

# Single P-channel MOSFET

ELM6040P03A-S

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## ■ General description

ELM6040P03A-S uses advanced trench technology to provide excellent  $R_{ds(on)}$ , low gate charge and low gate threshold voltage.

## ■ Features

- $V_{ds} = -30V$
- $I_d = -4A$  ( $V_{gs} = -10V$ )
- $R_{ds(on)} = 42m\Omega$  ( $V_{gs} = -10V$ )

## ■ Maximum absolute ratings

$T_a = 25^\circ C$ . Unless otherwise noted.

Parameter	Symbol	Limit	Unit	Note	
Drain-source voltage	$V_{ds}$	-30	V		
Gate-source voltage	$V_{gs}$	$\pm 20$	V		
Continuous drain current	$I_d$	$T_a = 25^\circ C$	-4.0	A	3
		$T_a = 70^\circ C$	-3.2		
Pulsed drain current	$I_{dm}$	-24	A	1, 2	
Power dissipation	$P_d$	1.25	W		
Linear derating factor	$K_\theta$	0.01	$W/^\circ C$		
Junction and storage temperature range	$T_j, T_{stg}$	-55 to +150	$^\circ C$		

## ■ Thermal characteristics

Parameter	Symbol	Typ.	Max.	Unit	Note
Thermal resistance, junction-to-ambient (PCB mounted)	$R_{\theta ja}$	-	100	$^\circ C/W$	3
Thermal resistance, junction-to-case	$R_{\theta jc}$	-	45		

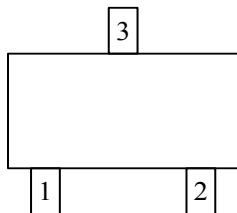
NOTE : 1. Pulse width limited by maximum junction temperature.

2. Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .

3. Surface mounted on 1 in<sup>2</sup> copper pad of FR-4 board; 270 $^\circ C/W$  when mounted on minimum copper pad.

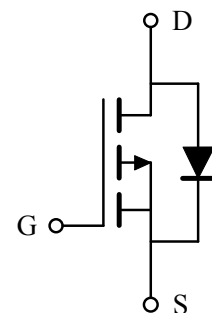
## ■ Pin configuration

SOT-23(TOP VIEW)



Pin No.	Pin name
1	GATE
2	SOURCE
3	DRAIN

## ■ Circuit



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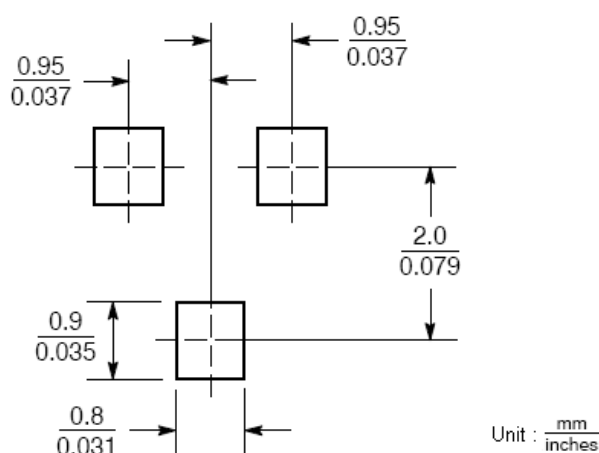
### ■Electrical characteristics

