

Features

- Advanced trench technology
- Extremely low threshold voltage
- Fast switching speed
- HBM: AEC-Q101-001: H2 (JESD22-A114-B: 2)
- RoHS compliant with Halogen-free
- Qualified to AEC-Q101 Standards

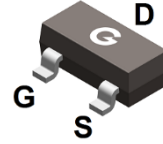
HF

Applications

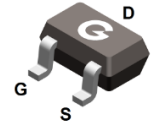
- Load switch appliances

Mechanical Data

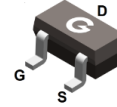
- Case: SOT-23, SOT-323, SOT-523, DFN1006-3, SOT-723
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



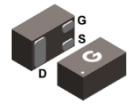
TBL1015
SOT-23



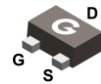
TBL1015W
SOT-323



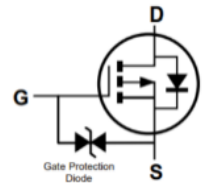
TBL1015T
SOT-523



TBL1015L
DFN1006-3



TBL1015M
SOT-723



Ordering Information

Part Number	Package	Shipping	Marking Code
TBL1015	SOT-23	3000pcs / Tape & Reel	1015
TBL1015W	SOT-323	3000pcs / Tape & Reel	1015
TBL1015T	SOT-523	3000pcs / Tape & Reel	1015
TBL1015L	DFN1006-3	10000pcs / Tape & Reel	1015
TBL1015M	SOT-723	10000pcs / Tape & Reel	1015

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

Parameter	Symbol	Value	Units
Drain-Source Voltage	V _{DSS}	-30	V
Gate -Source Voltage	V _{GSS}	±10	V
Continuous Drain Current (T _A = 25°C) *1	I _D	-0.33	A
Continuous Drain Current (T _A = 70°C) *1		-0.27	
Pulsed Drain Current (t _p = 10μs, T _A = 25°C)	I _{DM}	-2	A
Single Pulse Avalanche Energy *3	E _{AS}	0.2	mJ
Power Dissipation *1	SOT-23	0.42	W
	SOT-323	0.25	
	SOT-523	0.2	
	DFN1006-3	0.15	
	SOT-723	0.15	
Operating Junction Temperature Range	T _J	-55 ~ +150	°C
Storage Temperature Range	T _{STG}	-55 ~ +150	°C

Thermal Characteristics

Parameter		Symbol	Limits	Unit
Thermal Resistance Junction to Ambient Air ^{*1}	SOT-23	$R_{\theta JA}$	300	°C/W
	SOT-323		500	
	SOT-523		625	
	DFN1006-3		833	
	SOT-723		833	

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	-30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -30V, V _{GS} = 0V	-	-	-1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±8V, V _{DS} = 0V	-	-	±10	μA
On Characteristics						
R _{DS(ON)}	Drain-Source On-resistance *2	V _{GS} = -4.5V, I _D = -0.3A	-	1.4	2.5	Ω
		V _{GS} = -2.5V, I _D = -0.2A	-	1.8	2.9	
		V _{GS} = -1.8V, I _D = -0.1A	-	2.2	5	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-0.4	-0.65	-1.0	V
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	6	-	pF
C _{OSS}	Output Capacitance	V _{DS} = -10V	-	5	-	
C _{RSS}	Reverse Transfer Capacitance	f = 1.0MHz	-	1.3	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time *4	V _{DD} = -10V, V _{GS} = -4.5V R _G = 6Ω, R _L = 150Ω I _D = -0.1A	-	3.4	-	ns
t _r	Turn-on Rise Time *4		-	13	-	
t _{d(OFF)}	Turn-Off Delay Time *4		-	37	-	
t _f	Turn-Off Fall Time *4		-	23	-	
Q _G	Total Gate-Charge	V _{DD} = -15V	-	2.1	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = -4.5V	-	0.5	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = -0.3A	-	0.25	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *2	I _{SD} = -0.3 A, V _{GS} = 0V	-	-0.9	-1.3	V

Notes:

- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper
- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The E_{AS} data shows Max. rating. The test condition is $V_{DD} = -15V, V_{GS} = -8V, L = 0.1mH$
- Guaranteed by design, not subject to production

