Single P-channel MOSFET

ELM6PB8P6FCA-S

■General description

ELM6PB8P6FCA-S uses advanced trench technology to provide excellent Rds(on), low gate charge and low gate threshold voltage.

■Features

- Vds=-60V
- Id=-3.0A (Vgs=-10V)
- Rds(on) = 83mΩ (Vgs=-10V)
- Rds(on) = 120mΩ (Vgs=-4.5V)

■Maximum absolute ratings

Ta=25°C. Unless otherwise noted.

Parameter		Symbol	Limit	Unit	Note
Drain-source voltage		Vds	-60	V	
Gate-source voltage		Vgs	±20	V	
Continuous drain current	Tc=25°C	Id	-7.3	A	1
	Tc=100°C		-6.3		
Continuous drain current	Ta=25°C		-3.0	A	2
	Ta=70°C		-2.4		
Pulsed drain current		Idm	-30	A	3
Continuous body diode forward current		Is	-4.8	A	1
Avalanche current (L=0.1mH)		Ias	-12	A	
Avalanche energy (L=0.5mH)		Eas	12	mJ	
Power dissipation	Tc=25°C	Pd	21.0	W	1
	Tc=100°C		8.4		
Power dissipation	Ta=25°C		2.7	W	2
	Ta=70°C		1.7		
Junction and storage temperature range		Tj, Tstg	-55 to +150	°C	

■Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance, junction-to-case	Rθjc	-	6	°C/W	
Thermal resistance, junction-to-ambient	Rθja	-	47		1

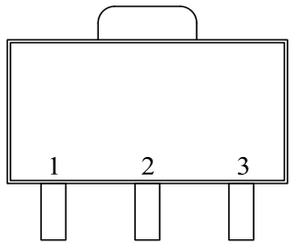
NOTE : 1. The power dissipation Pd is based on Tj(max)=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

2. The value of Rθja is measured with the device mounted on 1 in² FR-4 board with 2 oz. copper, in a still air environment with Ta=25°C. The power dissipation Pd is based on Rθja and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

3. Repetitive rating, pulse width limited by junction temperature Tj(max)=150°C. Ratings are based on low frequency and low duty cycles to keep initial Tj=25°C.

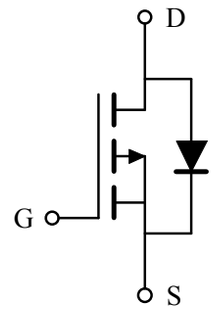
■Pin configuration

SOT-89(TOP VIEW)



Pin No.	Pin name
1	GATE
2	DRAIN
3	SOURCE

■Circuit



■Electrical characteristics

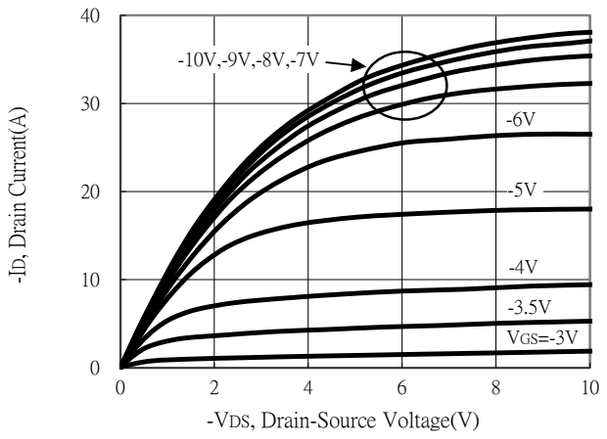
Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V	-60	-	-	V
Zero gate voltage drain current	Idss	Vds=-48V, Vgs=0V	-	-	-1	μA
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V	-	-	±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-1.0	-	-2.5	V
Static drain-source on-resistance	Rds(on)	Vgs=-10V, Id=-3A	-	83	110	mΩ
		Vgs=-4.5V, Id=-2A	-	120	170	
Forward transconductance	Gfs	Vds=-10V, Id=-3A	-	6.4	-	S
Diode forward voltage *1	Vsd	Is=-3A, Vgs=0V	-	-0.84	-1.20	V
DYNAMIC PARAMETERS						
Input capacitance	Ciss	Vgs=0V, Vds=-30V, f=1MHz	-	500	-	pF
Output capacitance	Coss		-	51	-	pF
Reverse transfer capacitance	Crss		-	37	-	pF
Gate resistance	Rg	f=1MHz	-	6.6	-	Ω
SWITCHING PARAMETERS						
Total gate charge *1, 2	Qg	Vgs=-10V, Vds=-30V Id=-3A	-	11.0	-	nC
Gate-source charge *1, 2	Qgs		-	2.0	-	nC
Gate-drain charge *1, 2	Qgd		-	3.2	-	nC
Turn-on delay time *1, 2	td(on)	Vgs=-10V, Vds=-30V Id=-3A, Rgen=3Ω	-	6.4	-	ns
Turn-on rise time *1, 2	tr		-	17.0	-	ns
Turn-off delay time *1, 2	td(off)		-	25.0	-	ns
Turn-off fall time *1, 2	tf		-	7.2	-	ns
Body diode reverse recovery time	trr	If=-3A, dIf/dt=100A/μs	-	13	-	ns
Body diode reverse recovery charge	Qrr		-	8	-	nC

