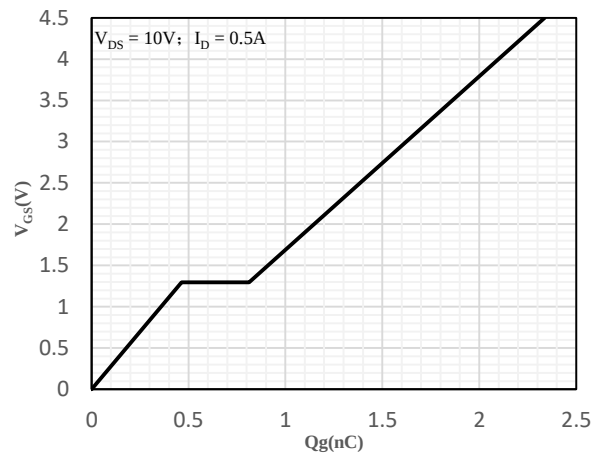


Fig 8 Gate-Charge Characteristics

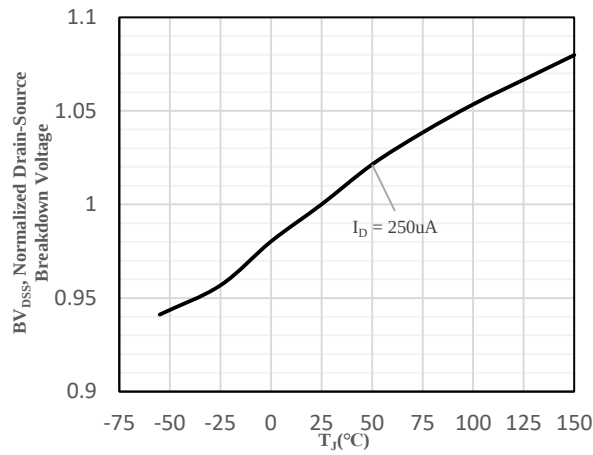


Fig 9 Normalized Breakdown Voltage vs. Junction Temperature

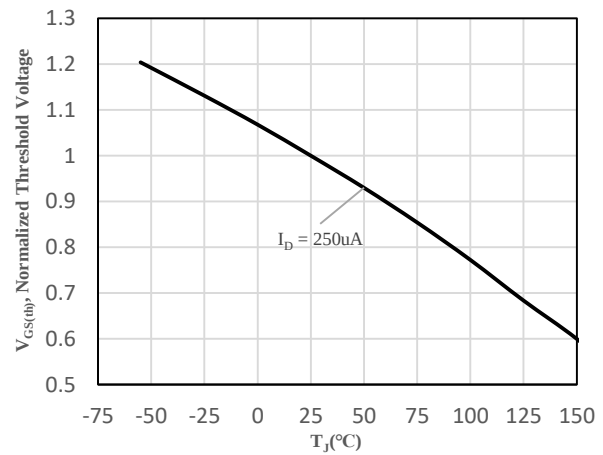


Fig 10 Normalized $V_{GS(th)}$ vs. Junction Temperature

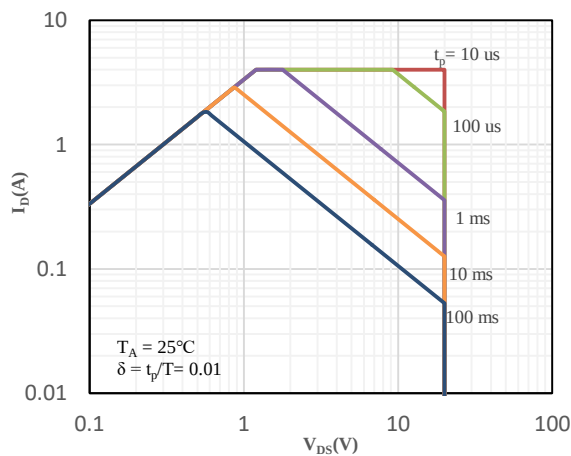


Fig 11 Safe Operation Area

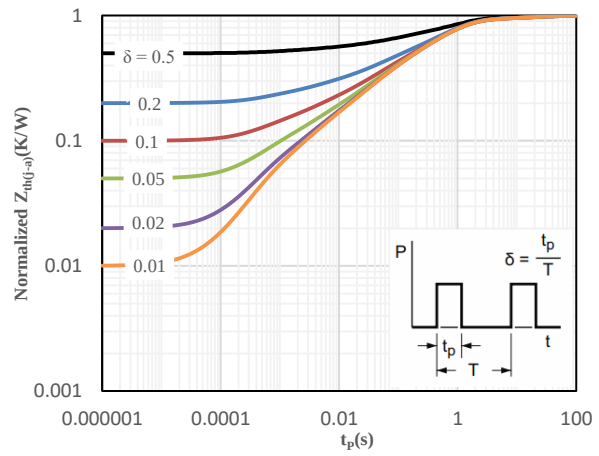
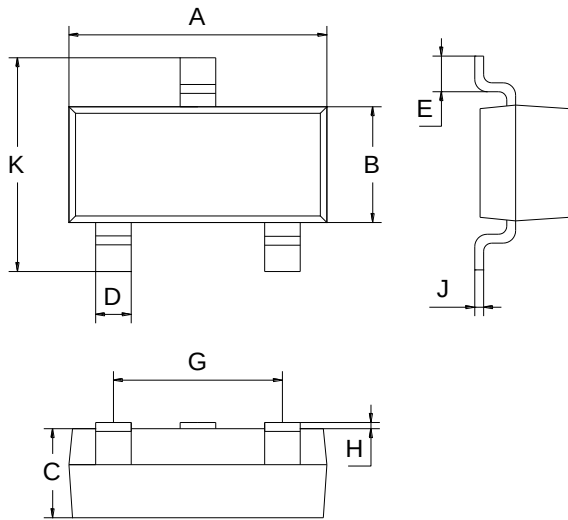
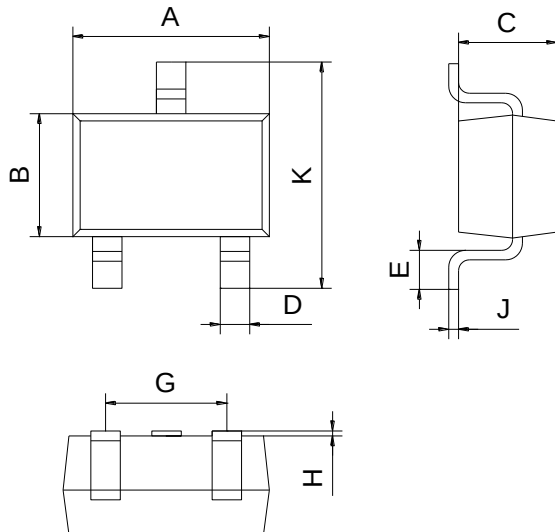


