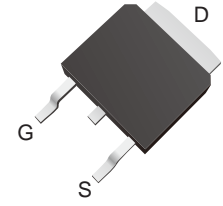


## N-Channel Enhancement Mode MOSFET

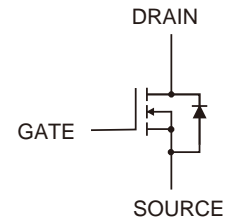
### Features

- Advanced SGT cell design
- Low Thermal Resistance
- Low Gate Charge
- Fast Switching Speed
- Lead free in comply with EU RoHS 2011/65/EU directives



### Application

- Motor/Body Load Control
- Load Switch
- PWM Application
- DC-DC converters and Off-line



### Ordering Information

Part Number	Marking	Shipping	Reel
LTM49N10-TR2K5	49N10	2500PCS Tape&Reel	13 inches

### Absolute Maximum Ratings (at $T_a = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Cure	$I_D$	$T_c = 25^\circ\text{C}$	120
		$T_c = 100^\circ\text{C}$	81
Peak Drain Current, Pulsed <sup>1)</sup>	$I_{DM}$	480	A
Single Pulse Avalanche Energy <sup>2)</sup>	$E_{AS}$	267	mJ
Power Dissipation $T_c = 25^\circ\text{C}$	$P_{tot}$	139	W
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~150	$^\circ\text{C}$

### Thermal Characteristics

Parameter	Symbol	Max	Unit
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.90	$^\circ\text{C}/\text{W}$
Thermal Resistance from Junction to Ambient <sup>3)</sup>	$R_{\theta JA}$	75	$^\circ\text{C}/\text{W}$

Note:

1) Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 1\%$ , Repetitive rating, pulse width limited by junction temperature  $T_{J(MAX)} = 150^\circ\text{C}$ .

2) Limited by  $T_{J(MAX)}$ , starting  $T_J = 25^\circ\text{C}$ ,  $R_g = 25 \Omega$ ,  $I_{AS} = -8\text{A}$ ,  $V_{DS} = -25\text{V}$ .

3) Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.

**Characteristics** ( at  $T_a = 25^\circ\text{C}$  unless otherwise specified )

Parameter	Symbol	Min	Typ	Max	Unit
<b>STATIC PARAMETERS</b>					
Drain-Source Breakdown Voltage at $I_D = 250 \mu\text{A}$	$BV_{DSS}$	105	108		V
Drain-Source Leakage Current at $V_{DS} = 100 \text{ V}$	$I_{DSS}$			1	$\mu\text{A}$
Gate Leakage Current at $V_{GS} = \pm 20 \text{ V}$	$I_{GSS}$			$\pm 100$	nA
Gate-Source Threshold Voltage at $V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	$V_{GS(th)}$	1.3	2	2.5	V
Drain-Source On-State Resistance at $V_{GS} = 10 \text{ V}, I_D = 40 \text{ A}$	$R_{DS(on)}$		4.9	5.7	$\text{m}\Omega$
<b>DYNAMIC PARAMETERS</b>					
Input Capacitance at $V_{GS} = 0 \text{ V}, V_{DS} = 50 \text{ V}, f = 1 \text{ MHz}$	$C_{iss}$		4806		pF
Output Capacitance at $V_{GS} = 0 \text{ V}, V_{DS} = 50 \text{ V}, f = 1 \text{ MHz}$	$C_{oss}$		983		pF
Reverse Transfer Capacitance at $V_{GS} = 0 \text{ V}, V_{DS} = 50 \text{ V}, f = 1 \text{ MHz}$	$C_{rss}$		50		pF
Gate charge total at $V_{DS} = -50 \text{ V}, I_D = 40 \text{ A}, V_{GS} = 10 \text{ V}$	$Q_g$		92		nC
Gate to Source Charge at $V_{DS} = -50 \text{ V}, I_D = 40 \text{ A}, V_{GS} = 10 \text{ V}$	$Q_{gs}$		35		nC
Gate to Drain Charge at $V_{DS} = -50 \text{ V}, I_D = 40 \text{ A}, V_{GS} = 10 \text{ V}$	$Q_{gd}$		14		nC
Turn-On Delay Time at $V_{DS} = 50\text{V}, I_D = 40\text{A}, R_g = 3\Omega, V_{GS} = 10 \text{ V}$	$t_{d(on)}$		25		nS
Turn-On Rise Time at $V_{DS} = 50\text{V}, I_D = 40\text{A}, R_g = 3\Omega, V_{GS} = 10 \text{ V}$	$t_r$		40		nS
Turn-Off Delay Time at $V_{DS} = 50\text{V}, I_D = 40\text{A}, R_g = 3\Omega, V_{GS} = 10 \text{ V}$	$t_{d(off)}$		49		ns
Turn-Off Fall Time at $V_{DS} = 50\text{V}, I_D = 40\text{A}, R_g = 3\Omega, V_{GS} = 10 \text{ V}$	$t_f$		41		nS
<b>Body-Diode PARAMETERS</b>					
Drain-Source Diode Forward Voltage at $I_S = 40 \text{ A}, V_{GS} = 0 \text{ V}$	$V_{SD}$			1.2	V



