

20V P-Channel Enhancement-Mode MOSFET

$V_{DS} = -20V$

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

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

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

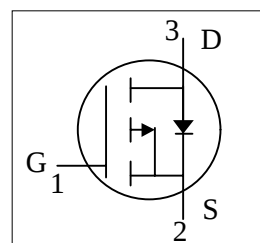
▼ Small Package Outline

▼ Surface Mount Device

LP2301LT1G



SOT-23 (TO-236AB)



Ordering Information

Device	Marking	Shipping
LP2301LT1G	01	3000/Tape & Reel
LP2301LT3G	01	10,000/Tape & Reel

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

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	± 8	
Continuous Drain Current		I_D	-2.3	A
Pulsed Drain Current 1)		I_{DM}	-8	
Maximum Power Dissipation	TA = 25°C	P_D	0.9	W
	TA = 75°C		0.57	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C
Junction-to-Case Thermal Resistance		R_{qJC}		°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-in² 2oz Cu PCB board

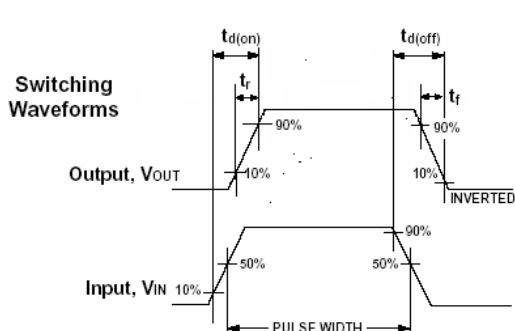
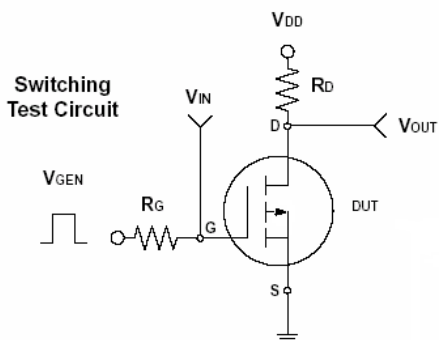
3. Guaranteed by design; not subject to production testing

LP2301LT1G

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = -250uA	-20	-	-	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = -4.5V, I _D = -2.8A		69	100	mΩ
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = -2.5V, I _D = -2.0A		83	150	mΩ
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D = -250uA	-0.40		-0.90	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -9.6V, V _{GS} = 0V			-1	uA
Gate Body Leakage	I _{GSS}	V _{GS} = ±8V, V _{DS} = 0V			±100	nA
Gate Resistance	R _g					Ω
Forward Transconductance	g _{fs}	V _{DS} = -5V, I _D = -4.0A		6.5		S
Dynamic ³⁾						
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 = 6Ω I _D = -1A, V _{GEN} = -4.5V R _G = 6Ω		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 MHz		882.51		pF
Output Capacitance	C _{oss}			145.54		
Reverse Transfer Capacitance	C _{rss}			97.26		
Source-Drain Diode						
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