Fig 12 Normalized Maximum transient thermal impedance

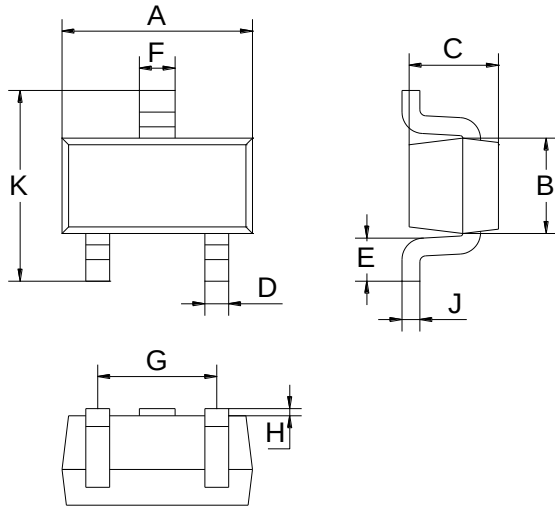
Package Outline Dimensions (Unit: mm)



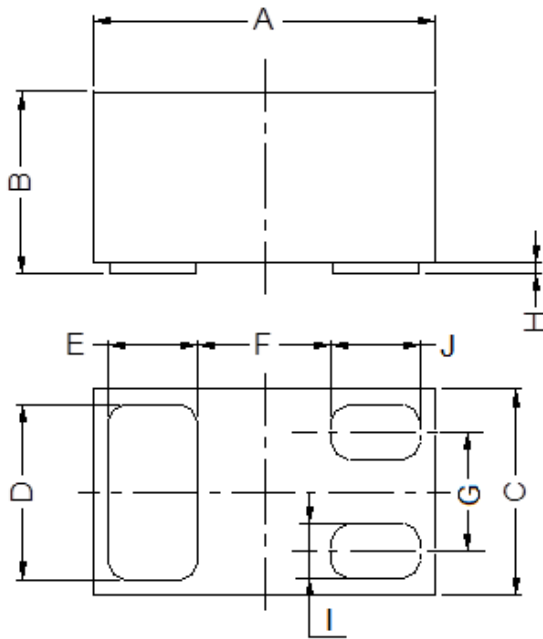
SOT-23		
Dimension	Min.	Max.
A	2.70	3.10
B	1.10	1.50
C	0.90	1.10
D	0.30	0.50
E	0.35	0.48
G	1.80	2.00
H	0.02	0.10
J	0.05	0.15
K	2.20	2.60



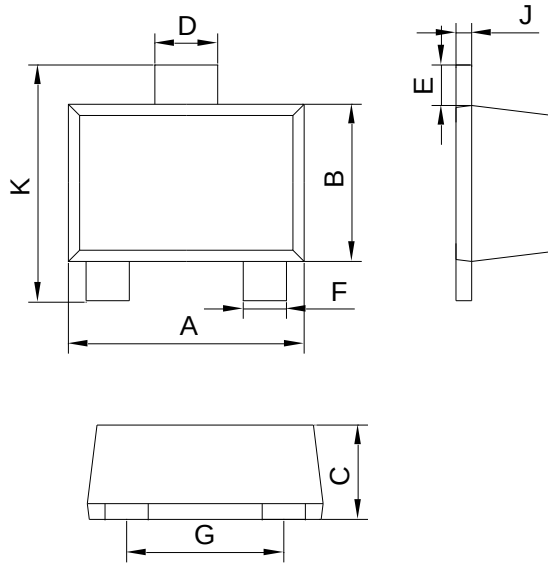
SOT-323		
Dimension	Min.	Max.
A	2.00	2.20
B	1.15	1.35
C	0.90	1.10
D	0.15	0.35
E	0.25	0.40
G	1.20	1.40
H	0.02	0.10
J	0.05	0.15
K	2.20	2.40