Ta=25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
<b>STATIC PARAMETERS</b>						
Drain-source breakdown voltage	BVdss	Id=-250μA, Vgs=0V	-30	-	-	V
Zero gate voltage drain current	Idss	Vds=-24V, Vgs=0V	-	-	-1	μA
		Vds=-24V, Vgs=0V (Ta=70°C)	-	-	-10	
Gate-body leakage current	Igss	Vds=0V, Vgs=±20V	-	-	±100	nA
Gate threshold voltage	Vgs(th)	Vds=Vgs, Id=-250μA	-2	-	-4	V
Static drain-source on-resistance *	Rds(on)	Vgs=-10V, Id=-4A	-	42	53	mΩ
Forward transconductance *	Gfs	Vds=-10V, Id=-3A	-	3.4	-	S
Diode forward voltage *	Vsd	Is=-1A, Vgs=0V	-	-0.78	-1.20	V
<b>DYNAMIC PARAMETERS</b>						
Input capacitance	Ciss	Vgs=0V, Vds=-25V, f=1MHz	-	482	-	pF
Output capacitance	Coss		-	65	-	pF
Reverse transfer capacitance	Crss		-	50	-	pF
<b>SWITCHING PARAMETERS</b>						
Total gate charge *	Qg	Vgs=-10V, Vds=-24V Id=-4A	-	10.3	-	nC
Gate-source charge *	Qgs		-	2.5	-	nC
Gate-drain charge *	Qgd		-	2.8	-	nC
Turn-on delay time *	td(on)	Vgs=-10V, Vds=-15V Id=-4A, Rgen=1Ω	-	7.6	-	ns
Turn-on rise time *	tr		-	15.8	-	ns
Turn-off delay time *	td(off)		-	34.8	-	ns
Turn-off fall time *	tf		-	12.6	-	ns
Body diode reverse recovery time	trr	Vgs=0V, If=-1A	-	8.2	-	ns
Body diode reverse recovery charge	Qrr	dIf/dt=100A/μs	-	3.3	-	nC

\* Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%.

