

## 20V P-Channel Enhancement-Mode MOSFET

$V_{DS} = -20V$

$R_{DS(ON)}, V_{GS} @ -4.5V, I_{DS} @ -2.8A = 100 \text{ m}\Omega$

$R_{DS(ON)}, V_{GS} @ -2.5V, I_{DS} @ -2.0A = 150 \text{ m}\Omega$

### Features

Advanced trench process technology

High Density Cell Design For Ultra Low On-Resistance

Fully Characterized Avalanche Voltage and Current

Improved Shoot-Through FOM

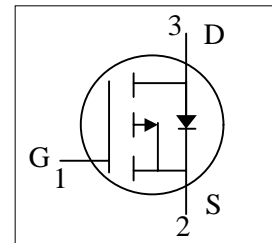
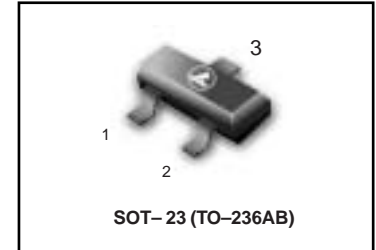
we declare that the material of product compliance with RoHS requirements.

### ▼ Simple Drive Requirement

### ▼ Small Package Outline

### ▼ Surface Mount Device

LP4101LT1G



### Ordering Information

Device	Marking	Shipping
LP4101LT1G	P41	3000/Tape & Reel
LP4101LT3G	P41	10,000/Tape & Reel

### Maximum Ratings and Thermal Characteristics ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	$V_{DS}$	-20	V	
Gate-Source Voltage	$V_{GS}$	$\pm 8$		
Continuous Drain Current	$I_D$	-2.3	A	
Pulsed Drain Current 1)	$I_{DM}$	-8		
Maximum Power Dissipation	$P_D$	$T_A = 25^\circ\text{C}$	0.9	W
		$T_A = 75^\circ\text{C}$	0.57	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150	$^\circ\text{C}$	
Junction-to-Case Thermal Resistance	$R_{qJC}$		$^\circ\text{C/W}$	
Junction-to-Ambient Thermal Resistance (PCB mounted) 2)	$R_{qJA}$	140		

Note: 1. Repetitive Rating; Pulse width limited by the Maximum junction temperature

2. 1-in<sup>2</sup> 2oz Cu PCB board

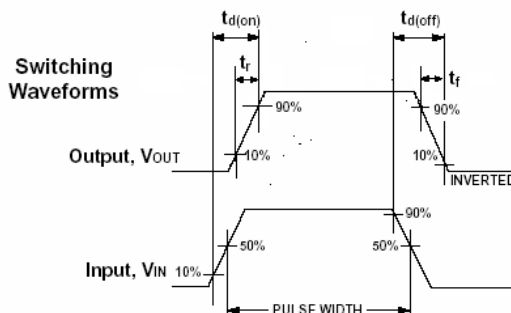
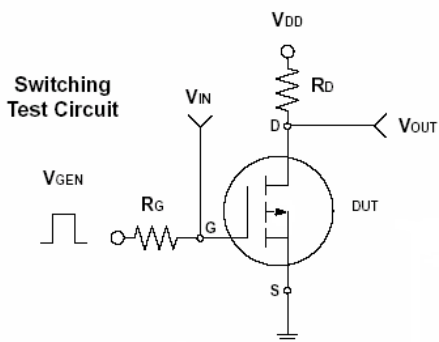
3. Guaranteed by design; not subject to production testing