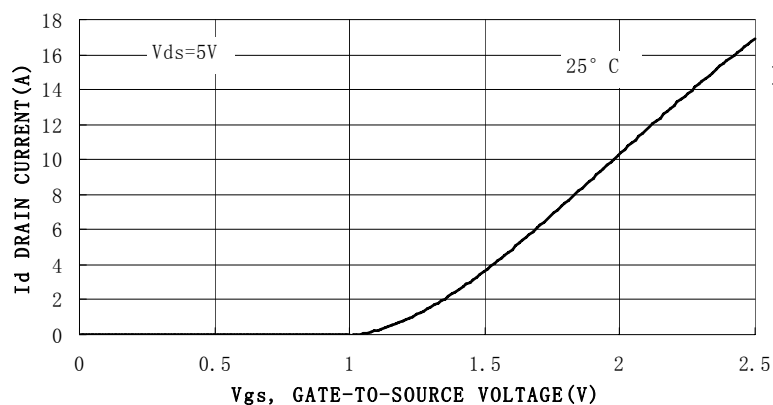


Figure 1. Transfer Characteristics

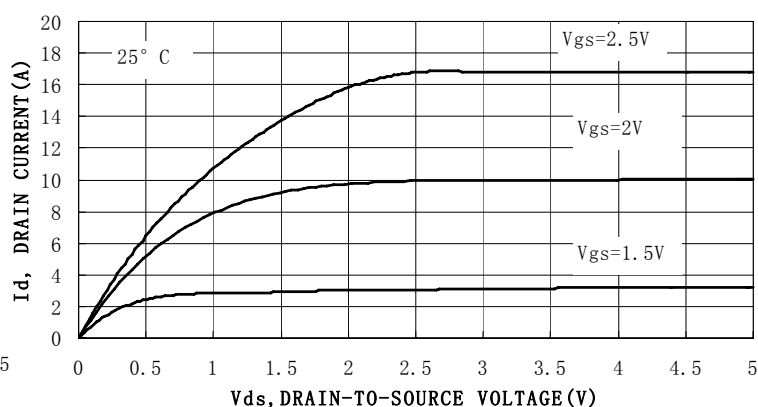


Figure 2. On-Region Characteristics

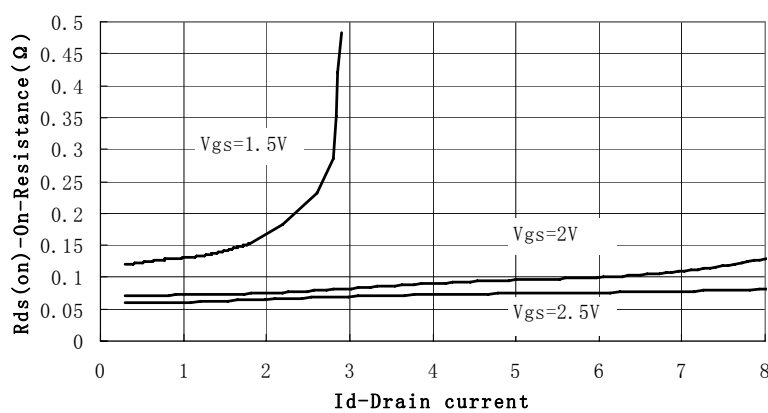


Figure 3. On-Resistance versus Drain Current

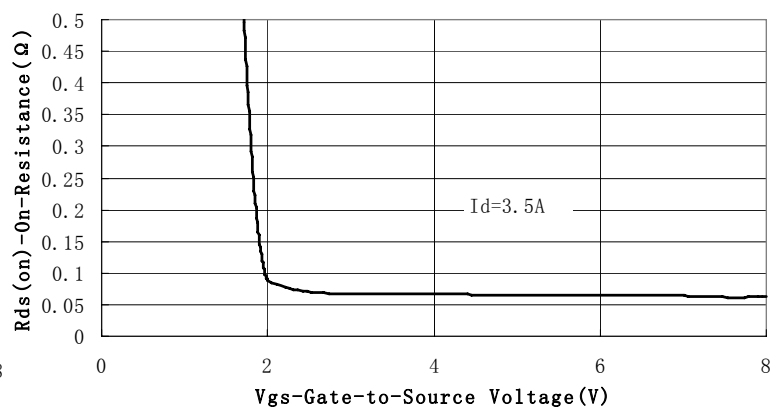


Figure 4. On-Resistance vs. Gate-to-Source Voltage

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TYPICAL ELECTRICAL CHARACTERISTICS