### ■Reference land pattern

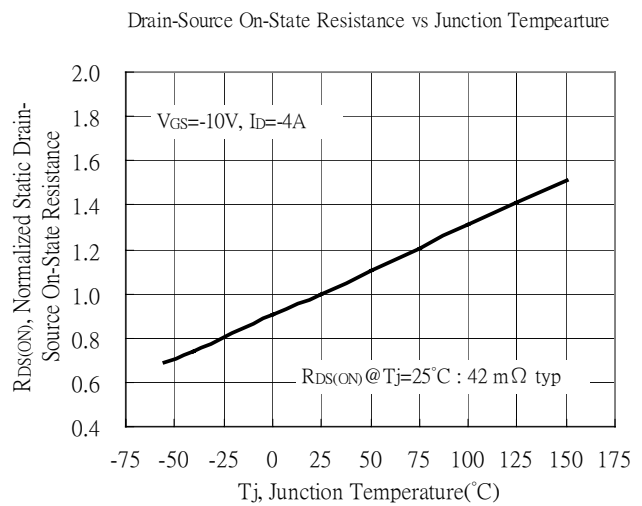
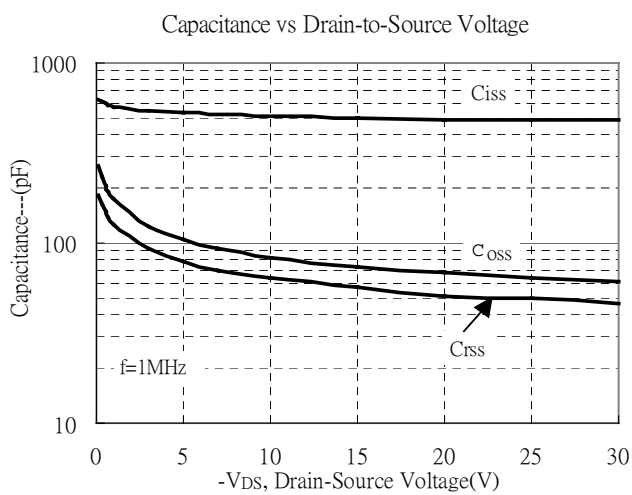
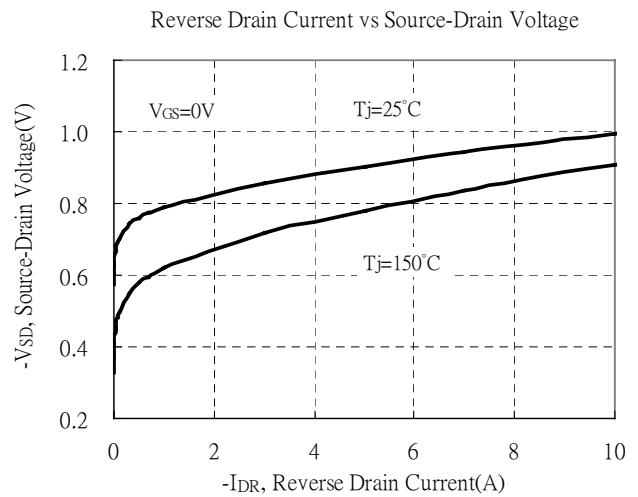
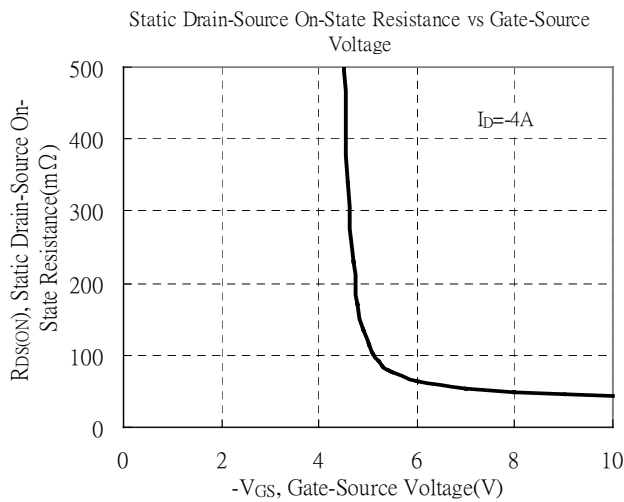
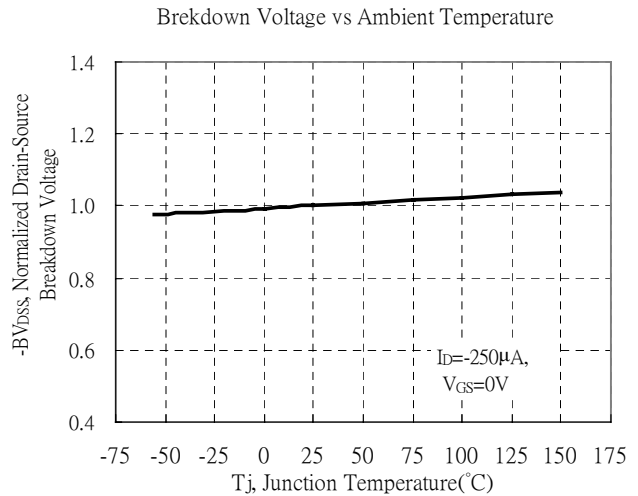
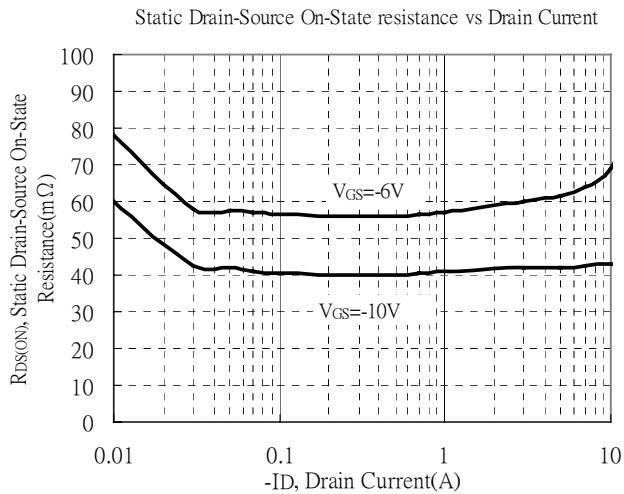