Characteristic Curves

Fig.1 Power Dissipation

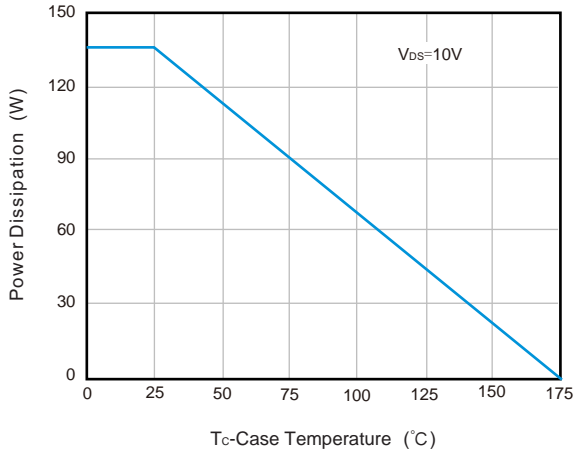


Fig.2 Drain Current

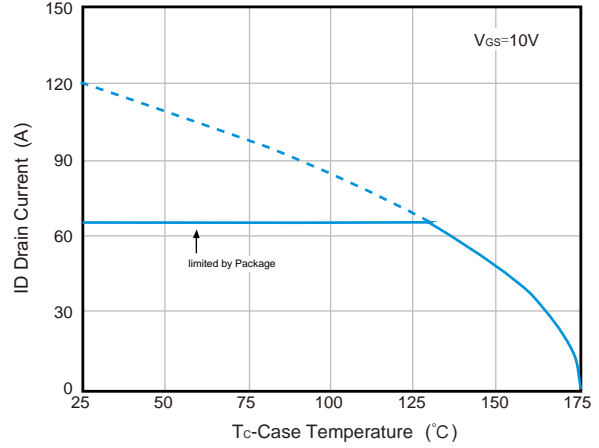


Fig.3 Safe Operation Area

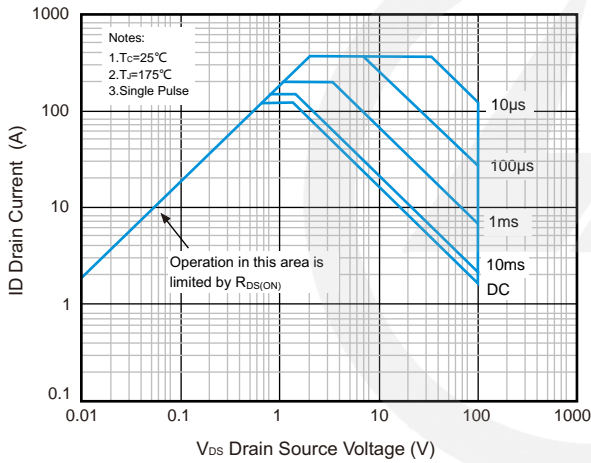


Fig.4 Thermal Transient Impedance

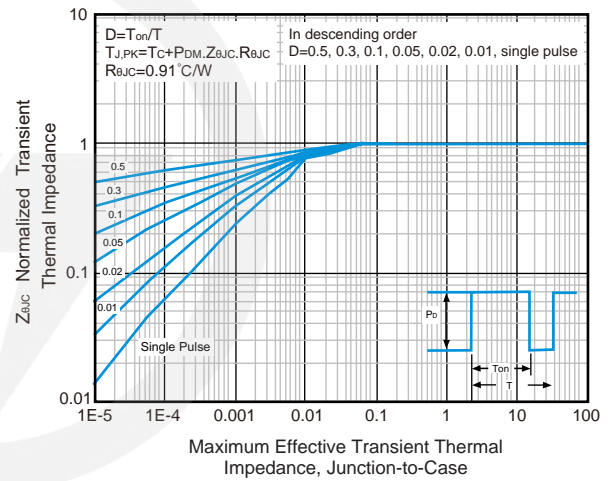