# LP4101LT1G

## ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-20	-	-	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -2.8A$		69	100	$m\Omega$
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = -2.5V, I_D = -2.0A$		83	150	$m\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.45		-0.95	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -9.6V, V_{GS} = 0V$			-1	$\mu A$
Gate Body Leakage	$I_{GSS}$	$V_{GS} = \pm 8V, V_{DS} = 0V$			$\pm 100$	nA
Gate Resistance	$R_g$					$\Omega$
Forward Transconductance	$g_{fs}$	$V_{DS} = -5V, I_D = -4.0A$		6.5		S
<b>Dynamic <sup>3)</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = -6V, I_D = -2.8A$ $V_{GS} = -4.5V$		15.23		nC
Gate-Source Charge	$Q_{gs}$			5.49		
Gate-Drain Charge	$Q_{gd}$			2.74		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -6V, R_L = 6\Omega$ $I_D = -1A, V_{GEN} = -4.5V$ $R_G = 6\Omega$		17.28		ns
Turn-On Rise Time	$t_r$			3.73		
Turn-Off Delay Time	$t_{d(off)}$			36.05		
Turn-Off Fall Time	$t_f$			6.19		
Input Capacitance	$C_{iss}$	$V_{DS} = -6V, V_{GS} = 0V$ $f = 1.0\text{ MHz}$		882.51		pF
Output Capacitance	$C_{oss}$			145.54		
Reverse Transfer Capacitance	$C_{rss}$			97.26		
<b>Source-Drain Diode</b>						
Max. Diode Forward Current	$I_S$				-2.4	A
Diode Forward Voltage	$V_{SD}$	$I_S = -0.75A, V_{GS} = 0V$		-0.8	-1.2	V

Note: Pulse test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$



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## TYPICAL ELECTRICAL CHARACTERISTICS