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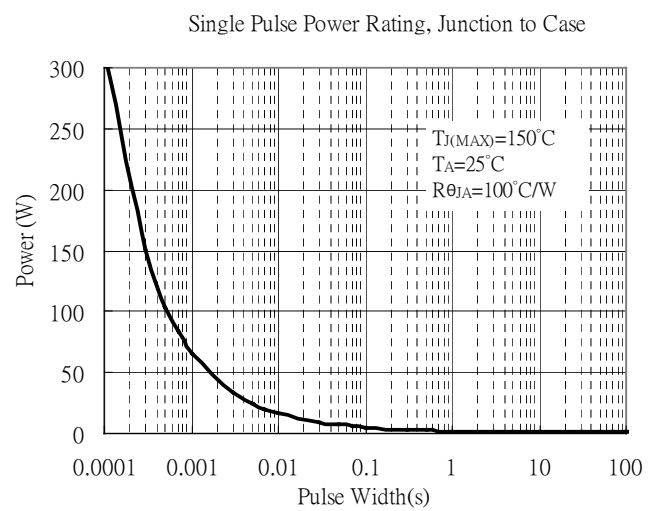
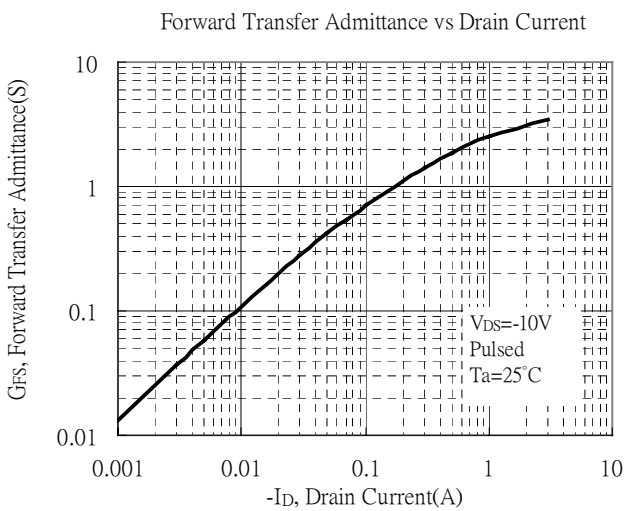
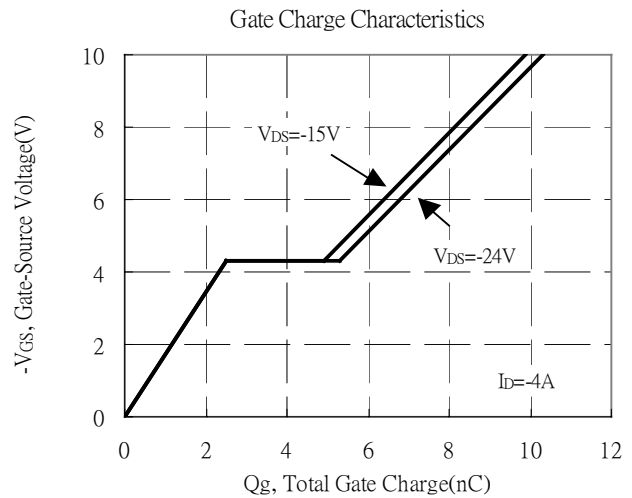
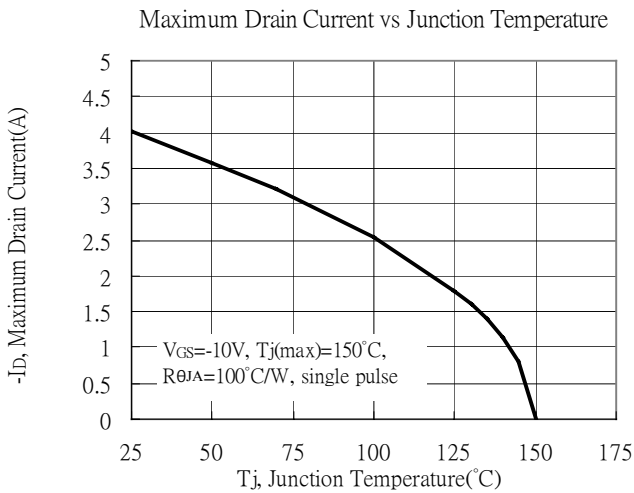
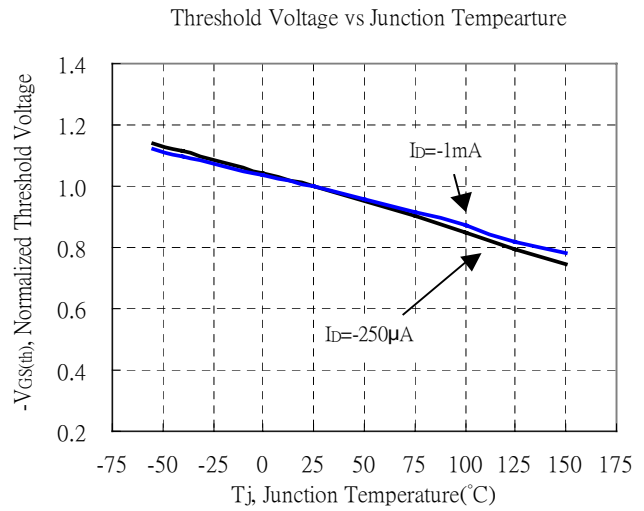
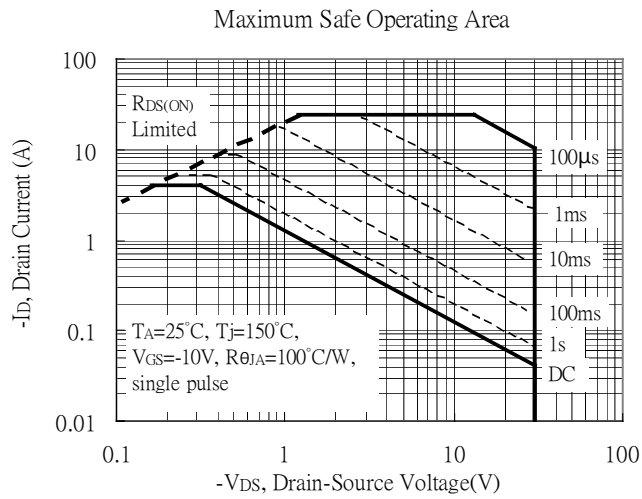
## Typical electrical and thermal characteristics