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

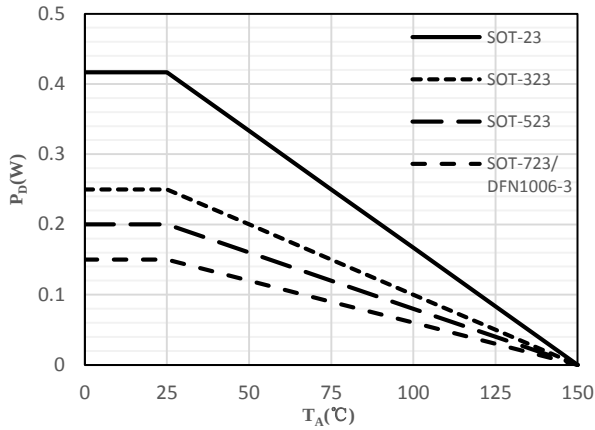


Fig 1 Power Dissipation

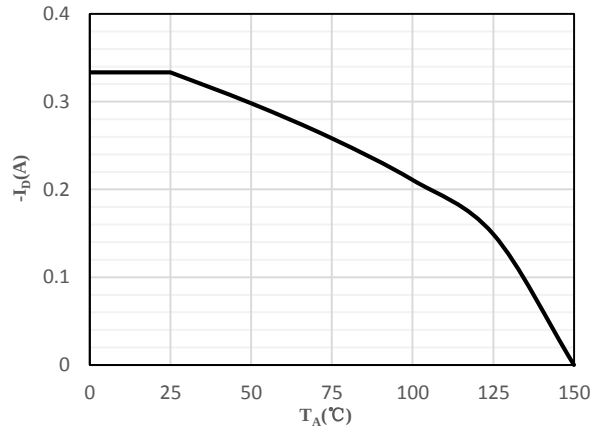


Fig 2 Drain Current

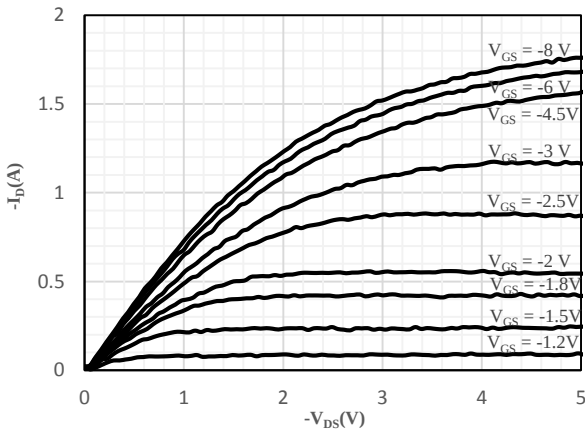


Fig 3 Typical Output Characteristics

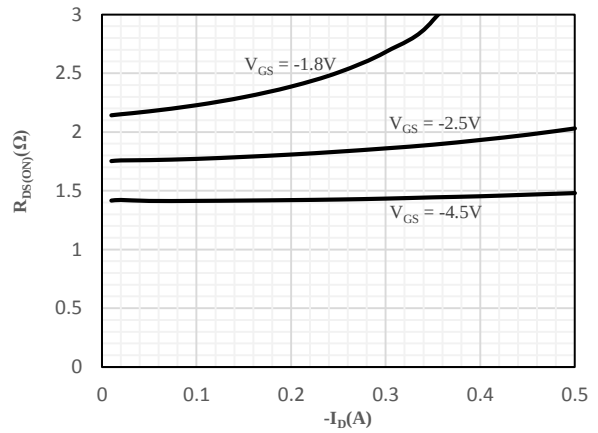


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

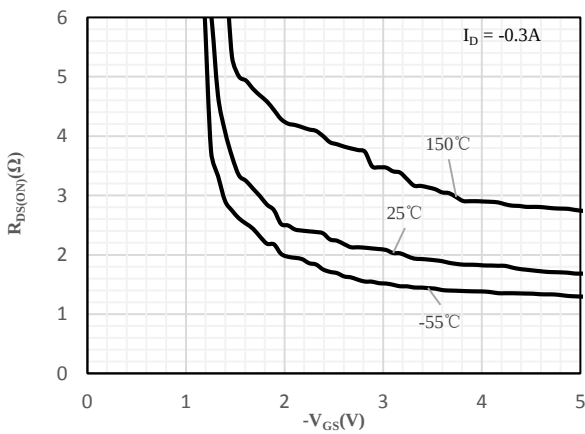