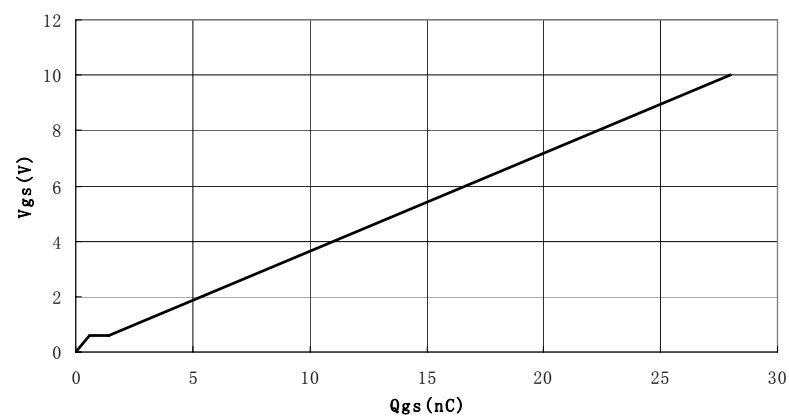


Figure 5. Gate Charge

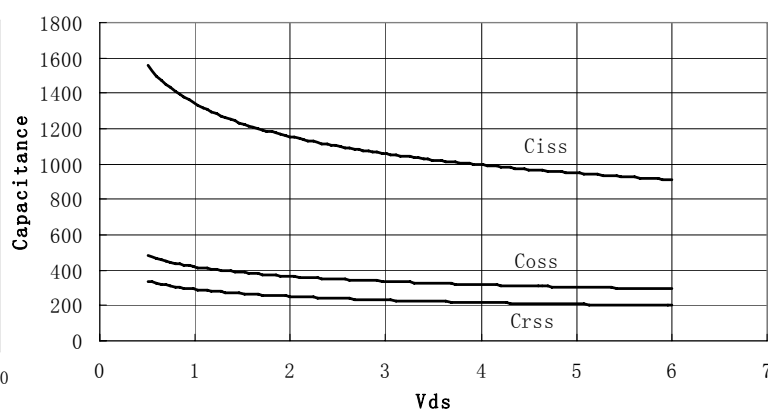


Figure 6. Capacitance

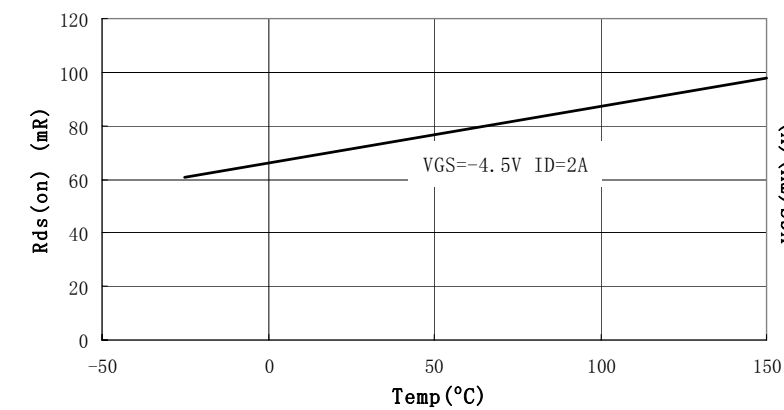


Figure 7. On-Resistance Vs. Junction Temperature

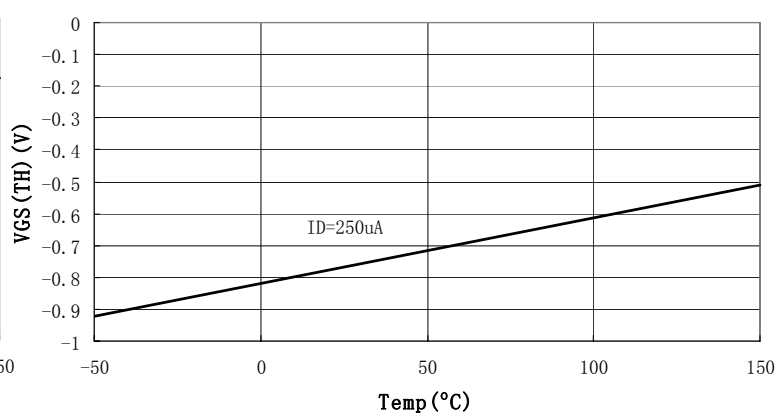


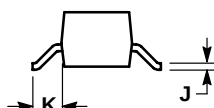
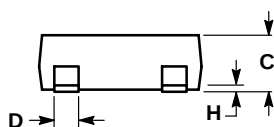
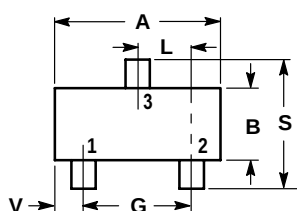
Figure 8. Vth Vs. Junction Temperature

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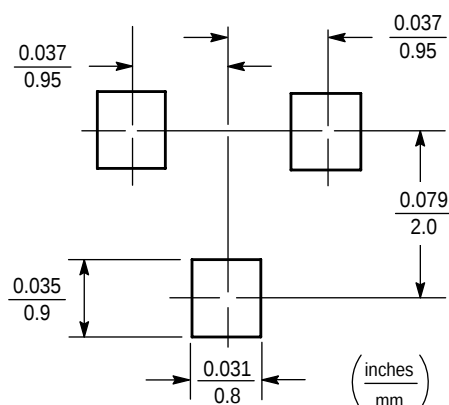
SOT-23

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



LP2301LT1G

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.