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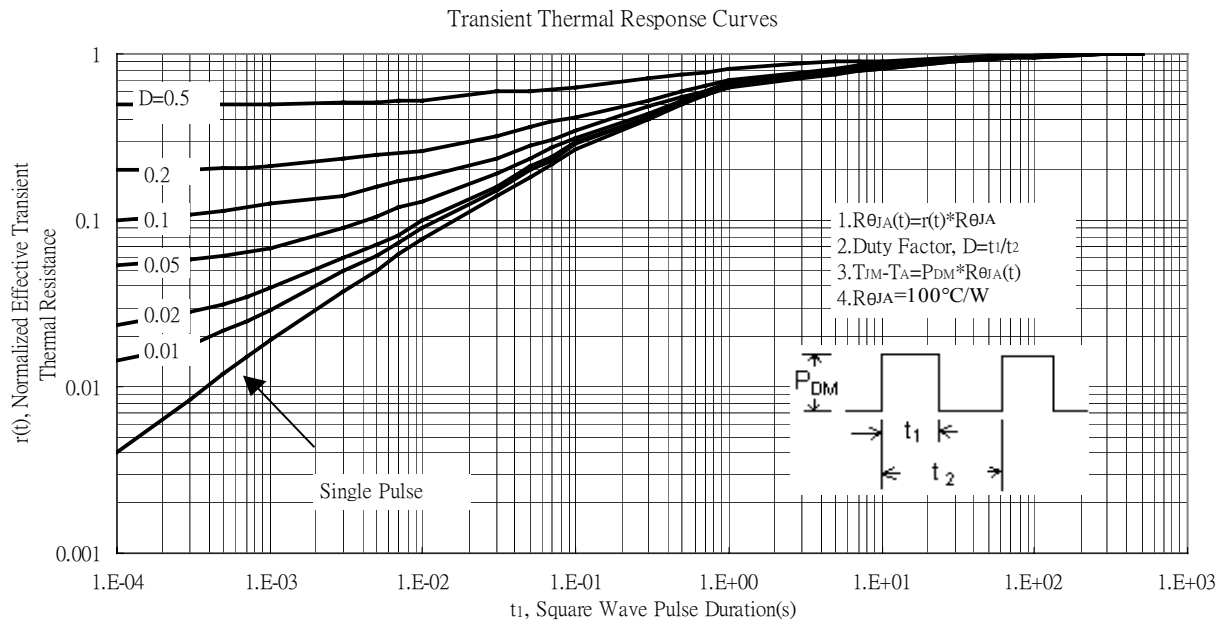
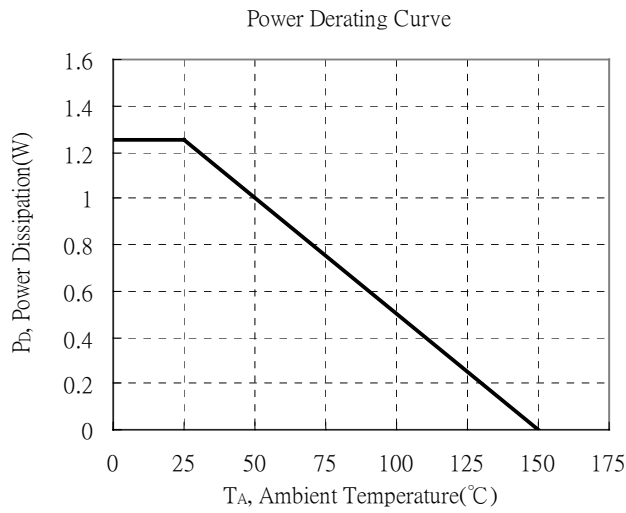