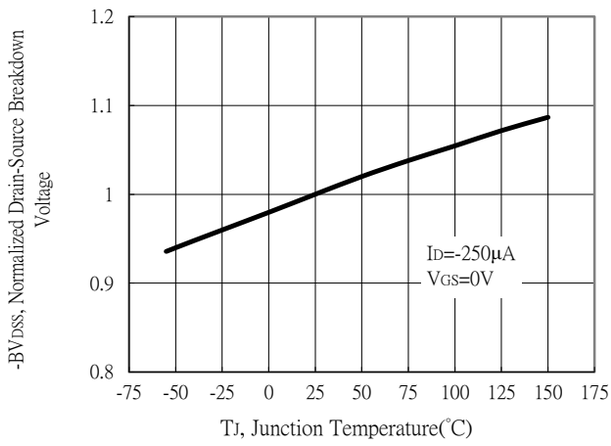
* 1. Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%.
  2. Independent of operating temperature.

■Typical electrical and thermal characteristics

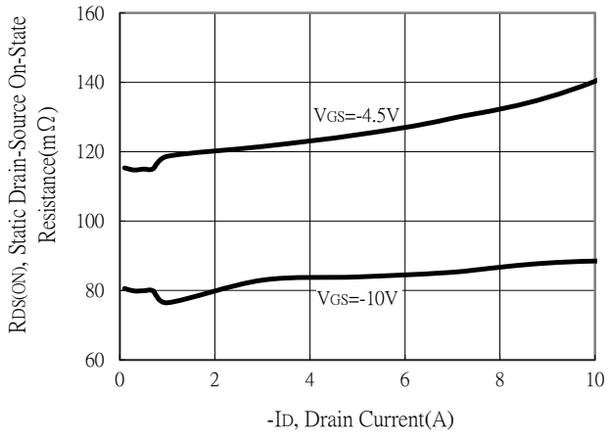
Typical Output Characteristics



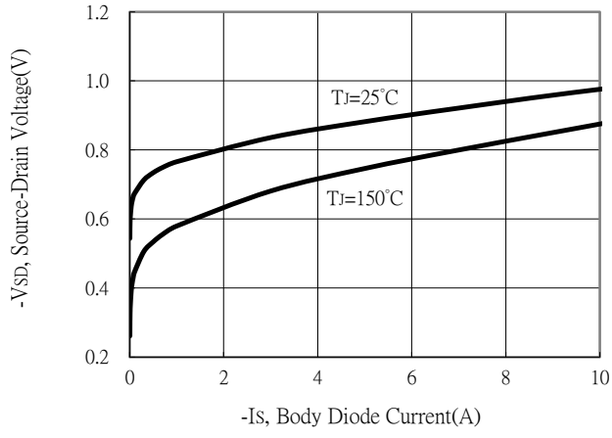
Breakdown Voltage vs Ambient Temperature