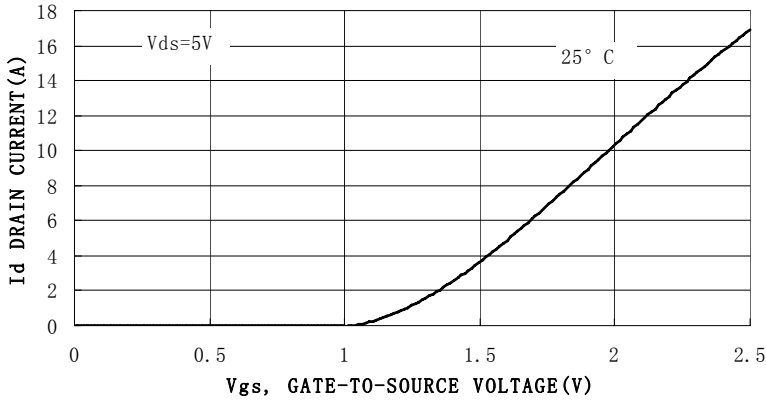


Figure 1. Transfer Characteristics

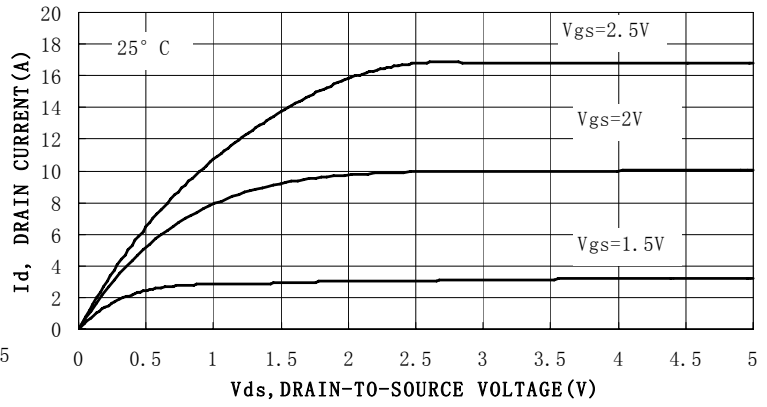


Figure 2. On-Region Characteristics

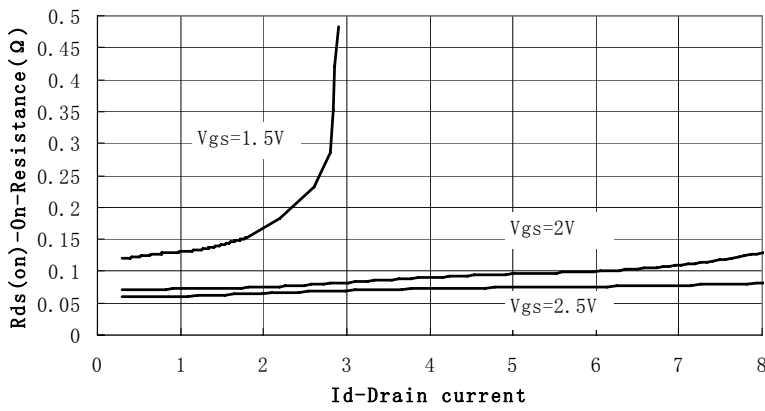


Figure 3. On-Resistance versus Drain Current

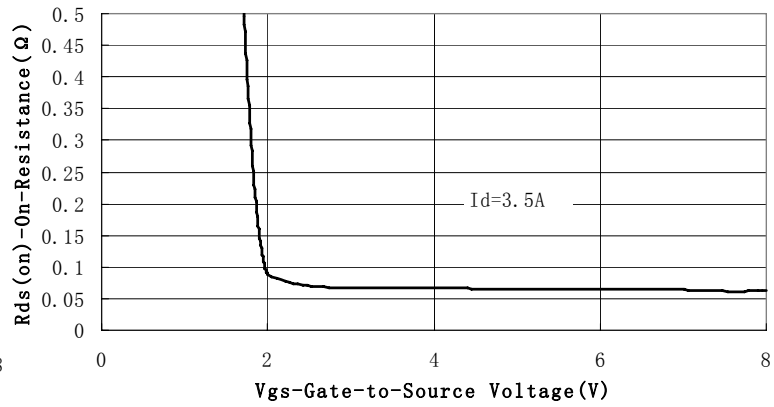


Figure 4. On-Resistance vs. Gate-to-Source Voltage

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## TYPICAL ELECTRICAL CHARACTERISTICS

