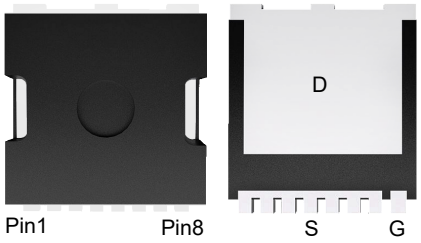
TNG700N30TL

N-Channel Enhancement Mode Power MOSFET

Product Summary

- V_{DS}= 30V,I_D= 700A
- $R_{DS(on)}$< 0.28mΩ @V_{GS}= 10V

TOLL



(Top View) **(Bottom View)**

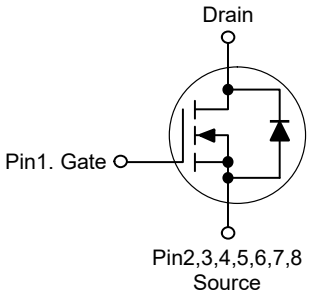
Features

- Advanced Split Gate Trench Technology
- RoHS Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 1
- 100% Avalanche Tested
- 100% DVDS

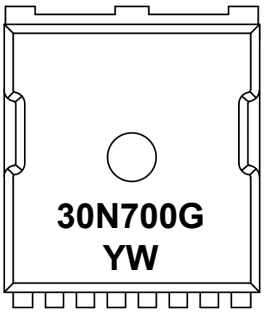
Application

- Power Tool Appliances
- High Power Inverter System
- BMS Appliances

Schematic Diagram



Marking Code



(Top View)

Absolute Maximum Ratings

Ratings at 25℃ case temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	700	A
Drain Current-Pulsed Note1	I_{DM}	2800	A
Maximum Power Dissipation	P_D	278	W
Single Pulse Avalanche Energy Note2	E_{AS}	1500	mJ
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +175	°C

Thermal Characteristics

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.45	°C/W

Electrical Characteristics

(T_J=25℃ unless otherwise specified)