SOT-523		
Dimension	Min.	Max.
A	1.50	1.70
B	0.75	0.85
C	0.60	0.80
D	0.15	0.30
E	0.30	0.40
F	0.25	0.40
G	0.90	1.10
H	0.02	0.10
J	0.08	0.18
K	1.45	1.75



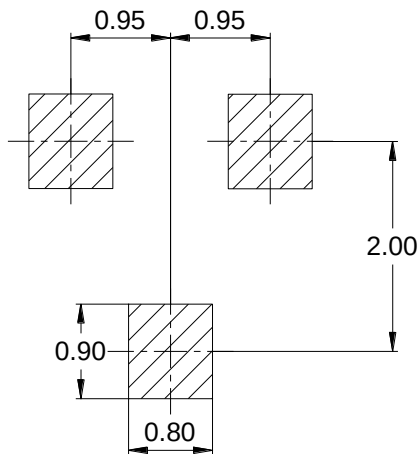
DFN1006-3			
Dimension	Min.	Typ.	Max.
A	0.95	1.00	1.075
B	0.47	0.50	0.53
C	0.55	0.60	0.675
D	0.45	0.50	0.55
E/J	0.20	0.25	0.30
F	-	0.40	-
G	-	0.35	-
H	0	0.03	0.05
I	0.10	0.15	0.20



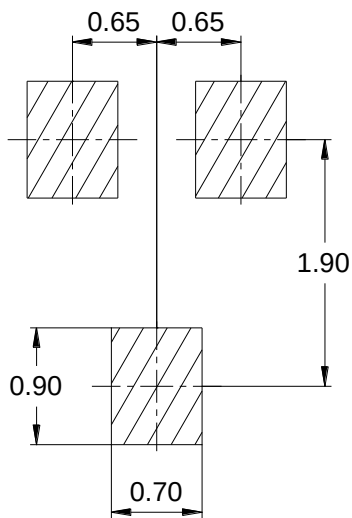
SOT-723		
Dimension	Min.	Max.
A	1.10	1.30
B	0.70	0.90
C	0.40	0.54
D	0.22	0.42
E	0.10	0.30
F	0.12	0.32
G	0.70	0.90
J	0.08	0.15
K	1.10	1.30

Mounting Pad Layout (Unit: mm)

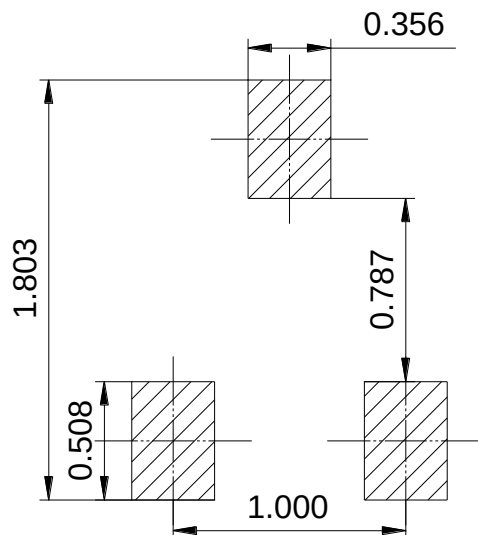
SOT-23



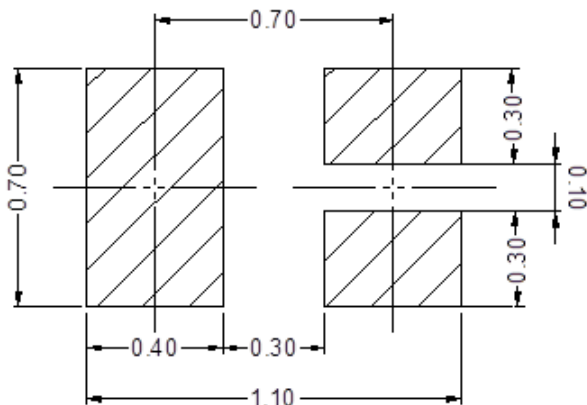
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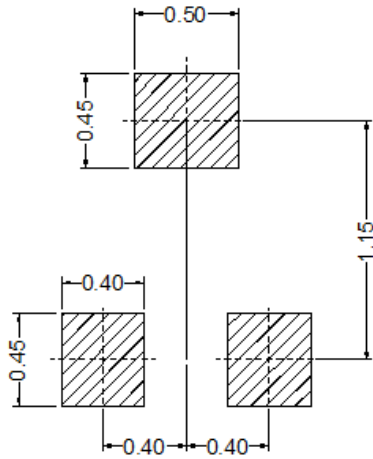
SOT-523



DFN1006-3



SOT-723



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