Fig.5 Output Characteristics

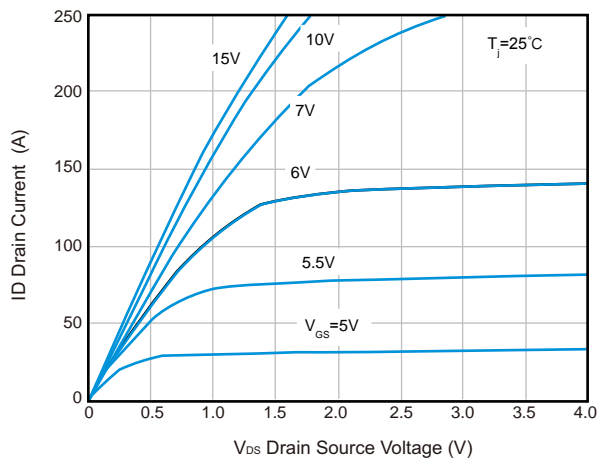


Fig.6 Drain-Source On Resistance

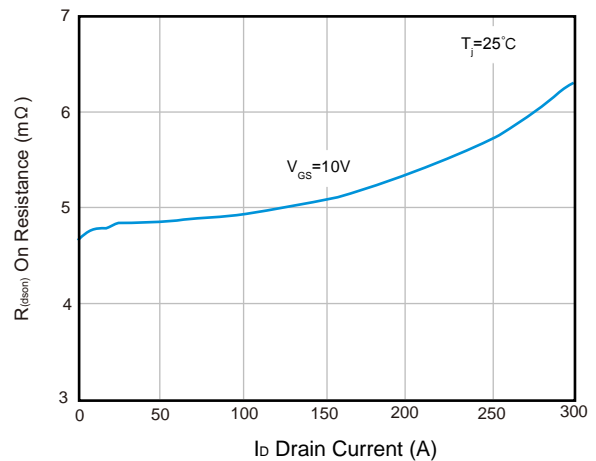




Fig.7 On-Resistance vs Temperature

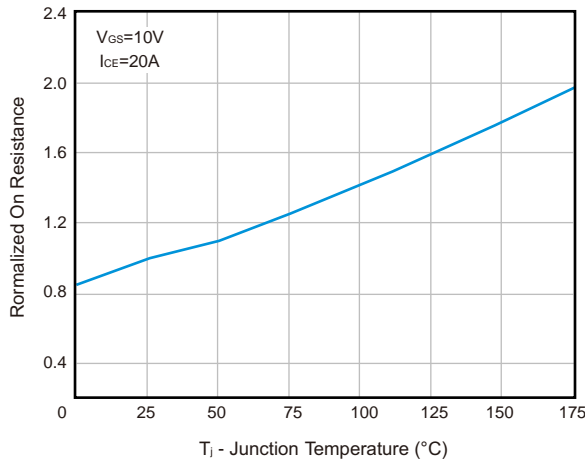


Fig.8 Source-Drain Diode Forward

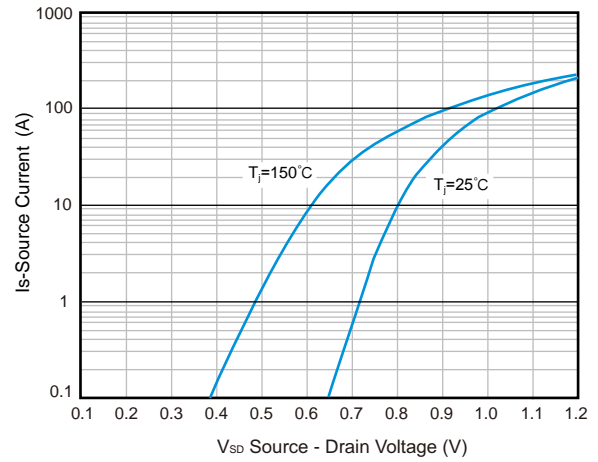


Fig.9 Capacitance Characteristics