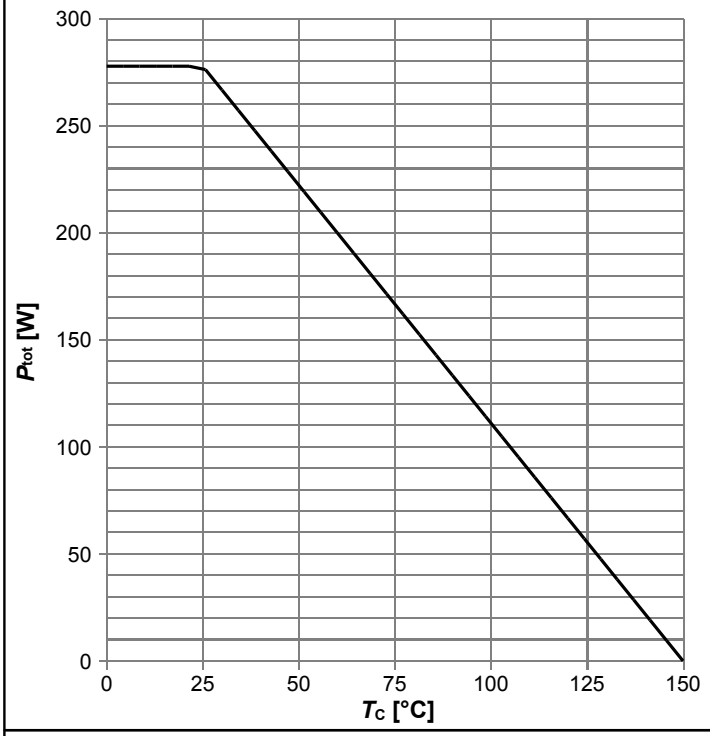
Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Drain-source breakdown voltage	$V_{(BR)DSS}$	30	-	-	V	V_{GS}=0 V, I_D=1 mA
Gate threshold voltage	$V_{GS(th)}$	1.2	1.6	2.0	V	V_{DS}=V_{GS}, I_D=1460 µA
Zero gate voltage drain current	I_{DSS}	- -	0.1 10	1 100	µA	V_{DS}=24 V, V_{GS}=0 V, T_j=25 °C V_{DS}=24 V, V_{GS}=0 V, T_j=125 °C
Gate-source leakage current	I_{GSS}	-	10	100	nA	V_{GS}=20 V, V_{DS}=0 V
Drain-source on-state resistance	$R_{DS(on)}$	- -	0.31 0.36	0.35 0.4	mΩ	V_{GS}=10 V, I_D=50 A V_{GS}=4.5 V, I_D=50 A
Gate resistance[1)]	R_G	-	0.47	-	Ω	-
Transconductance	g_{fs}	265	530	-	S	|V_{DS}|≥2|I_D|$R_{DS(on)max}$, I_D=50 A
Input capacitance[1)]	C_{iss}	-	14000	18000	pF	V_{GS}=0 V, V_{DS}=15 V, f=1 MHz
Output capacitance[1)]	C_{oss}	-	3300	4300	pF	V_{GS}=0 V, V_{DS}=15 V, f=1 MHz
Reverse transfer capacitance[1)]	C_{rss}	-	270	470	pF	V_{GS}=0 V, V_{DS}=15 V, f=1 MHz
Turn-on delay time	$t_{d(on)}$	-	12	-	ns	V_{DD}=15 V, V_{GS}=10 V, I_D=50 A, $R_{G,ext}$=1.6 Ω
Rise time	t_r	-	5	-	ns	V_{DD}=15 V, V_{GS}=10 V, I_D=50 A, $R_{G,ext}$=1.6 Ω
Turn-off delay time	$t_{d(off)}$	-	70	-	ns	V_{DD}=15 V, V_{GS}=10 V, I_D=50 A, $R_{G,ext}$=1.6 Ω
Fall time	t_f	-	14	-	ns	V_{DD}=15 V, V_{GS}=10 V, I_D=50 A, $R_{G,ext}$=1.6 Ω
Gate to source charge	Q_{gs}	-	31	-	nC	V_{DD}=15 V, I_D=50 A, V_{GS}=0 to 4.5 V
Gate charge at threshold	$Q_{g(th)}$	-	22	-	nC	V_{DD}=15 V, I_D=50 A, V_{GS}=0 to 4.5 V
Gate to drain charge[1)]	Q_{gd}	-	18	27	nC	V_{DD}=15 V, I_D=50 A, V_{GS}=0 to 4.5 V
Switching charge	Q_{sw}	-	27	-	nC	V_{DD}=15 V, I_D=50 A, V_{GS}=0 to 4.5 V
Gate charge total[1)]	Q_g	-	91	114	nC	V_{DD}=15 V, I_D=50 A, V_{GS}=0 to 4.5 V
Gate plateau voltage	$V_{plateau}$	-	2.3	-	V	V_{DD}=15 V, I_D=50 A, V_{GS}=0 to 4.5 V
Gate charge total	Q_g	-	197	-	nC	V_{DD}=15 V, I_D=50 A, V_{GS}=0 to 10 V
Gate charge total, sync. FET	$Q_{g(sync)}$	-	86	-	nC	V_{DS}=0.1 V, V_{GS}=0 to 4.5 V
Output charge[1)]	Q_{oss}	-	95	126	nC	V_{DS}=15 V, V_{GS}=0 V

Reverse diode

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Diode continuous forward current	I_S	-	-	236	A	T_C=25 °C
Diode pulse current	$I_{S,pulse}$	-	-	2800	A	T_C=25 °C
Diode forward voltage	V_{SD}	-	0.72	1.0	V	V_{GS}=0 V, I_F=50 A, T_j=25 °C
Reverse recovery time[1)]	t_{rr}	-	49	98	ns	V_R=15 V, I_F=25 A, di_F/dt=100 A/µs
Reverse recovery charge[1)]	Q_{rr}	-	64	128	nC	V_R=15 V, I_F=25 A, di_F/dt=100 A/µs