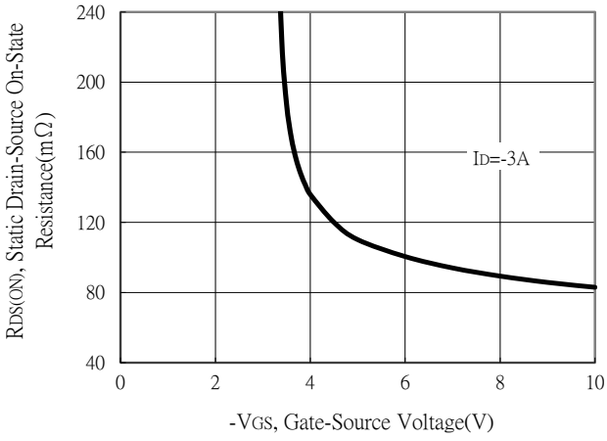
Static Drain-Source On-State resistance vs Drain Current



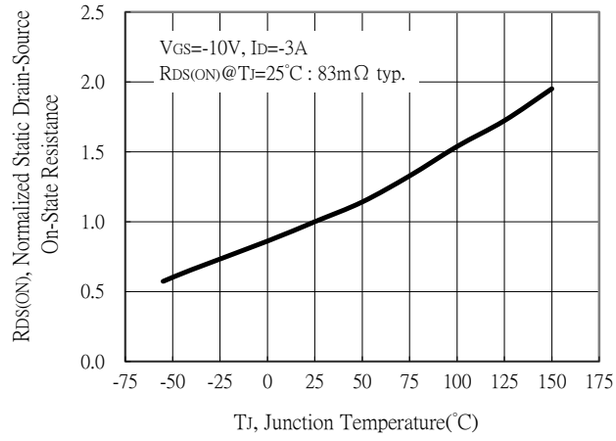
Body Diode Current vs Source-Drain Voltage



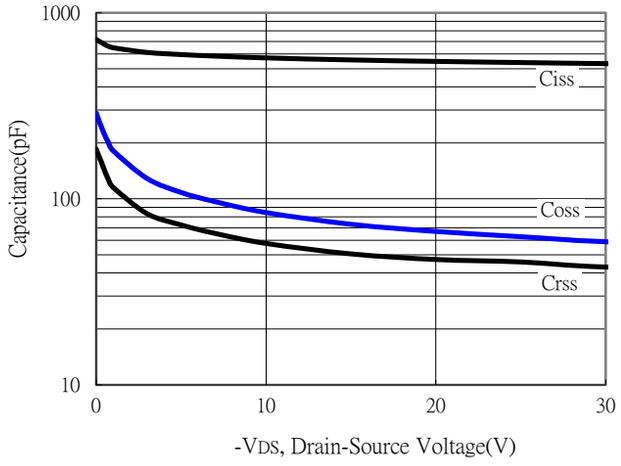
Static Drain-Source On-State Resistance vs Gate-Source Voltage



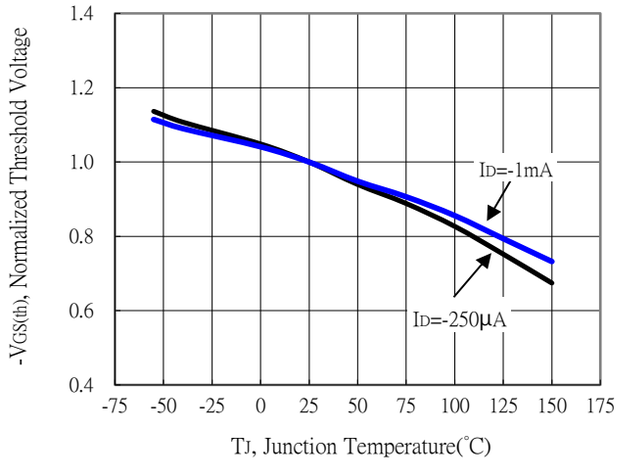
Drain-Source On-State Resistance vs Junction Temperature