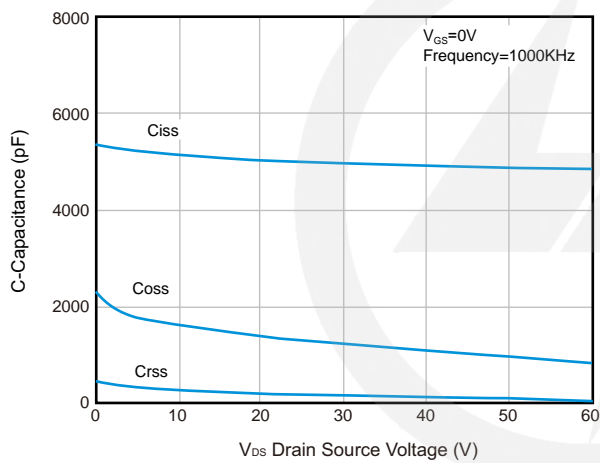
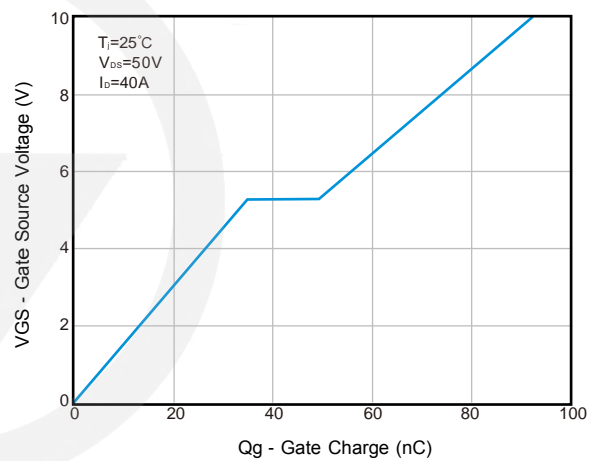
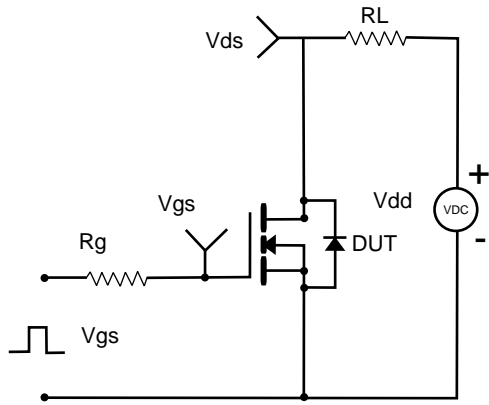


Fig.10 Gate Charge Characteristics

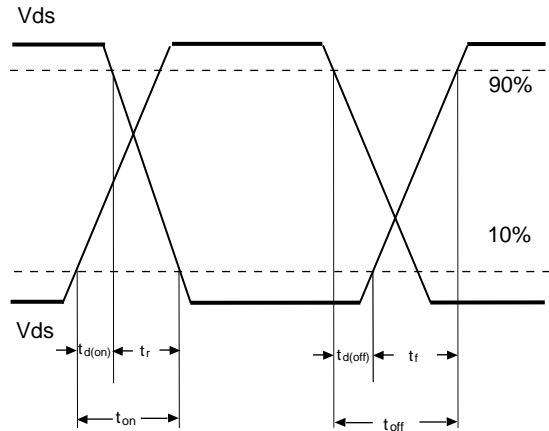


**Test Circuits**

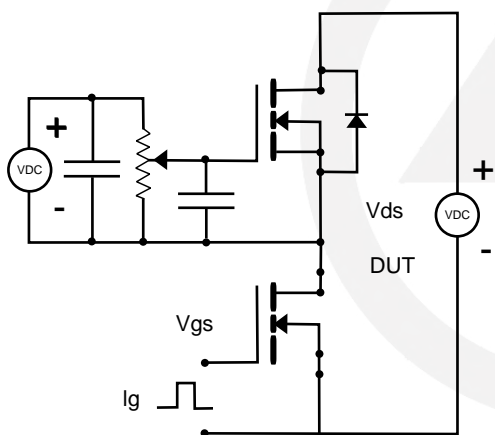
**Fig.1-1 Switching times test circuit**