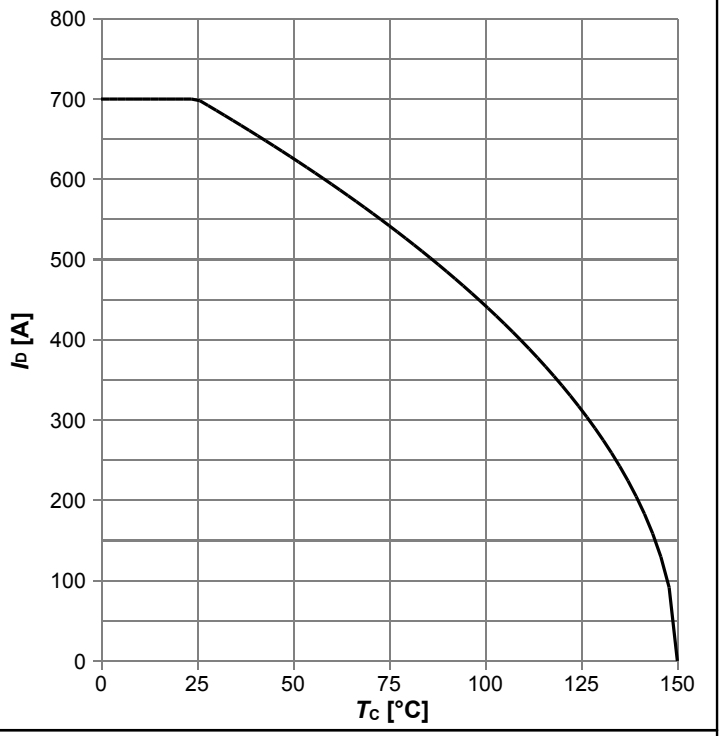
Typical Characteristic Curves

Diagram 1: Power dissipation



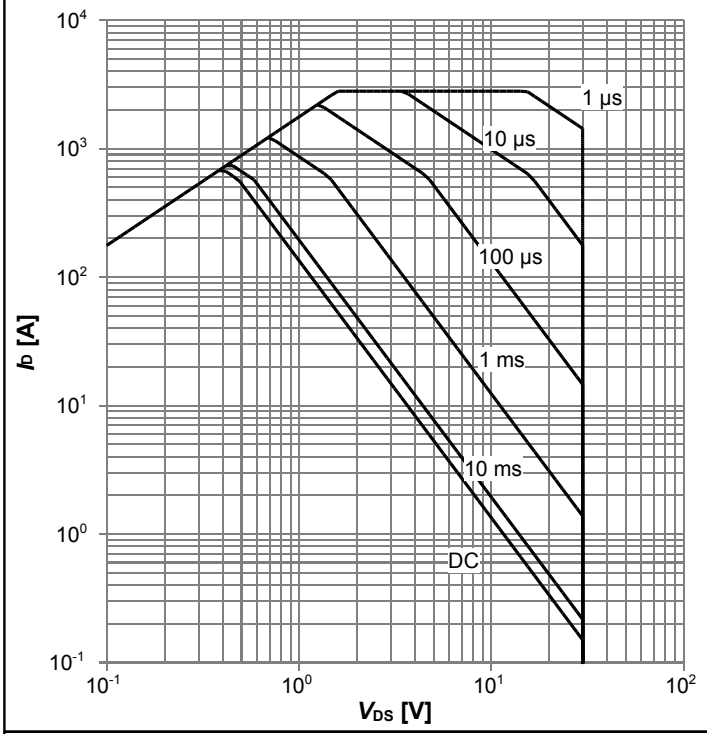
$P_{tot}=f(T_C)$

Diagram 2: Drain current