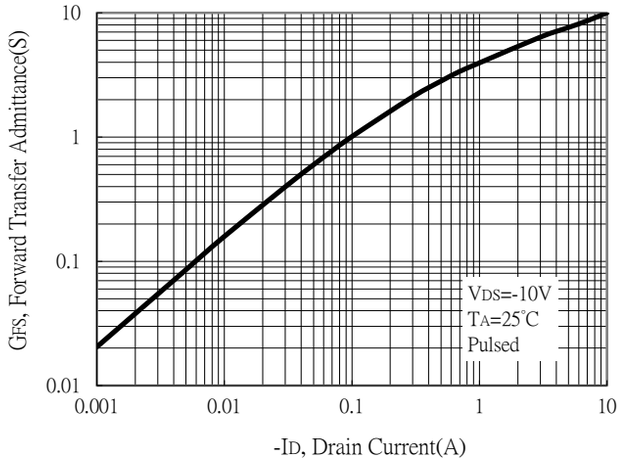
Capacitance vs Drain-to-Source Voltage



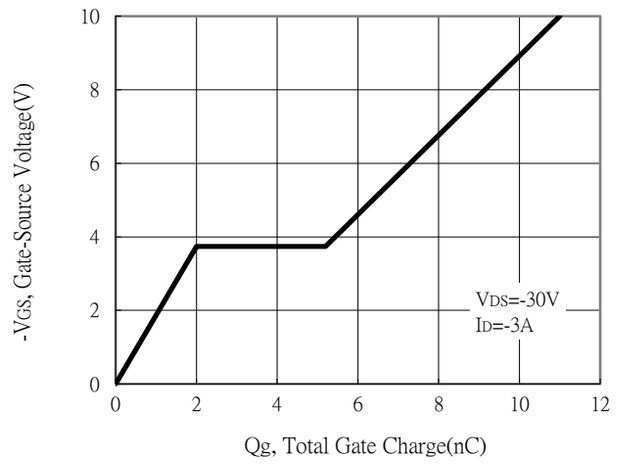
Threshold Voltage vs Junction Temperature



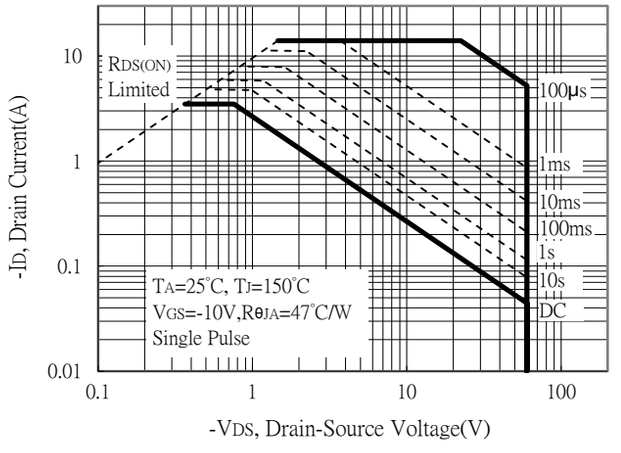
Forward Transfer Admittance vs Drain Current