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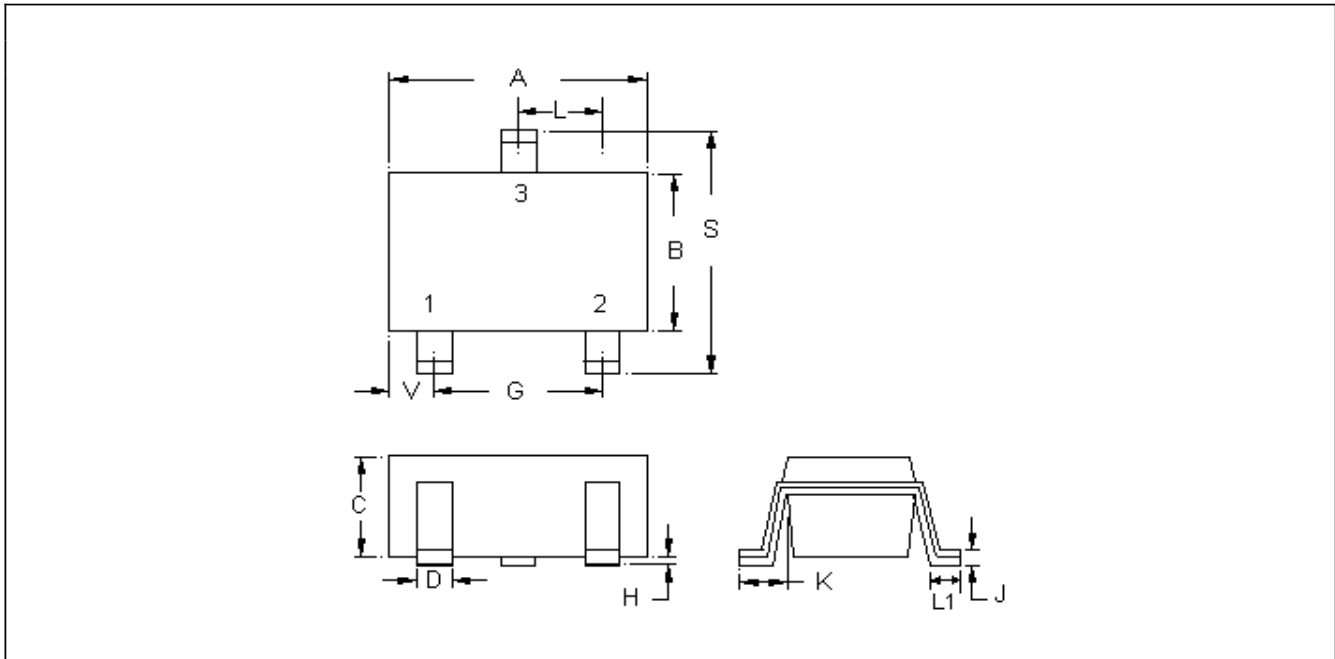