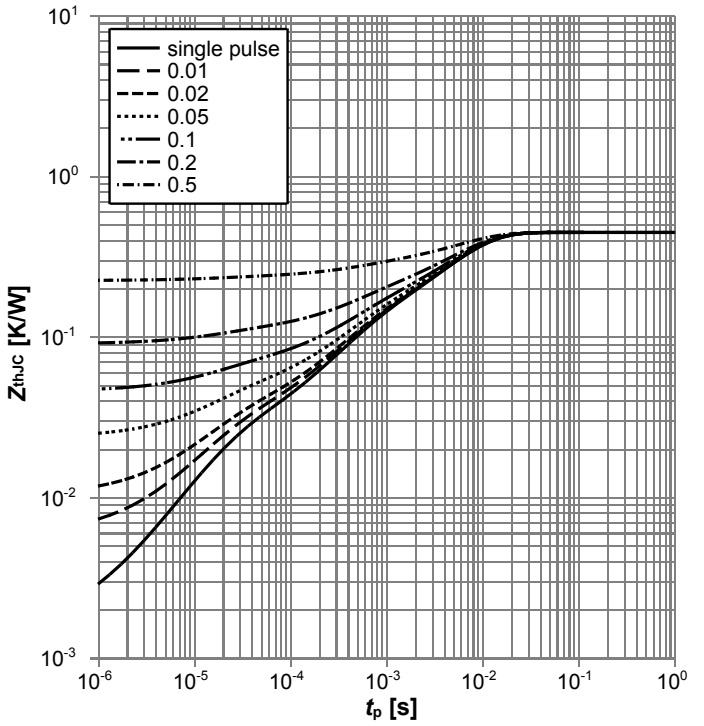
$I_D=f(T_C)$; $V_{GS}\geq 10$ V

Diagram 3: Safe operating area



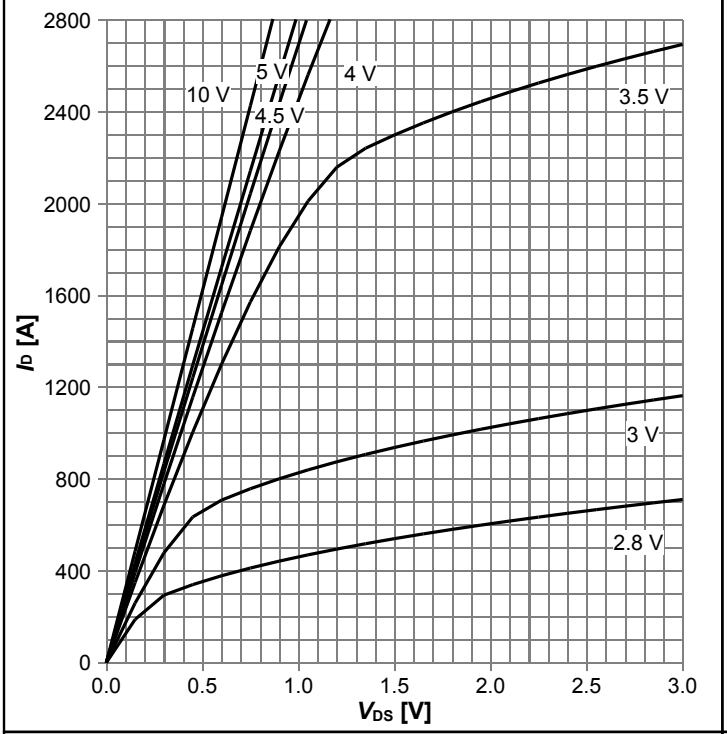
$I_D=f(V_{DS})$; $T_C=25$ °C; $D=0$; parameter: t_p