Fig 5 On-Resistance vs. Gate-Source Voltage

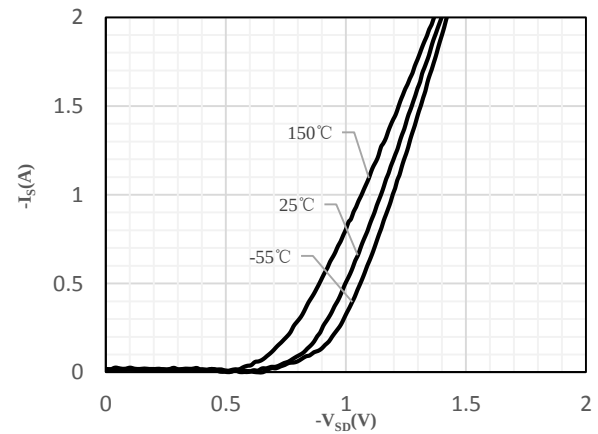


Fig 6 Body-Diode Characteristics

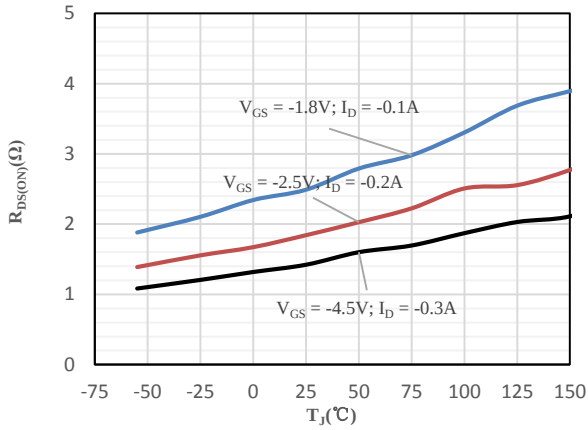


Fig 7 On-Resistance vs. Junction Temperature

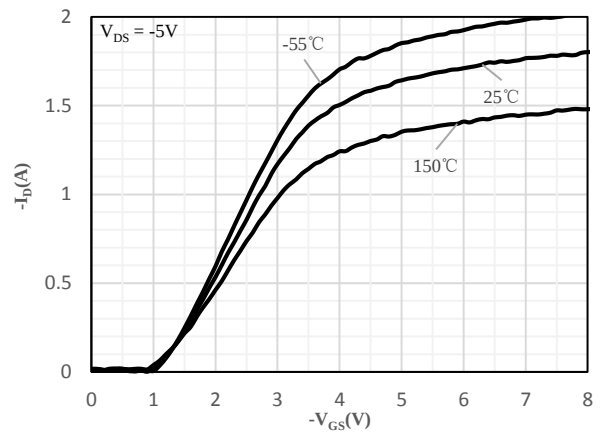


Fig 8 Transfer Characteristics

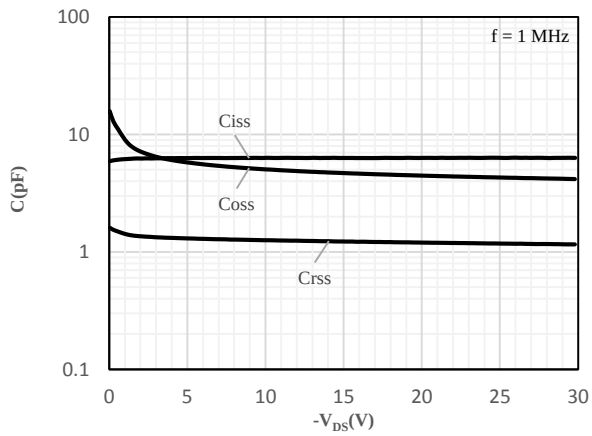


Fig 9 Capacitance Characteristics