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## ■SOT-23 dimension



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1102	0.1204	2.80	3.04	J	0.0032	0.0079	0.08	0.20
B	0.0472	0.0669	1.20	1.70	K	0.0118	0.0266	0.30	0.67
C	0.0335	0.0512	0.89	1.30	L	0.0335	0.0453	0.85	1.15
D	0.0118	0.0197	0.30	0.50	S	0.0830	0.1161	2.10	2.95
G	0.0669	0.0910	1.70	2.30	V	0.0098	0.0256	0.25	0.65
H	0.0000	0.0040	0.00	0.10	L1	0.0118	0.0197	0.30	0.50

Notes: 1. Controlling dimension: millimeters.

2. Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.

### Material:

- Lead: Pure tin plated.
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0.

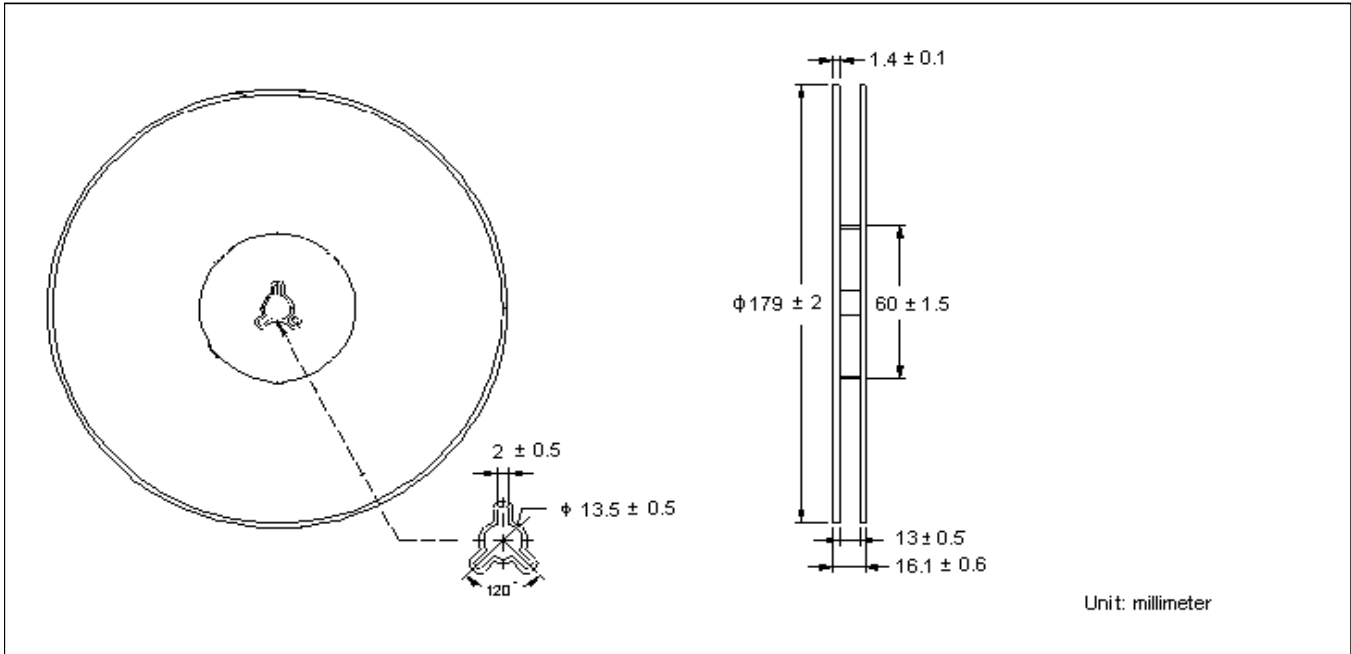
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## ■ Reel & carrier tape dimension

### • Reel



### • Carrier tape