Diagram 4: Max. transient thermal impedance



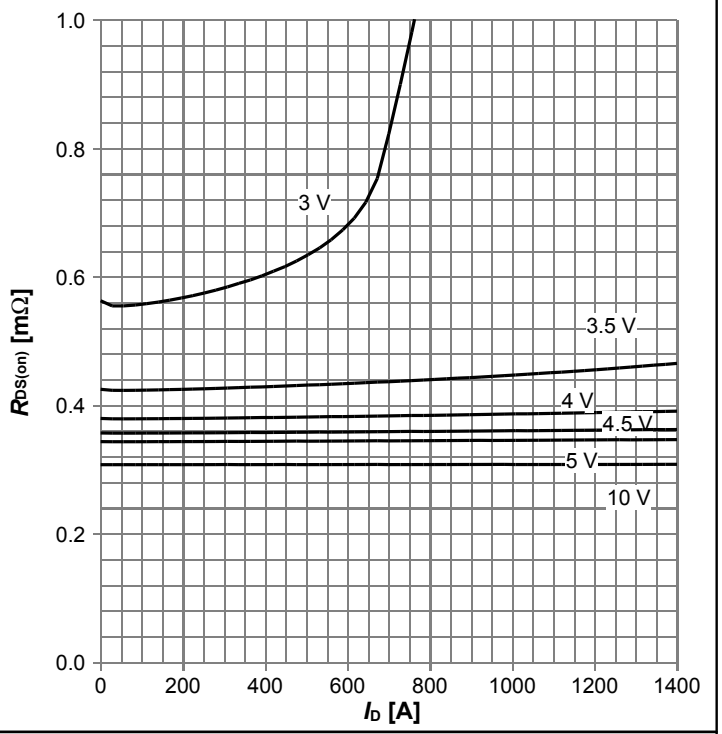
$Z_{thJC}=f(t_p)$; parameter: $D=t_p/T$

Diagram 5: Typ. output characteristics



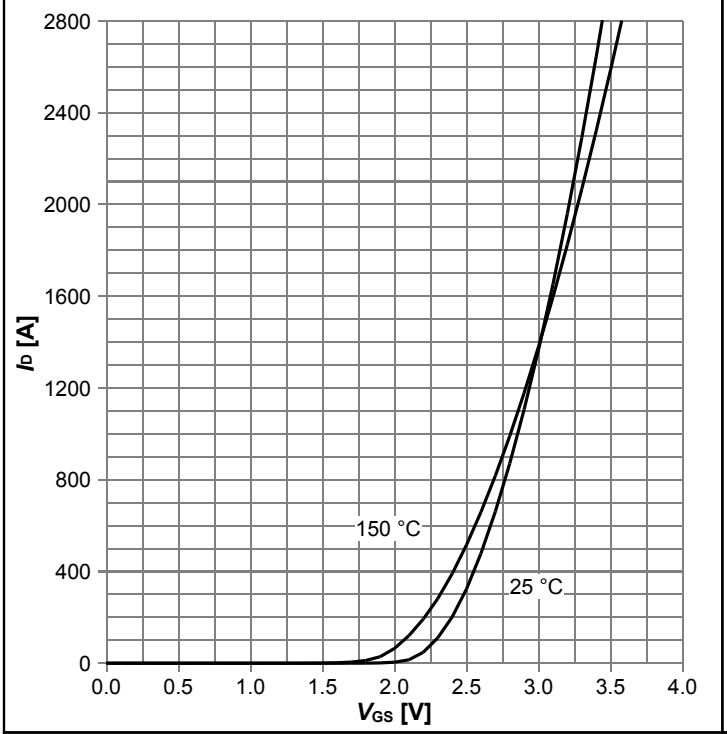
I_D=f(V_{DS}), T_j=25 °C; parameter: V_{GS}

Diagram 6: Typ. drain-source on resistance



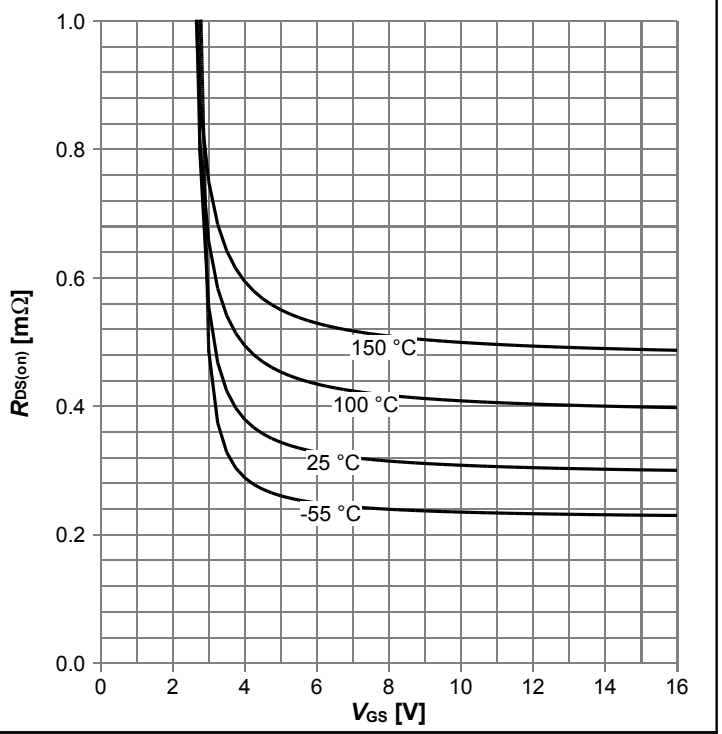
$R_{DS(on)}$=f(I_D), T_j=25 °C; parameter: V_{GS}