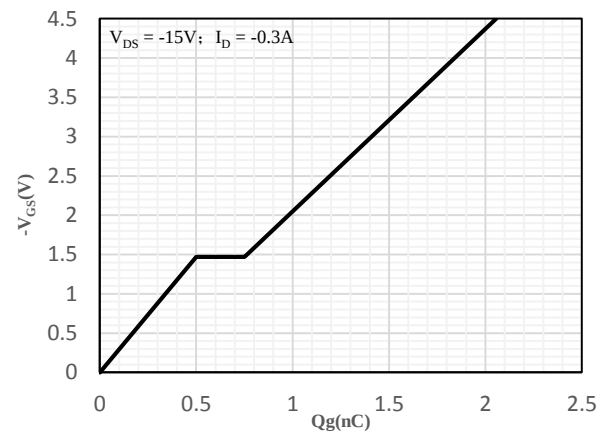


Fig 10 Gate-Charge Characteristics

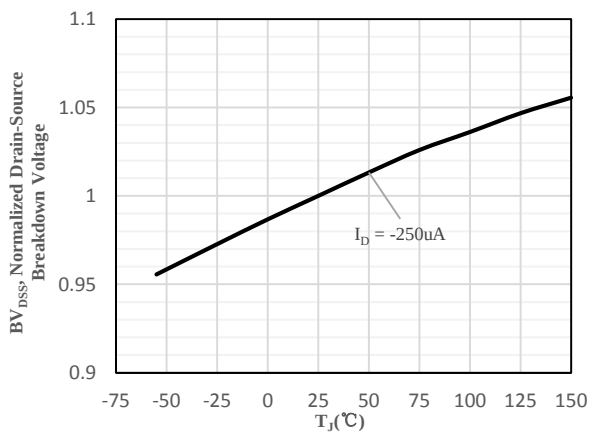


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

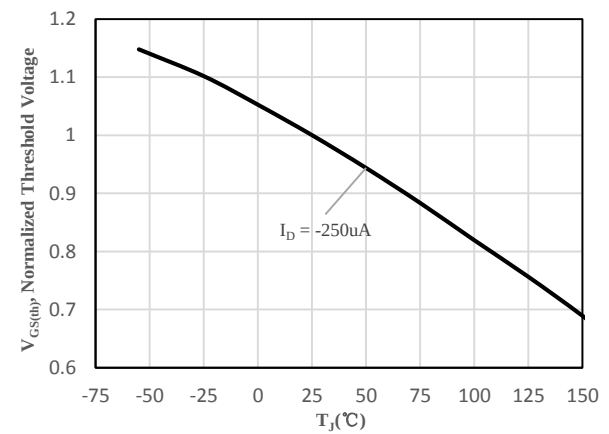


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

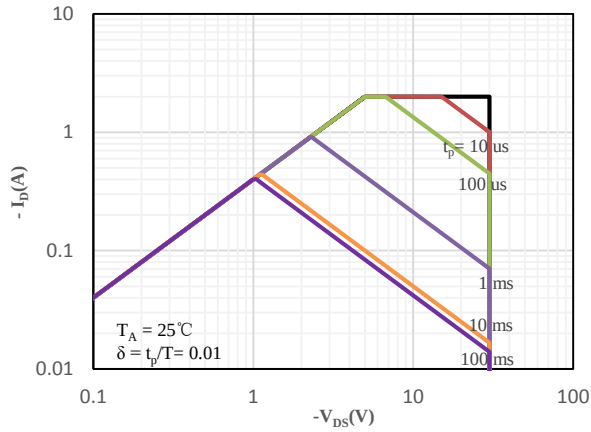


Fig 13 Safe Operating Area

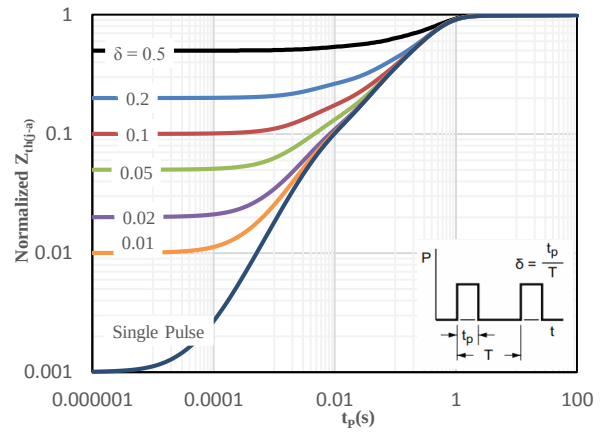