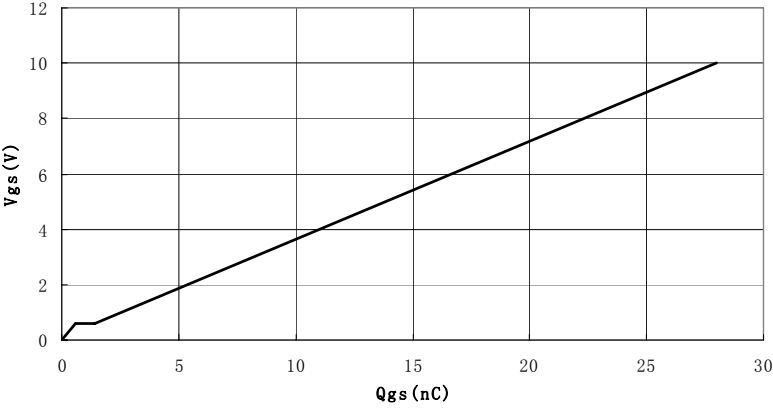


Figure 5. Gate Charge

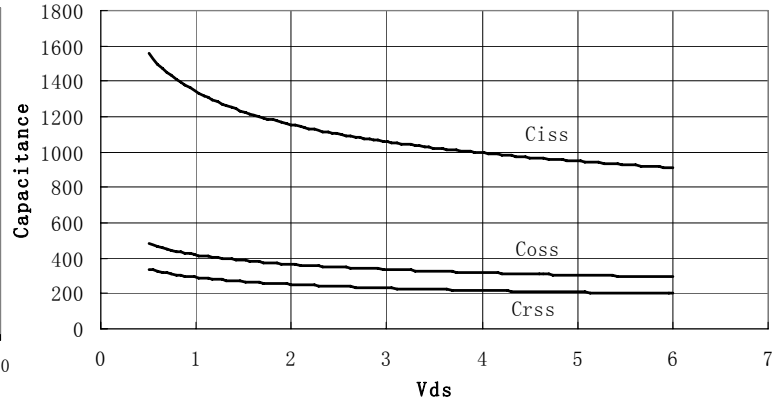


Figure 6. Capacitance

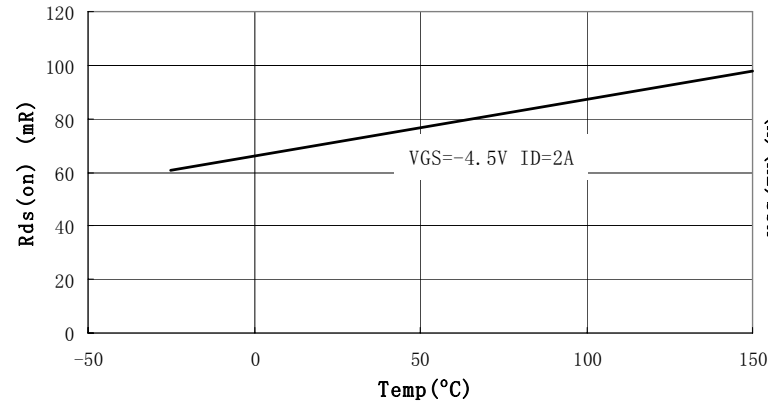


Figure 7. On-Resistance Vs. Junction Temperature

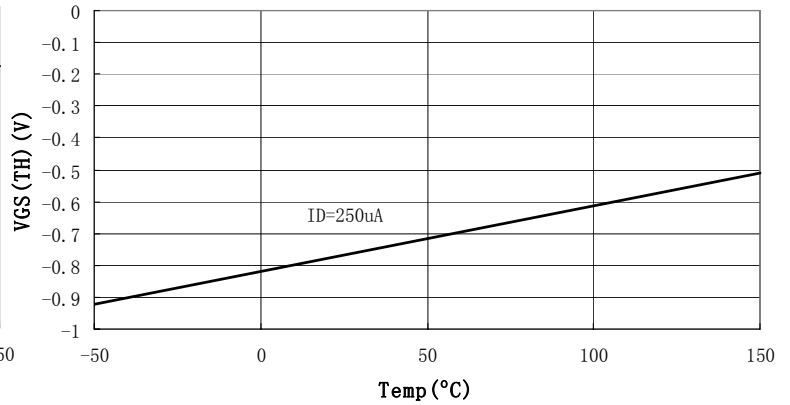


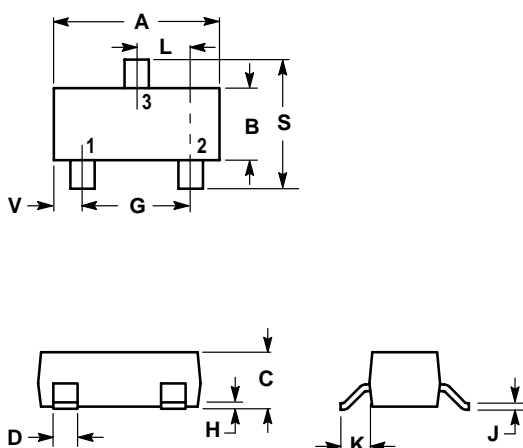
Figure 8. Vth Vs. Junction Temperature

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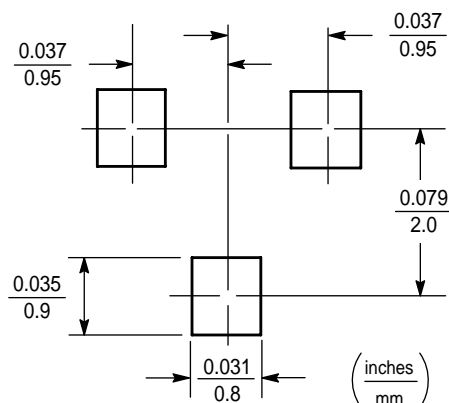
SOT-23

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M,1982
2. CONTROLLING DIMENSION: INCH.



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60



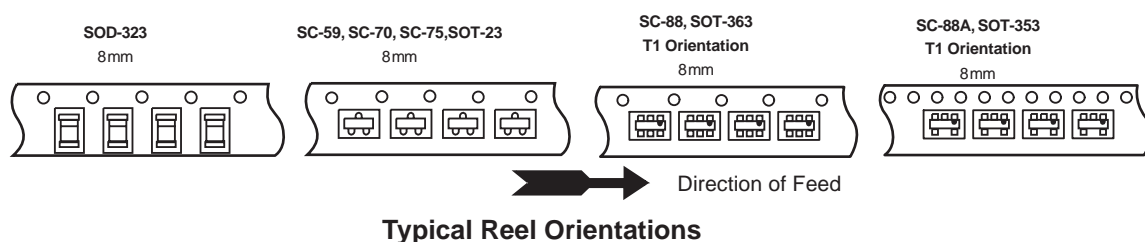
LP4101LT1G

## Tape & Reel and Packaging Specifications for Small-Signal Transistors, FETs and Diodes

Embossed Tape and Reel is used to facilitate automatic pick and place equipment feed requirements. The tape is used as the shipping container for various products and requires a minimum of handling. The antistatic/conductive tape provides a secure cavity for the product when sealed with the “peel-back” cover tape.