Diagram 7: Typ. transfer characteristics



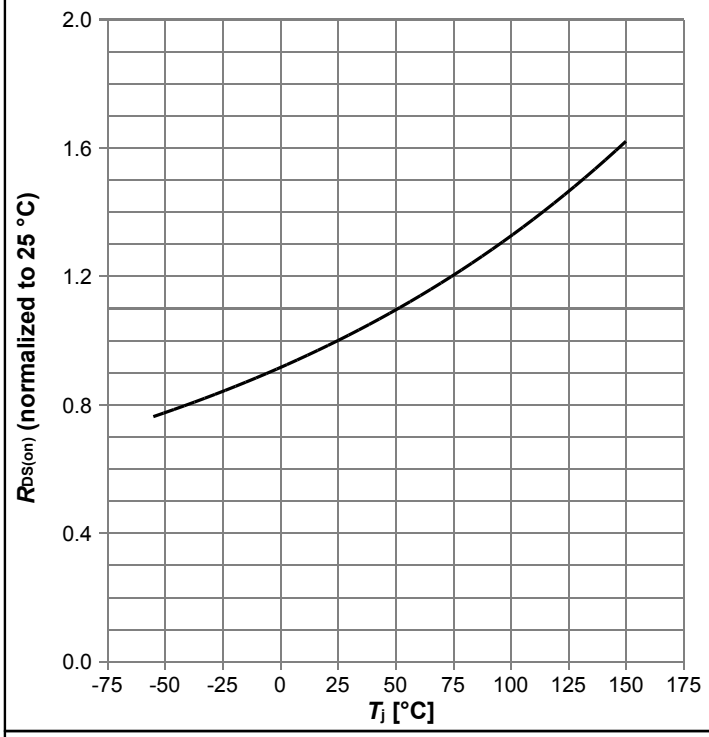
I_D=f(V_{GS}), |V_{DS}|>2|I_D|$R_{DS(on)max}$; parameter: T_j

Diagram 8: Typ. drain-source on resistance



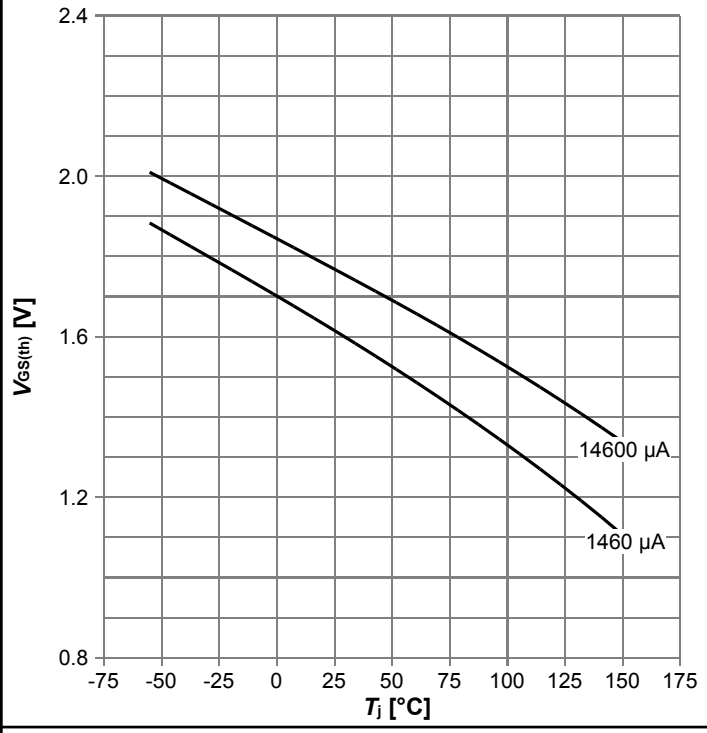
$R_{DS(on)}$=f(V_{GS}), I_D=50 A; parameter: T_j

Diagram 9: Normalized drain-source on resistance



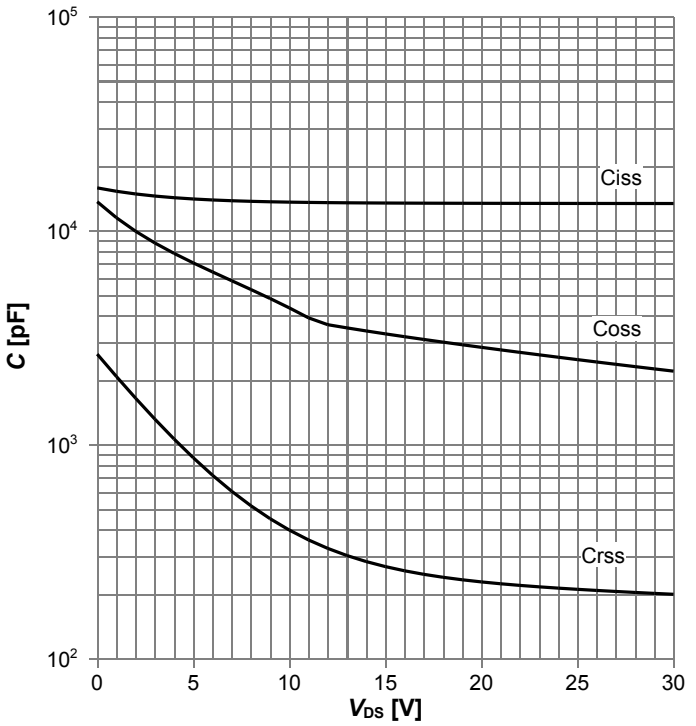
$R_{DS(on)}$=f(T_j), I_D=50 A, V_{GS}=10 V