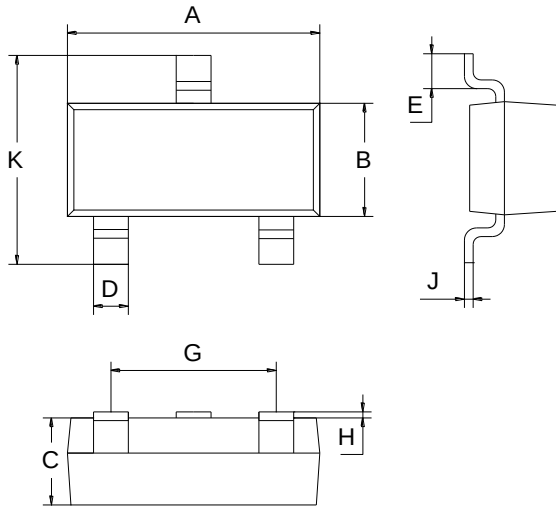
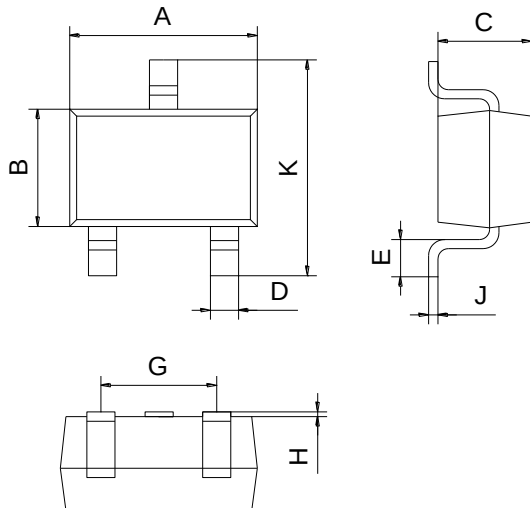


Fig 14 Normalized Maximum transient thermal impedance

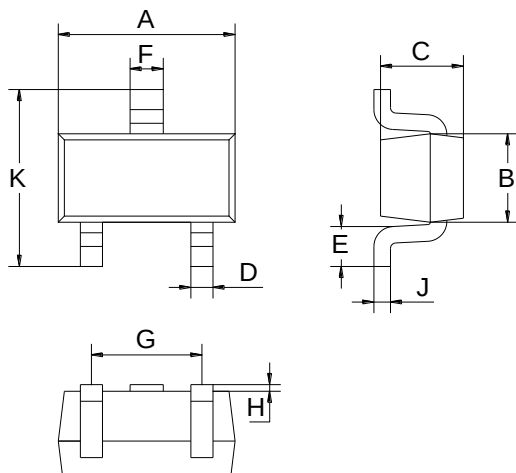
Package Outline Dimensions (Unit: mm)



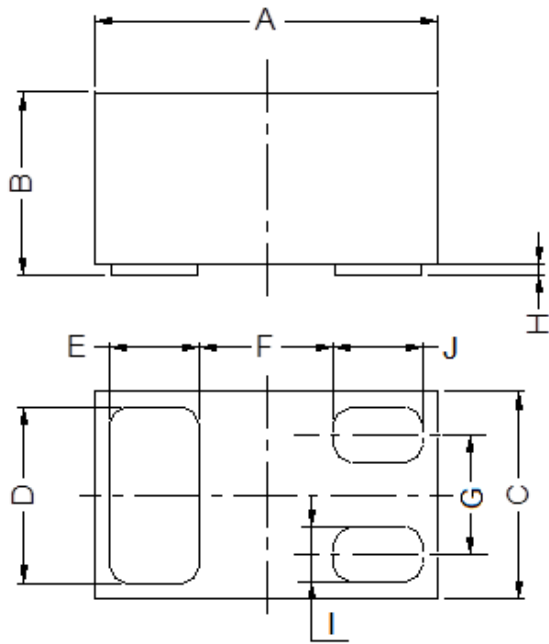
SOT-23		
Dimension	Min.	Max.
A	2.70	3.10
B	1.10	1.50
C	0.90	1.10
D	0.30	0.50
E	0.35	0.48
G	1.80	2.00
H	0.02	0.10
J	0.05	0.15
K	2.20	2.60