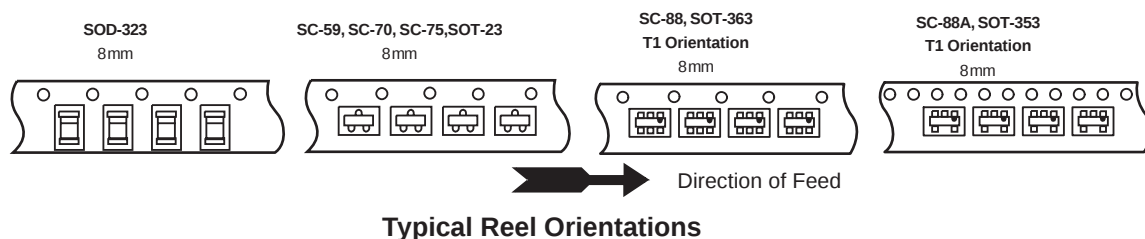
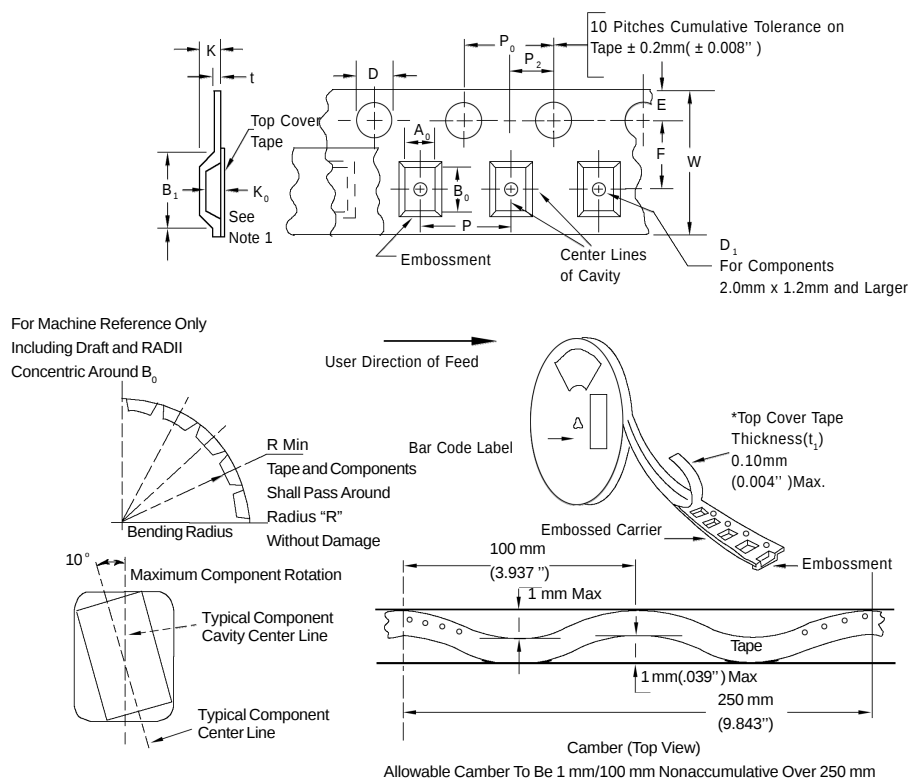


Table 1. EMBOSSED TAPE AND REEL ORDERING INFORMATION

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

EMBOSSSED 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")

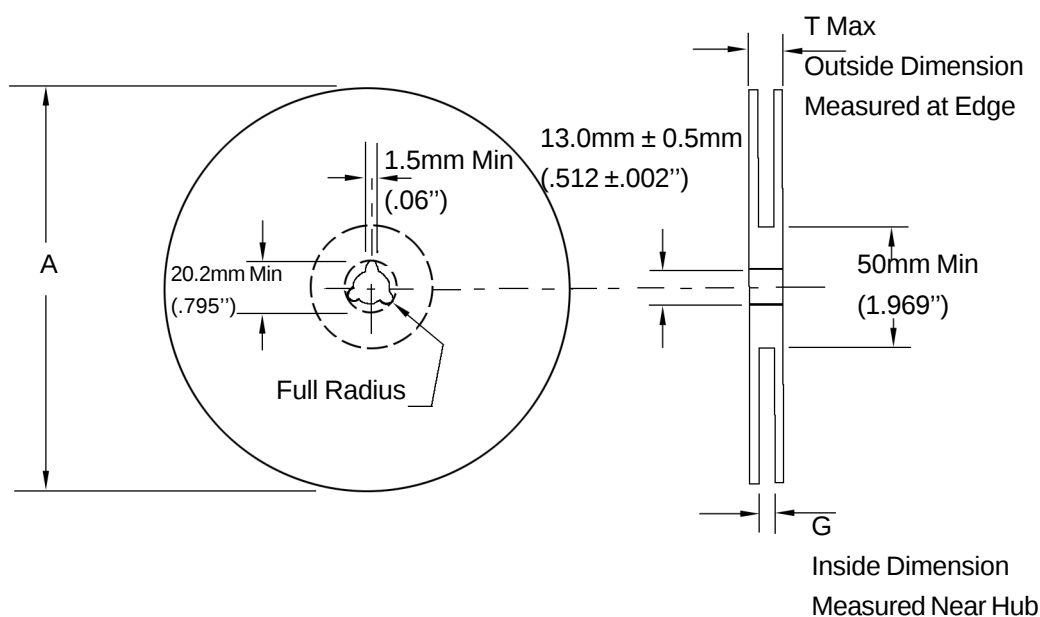
Metric dimensions govern - English are in parentheses for reference only.

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.

EMBOSED 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