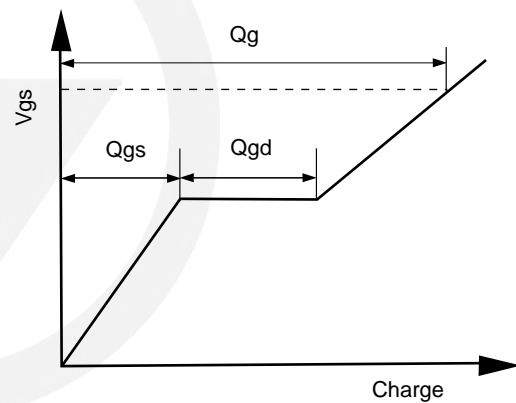
**Fig.1-2 Switching Waveform**



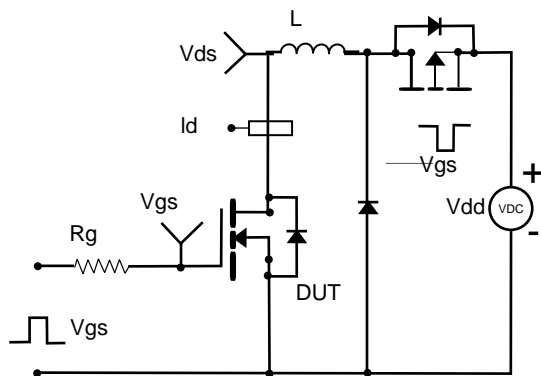
**Fig.2-1 Gate charge test circuit**



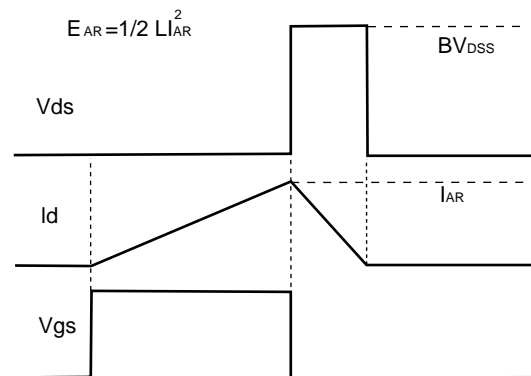
**Fig.2-2 Gate charge waveform**



**Fig.3-1 Avalanche test circuit**

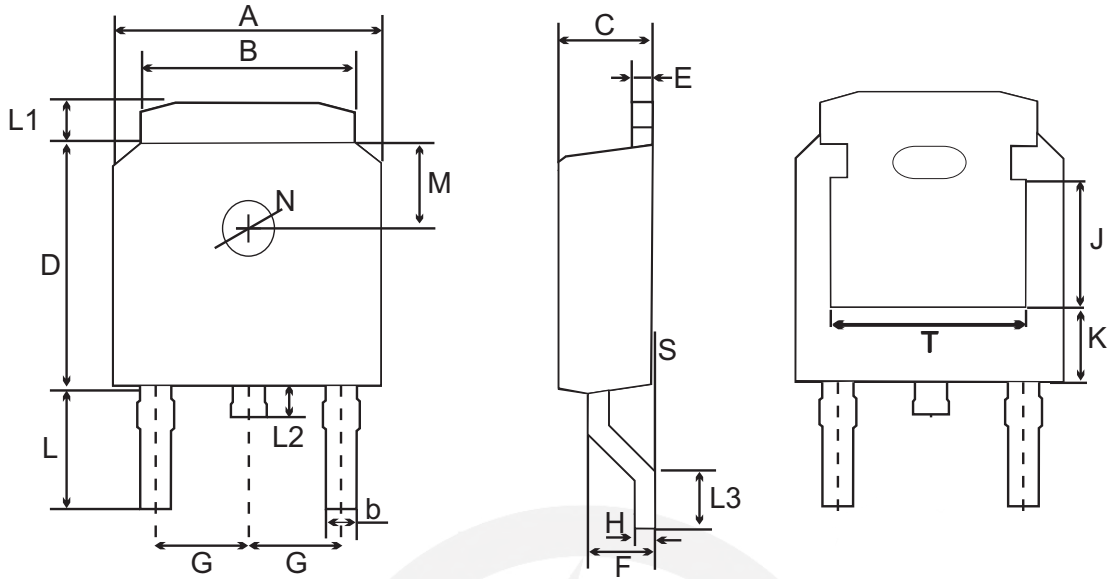


**Fig.3-2 Avalanche waveform**





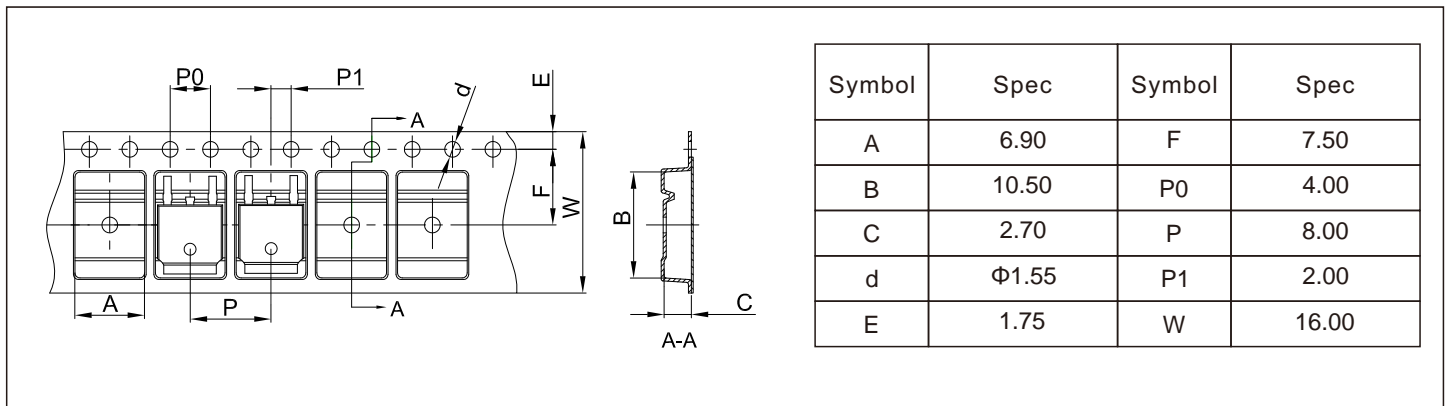
TO-252 Package Outline



UNIT	A	B	b	C	D	E	F	G	H	L	L1	L2	L3	S	M	N	J	K	T	
mm	max	6.7	5.5	0.8	2.5	6.3	0.6	1.8	2.29 TYPICAL	0.55	3.1	1.2	1.0	1.75	0.23	1.8 TYPICAL	1.3 TYPICAL	3.16 ref.	1.80 ref.	4.83 ref.
	typ	6.6	5.3	0.7	2.3	6.1	0.5	1.5		0.50	2.8	1.0	0.8	1.30	0.15					
	min	6.3	5.1	0.3	2.1	5.9	0.4	1.3		0.45	2.7	0.8	0.6	1.00	0.0					