- Two Reel Sizes Available (7"and 13",)
- Used for Automatic Pick and Place Feed Systems
- Minimizes Product Handling
- EIA 481, -1, -2
- SOT-23, SC-70/SOT-323,
- SC-89, SC-88/SOT-363, SC-88A/SOT-353,
- SOD-323, SOD-523 in 8 mm Tape

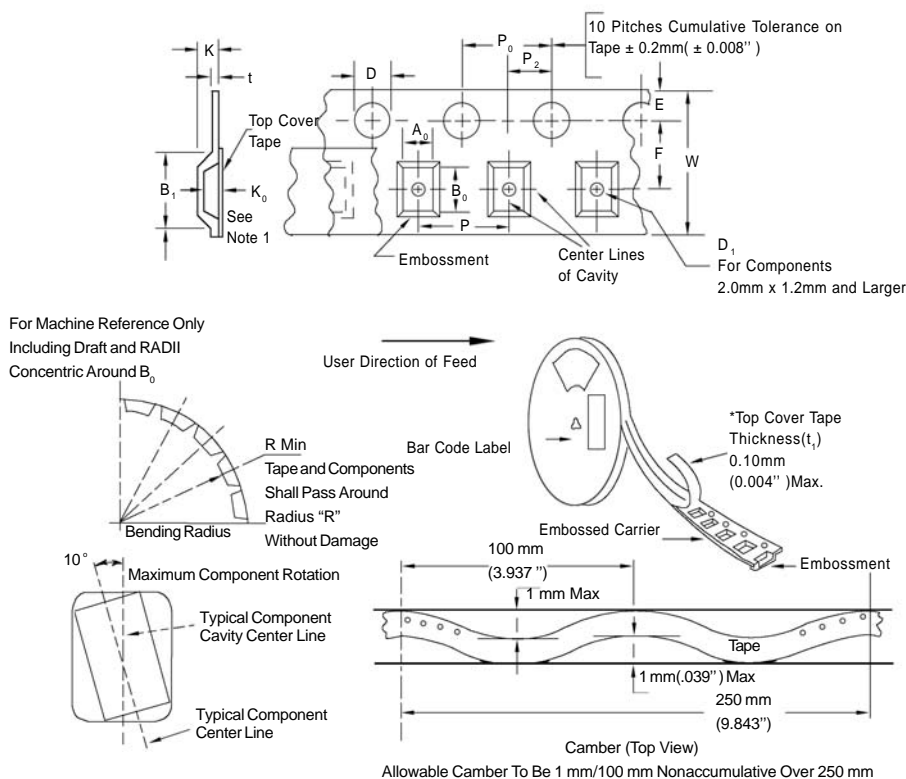
Use the standard device title and add the required suffix as listed in the option table below (Table 1). Note that the individual reels have a finite number of devices depending on the type of product contained in the tape. Also note the minimum lot size is one full reel for each line item, and orders are required to be in increments of the single reel quantity.



**Table 1. EMBOSSED TAPE AND REEL ORDERING INFORMATION**

Package	Tape Width (mm)	Pitch mm	Reel Size mm(inch)	Devices Per Reel and Minimum Order Quantity	Device Suffix
SOT-23	8	4	178	(7)	3,000 T1
	8		330	(13)	10,000 T3
SC-70/SOT-323	8	4	178	(7)	3,000 T1
	8		330	(13)	10,000 T3
SC-89	8	4	178	(7)	3,000 T1
	8		330	(13)	10,000 T3
SC-88/SOT-363	8	4	178	(7)	3,000 T1
	8		330	(13)	10,000 T3
SC-88A/SOT-353	8	4	178	(7)	3,000 T1
	8		330	(13)	10,000 T3
SOD-323	8	4	178	(7)	3,000 T1
	8		330	(13)	10,000 T3
SOD-523	8	4	178	(7)	3,000 T1
	8		330	(13)	10,000 T3

## EMBOSSED TAPE AND REEL DATA FOR DISCRETES CARRIER TAPE SPECIFICATIONS



### DIMENSIONS

Tape Size	$B_1$ Max	D	$D_1$	E	F	K	$P_0$	$P_2$	RMin	TMax	WMax
8mm	4.55mm (.179")	1.5+0.1mm - 0.0	1.0Min (.039")	1.75±0.1mm (.069±.004)	3.5±0.05mm (.138±.002")	2.4mmMax (.094")	4.0 ± 0.1mm (.157 ± .004")	2.0 ± 0.1mm (.079 ± .002")	25mm (.98")	0.6mm (.024")	8.3mm (.327")
12mm	8.2mm (.323")	(.059+.004" -0.0)	1.5mmMin (.060")		5.5±0.05mm (.217±.002")	6.4mmMax (.252")			30mm (1.18")		12 ± .30mm (.470±.012")
16mm	12.1mm (.476")				7.5±0.10mm (.295±.004")	7.9mmMax (.311")					16.3mm (.642")
24mm	20.1mm (.791")				11.5±0.1mm (.453±.004")	11.9mmMax (.468")					24.3mm (.957")