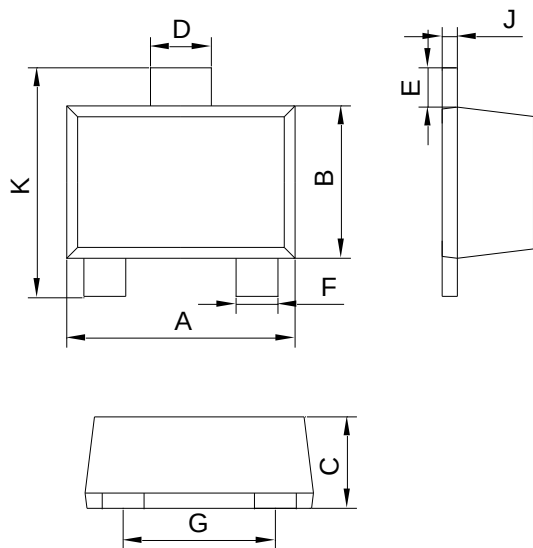
SOT-323		
Dimension	Min.	Max.
A	2.00	2.20
B	1.15	1.35
C	0.90	1.10
D	0.15	0.35
E	0.25	0.40
G	1.20	1.40
H	0.02	0.10
J	0.05	0.15
K	2.20	2.40



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



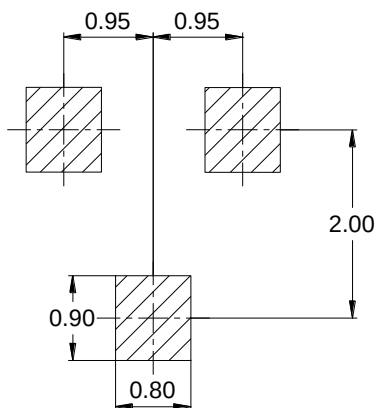
DFN1006-3			
Dimension	Min.	Typ.	Max.
A	0.95	1.00	1.075
B	0.47	0.50	0.53
C	0.55	0.60	0.675
D	0.45	0.50	0.55
E/J	0.20	0.25	0.30
F	-	0.40	-
G	-	0.35	-
H	0	0.03	0.05
I	0.10	0.15	0.20



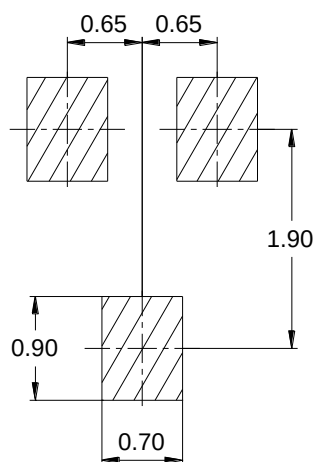
SOT-723		
Dim	Min	Max
A	1.10	1.30
B	0.70	0.90
C	0.40	0.54
D	0.22	0.42
E	0.10	0.30
F	0.12	0.32
G	0.70	0.90
J	0.08	0.15
K	1.10	1.30

Mounting Pad Layout (Unit: mm)

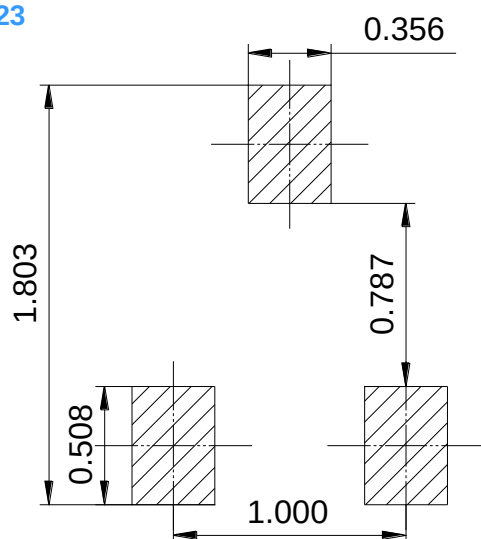
SOT-23



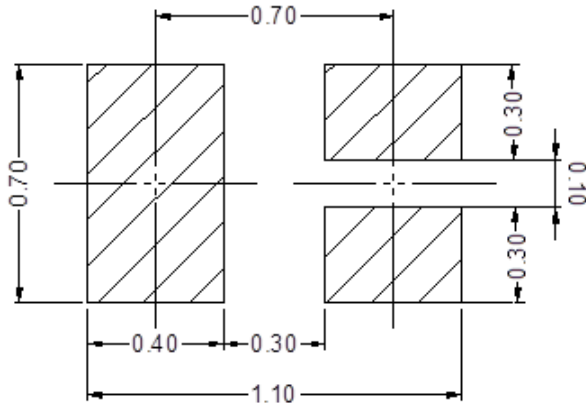
SOT-323



SOT-523



DFN1006-3



SOT-723