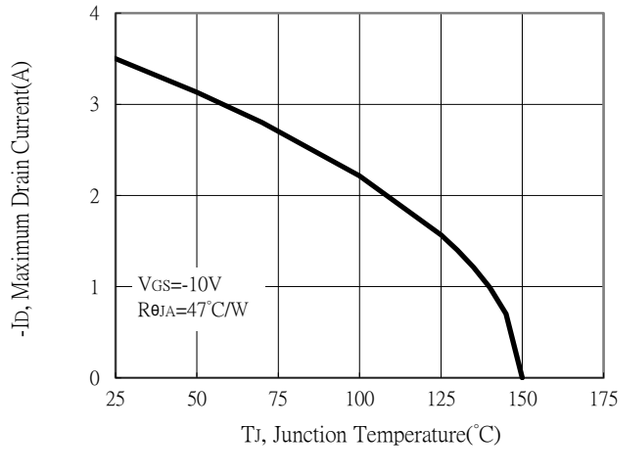
Gate Charge Characteristics



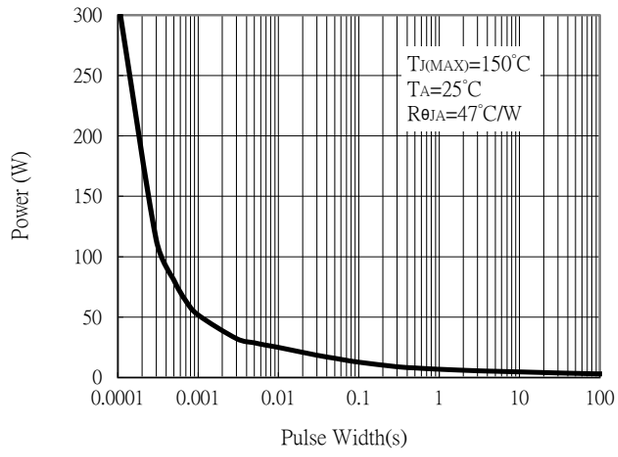
Maximum Safe Operating Area



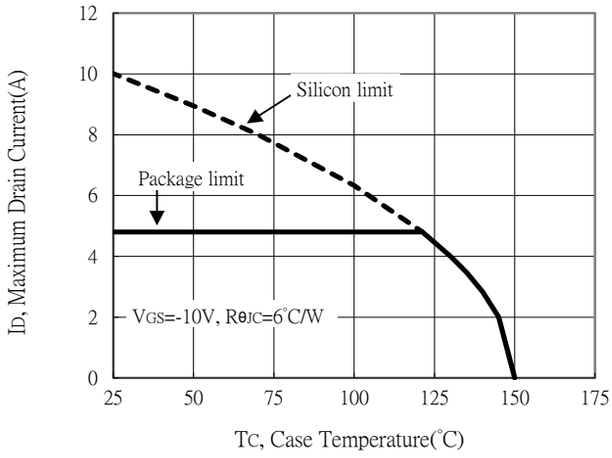
Maximum Drain Current vs Junction Temperature



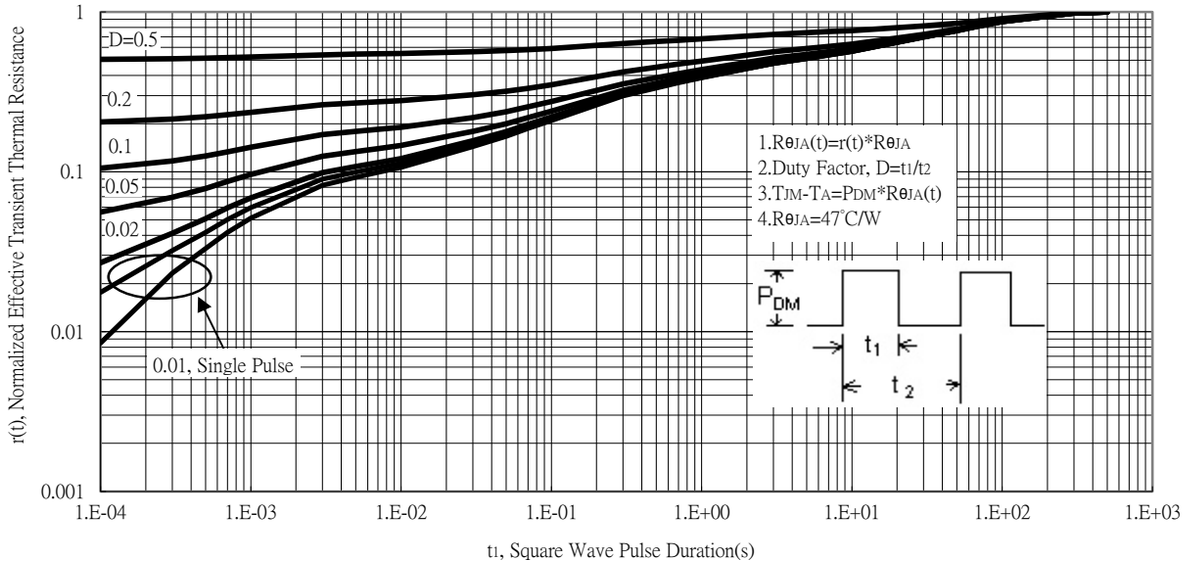
Single Pulse Power Rating, Junction to Ambient



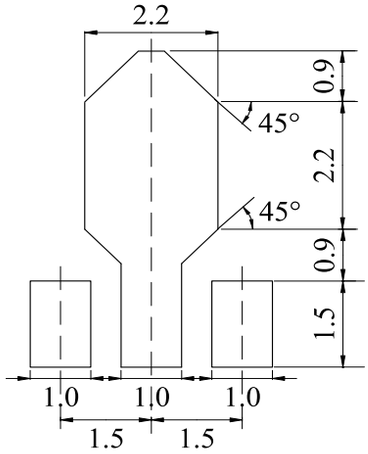
Maximum Drain Current vs Case Temperature