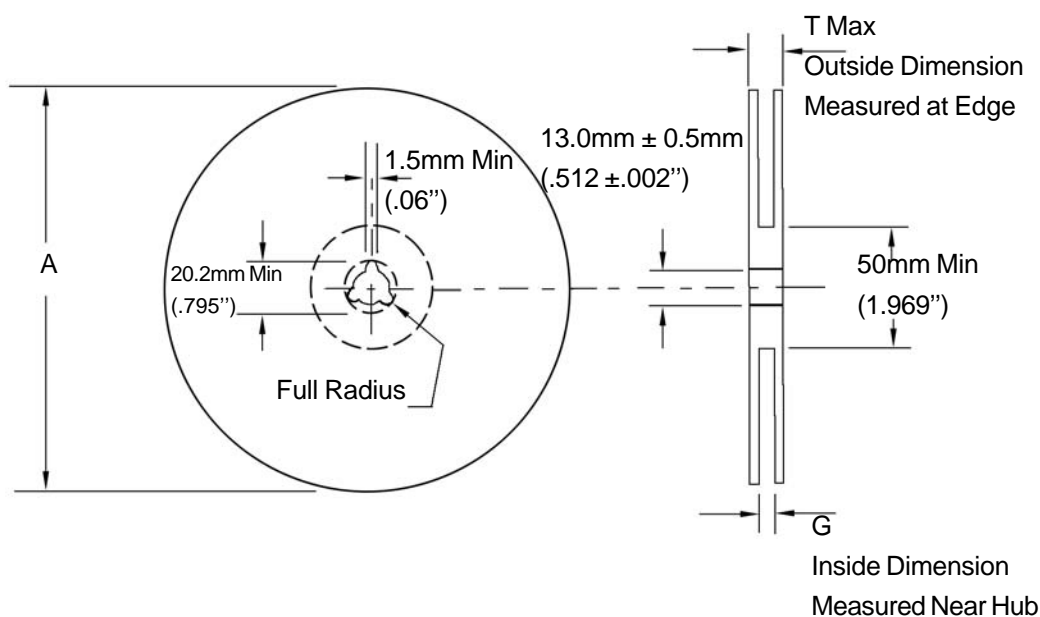
Metric dimensions govern - English are in parentheses for reference only.

NOTE 1:  $A_0$ ,  $B_0$ , and  $K_0$  are determined by component size. The clearance between the components and the cavity must be within .05 mm min. to .50 mm max.,

NOTE 2: the component cannot rotate more than 10° within the determined cavity.

NOTE 3: If  $B_1$  exceeds 4.2 mm (.165") for 8 mm embossed tape, the tape may not feed through all tape feeders.

## EMBOSSED TAPE AND REEL DATA FOR DISCRETES



Size	A Max	G	T Max
8 mm	330mm (12.992")	8.4mm+1.5mm, -0.0 (.33"+.059", -0.00)	14.4mm (.56")
12mm	330mm (12.992")	12.4mm+2.0mm, -0.0 (.49 "+ .079", -0.00)	18.4mm (.72")
16mm	360mm (14.173")	16.4mm+2.0mm, -0.0 (.646"+.078", -0.00)	22.4mm (.882")
24 mm	360mm (14.173")	24.4mm+2.0mm, -0.0 (.961"+.070", -0.00)	30.4mm (1.197")

### Reel Dimensions

Metric Dimensions Govern — English are in parentheses for reference only

#### Storage Conditions

Temperature: 5 to 40 Deg.C (20 to 30 Deg. C is preferred)

Humidity: 30 to 80 RH (40 to 60 is preferred )

Recommended Period: One year after manufacturing

(This recommended period is for the soldering condition only. The characteristics and reliabilities of the products are not restricted to this limitation)



## Shipment Specification