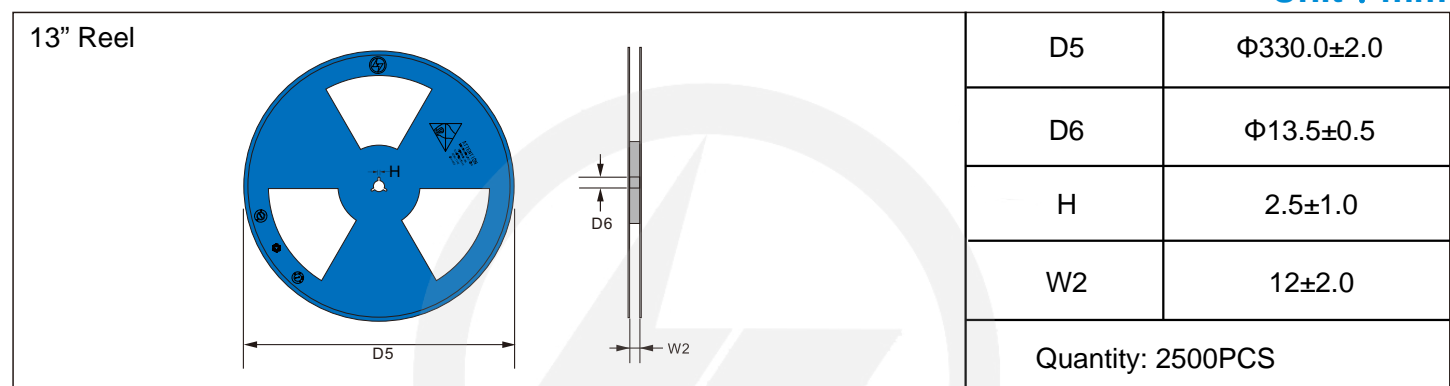
## Carrier Tape Dimensions

Unit : mm

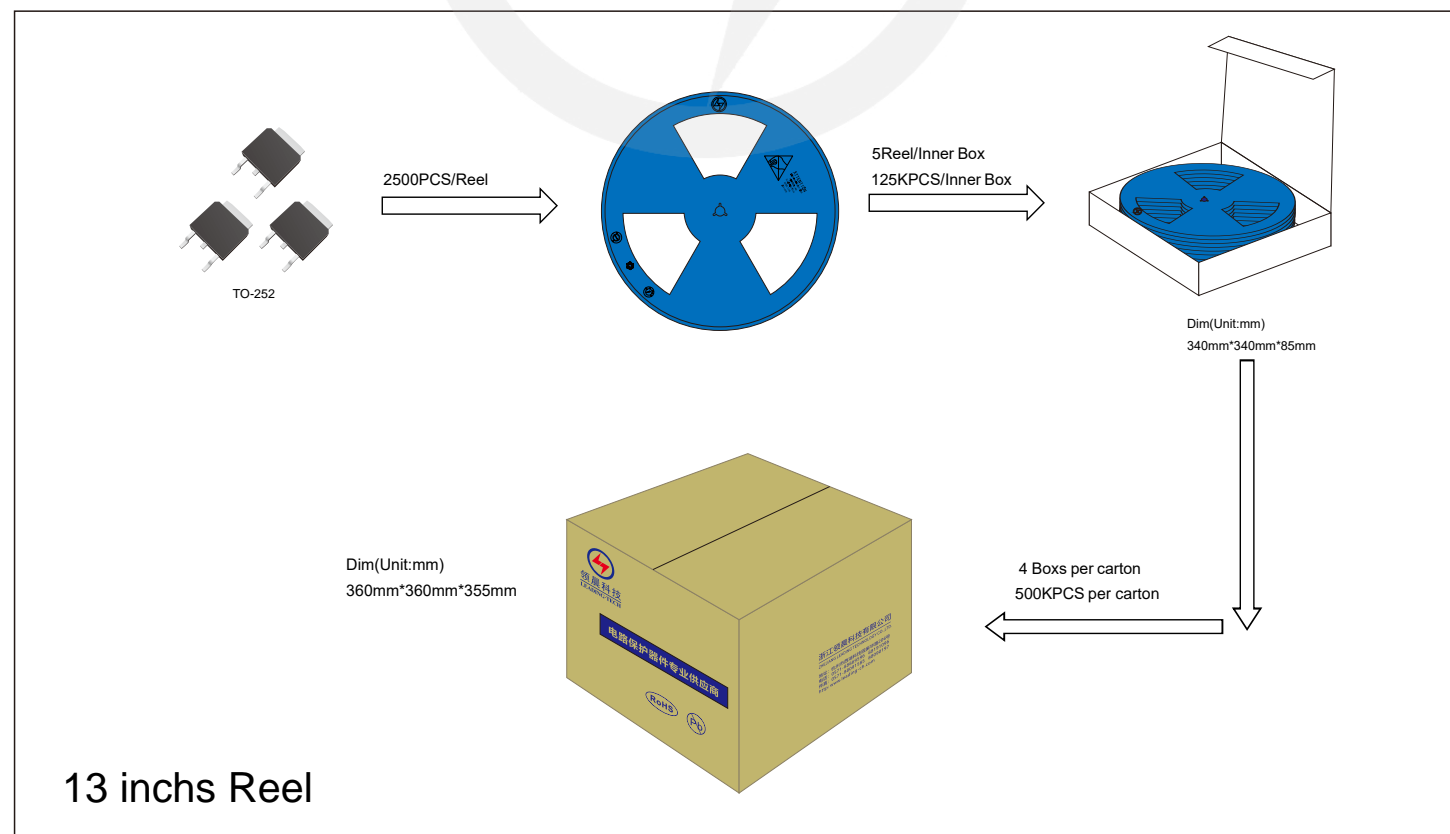


## Reel Dimensions

Unit : mm

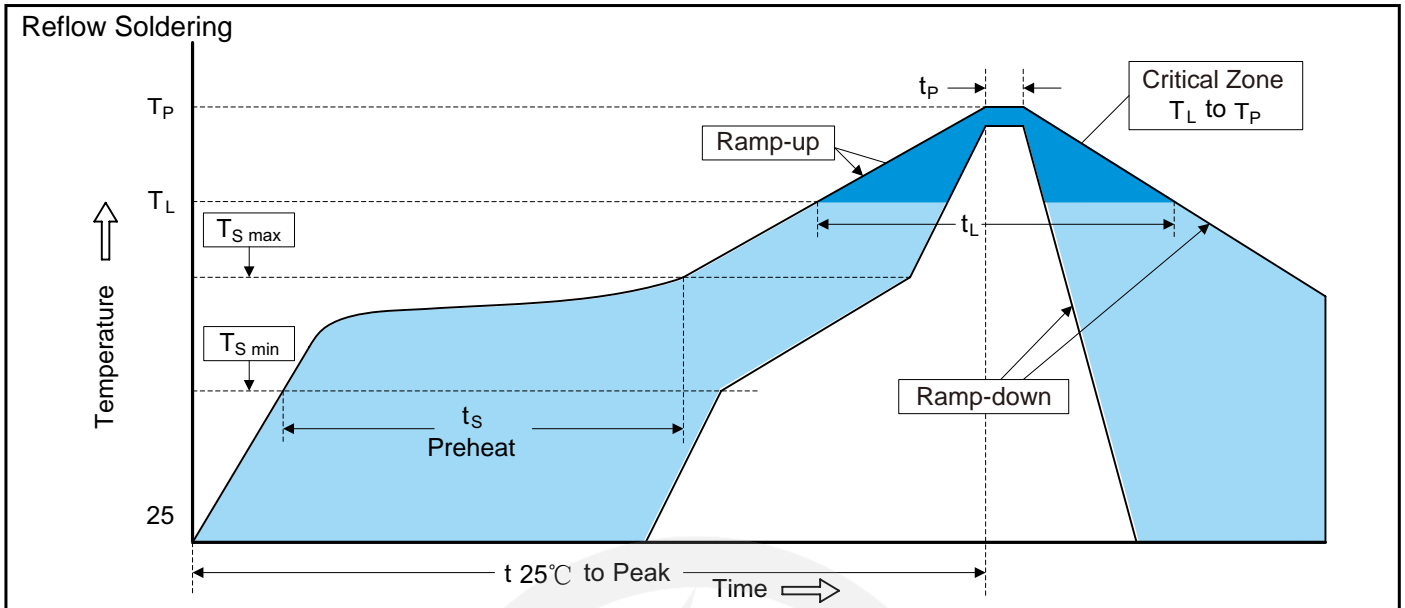


## Packaging





## Recommended Soldering Conditions



### Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate ( $T_L$ to $T_P$ )	3°C/second max.
Preheat	
-Temperature Min ( $T_{S\ min}$ )	150°C
-Temperature Max ( $T_{S\ max}$ )	200°C
-Time (min to max) ( $t_s$ )	60-180 seconds
$T_{S\ max}$ to $T_L$	
-Ramp-up Rate	3°C/second max.
Time maintained above:	
-Temperature ( $T_L$ )	217°C
-Time ( $t_L$ )	60-150 seconds
Peak Temperature ( $T_P$ )	260°C
Time within 5°C of actual Peak Temperature ( $t_p$ )	20-40 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.

## Important Notice and Disclaimer

Leading-Tech reserves the right to make changes to this document and its products and specifications at any time without notice.

Customers should obtain and confirm the latest product information and specifications before final design, purchase or use.

Leading-Tech makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, not does Leading-Tech assume any liability for application assistance or customer product design.

Leading-tech does not warrant or accept any liability with products which are purchase or used for any unintended or unauthorized application.

No license is granted by implication or otherwise under any intellectual property rights of Leading-Tech.

Leading-Tech products are not authorized for use as critical components in life support devices or systems without express written approval of Leading-tech.

## Version Update Information

Series NO.	Enactment/Revision Date	Effective Date	Version	Revision content	Revision Reason	Revision Person	Note
01	2024.12.12	2024.12.12	3.0	New File	/	Ding	