Transient Thermal Response Curves

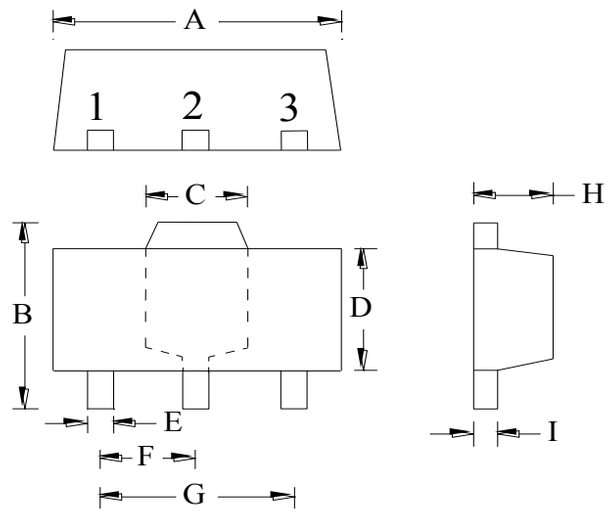


■Recmmended soldering footpeint



unit: mm

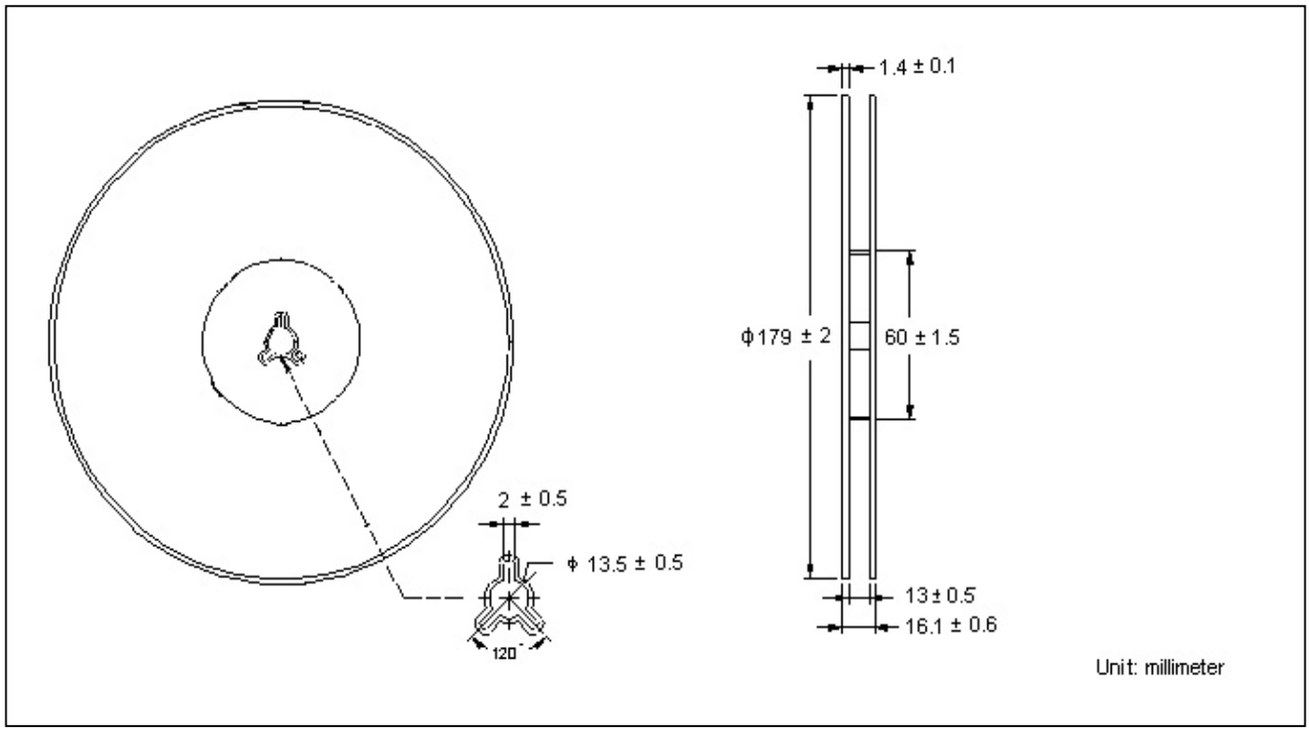
■SOT-89 dimension



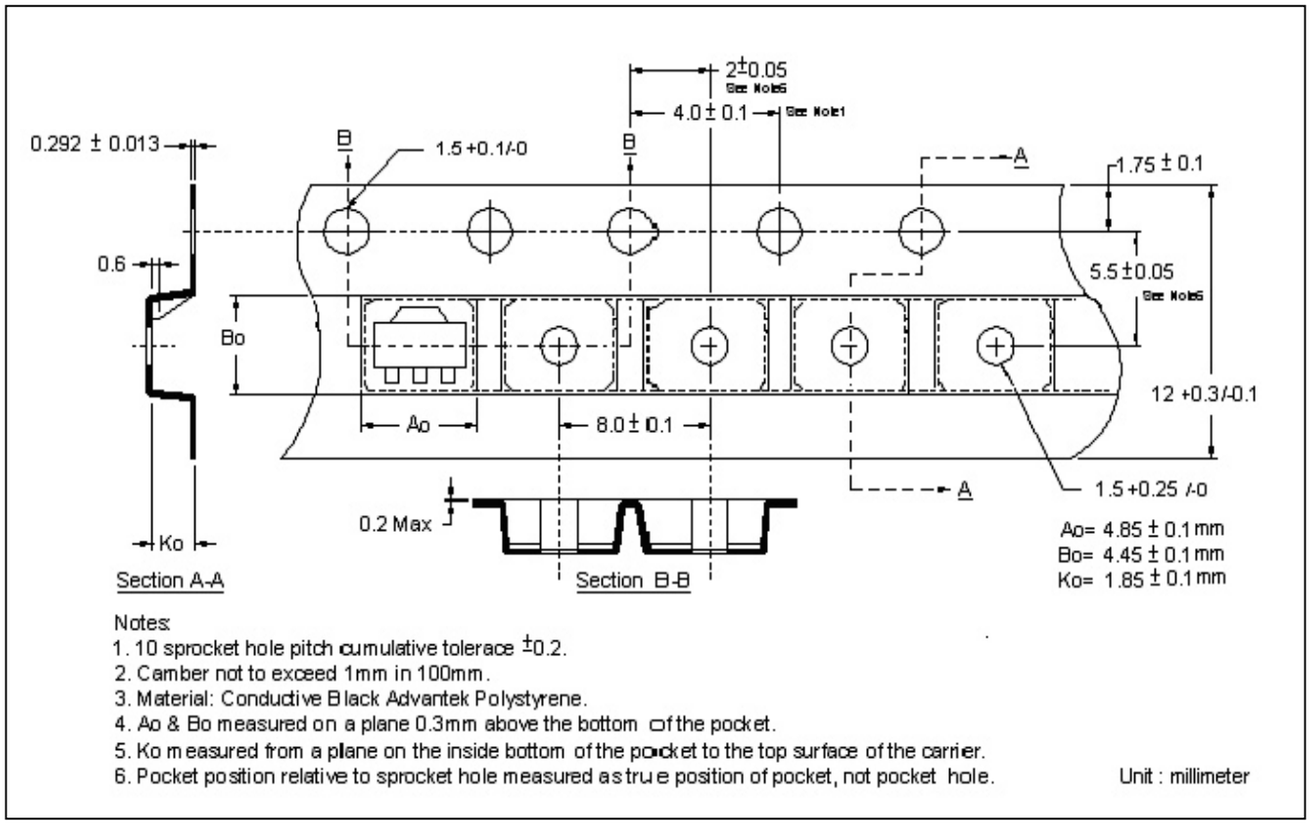
Symbols	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.1732	0.1811
B	3.94	4.25	0.1551	0.1673
C	1.55 REF		0.0610 REF	
D	2.30	2.60	0.0906	0.1024
E	0.32	0.52	0.0126	0.0205
F	1.50 TYP		0.0591 TYP	
G	3.00 TYP		0.1181 TYP	
H	1.40	1.60	0.0551	0.0630
I	0.35	0.44	0.0138	0.0173

■SOT-89 Reel & carrier tape dimension (Unit: mm)

• Reel



• Carrier tape



Notes:
1. 10 sprocket hole pitch cumulative tolerace ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive Black Advantek Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Unit : millimeter