Diagram 10: Typ. gate threshold voltage



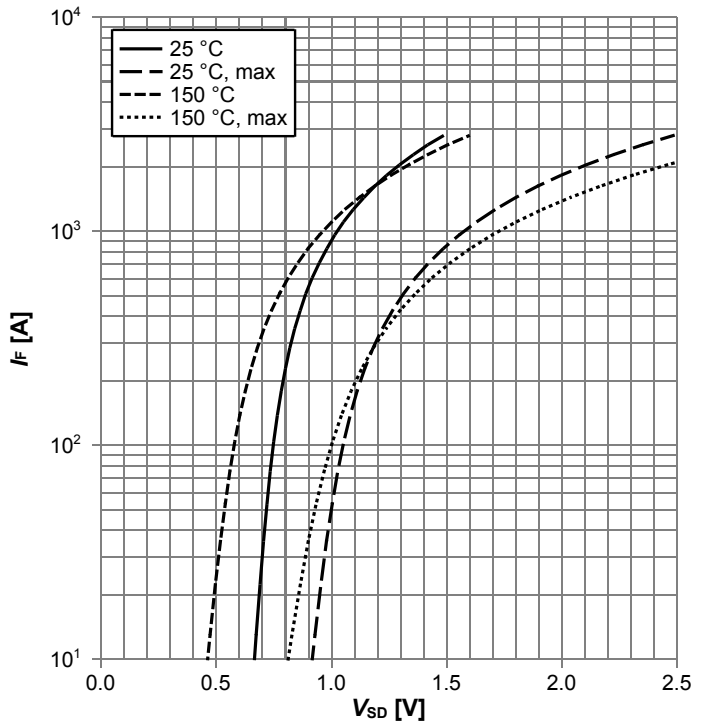
$V_{GS(th}$=f(T_j), V_{GS}=V_{DS}; parameter: I_D

Diagram 11: Typ. capacitances



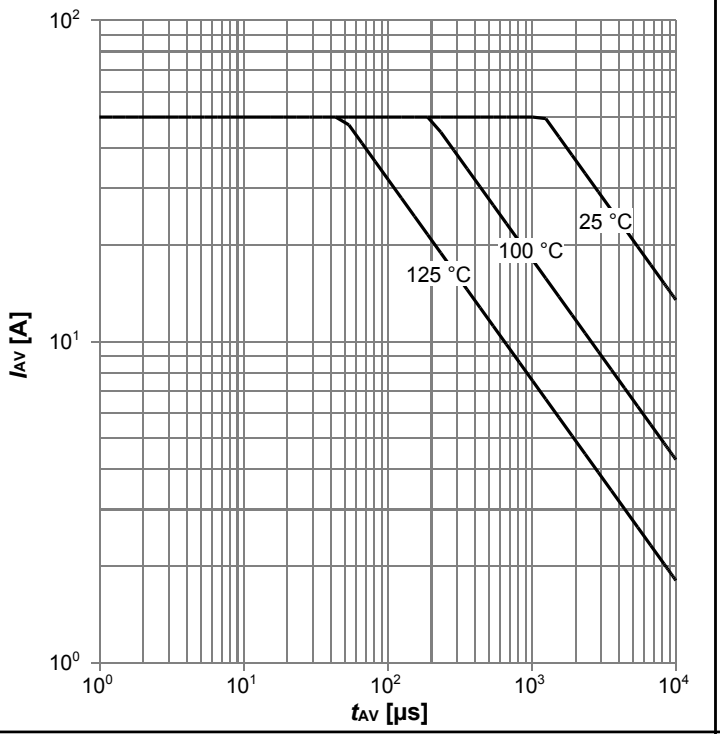
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz

Diagram 12: Forward characteristics of reverse diode



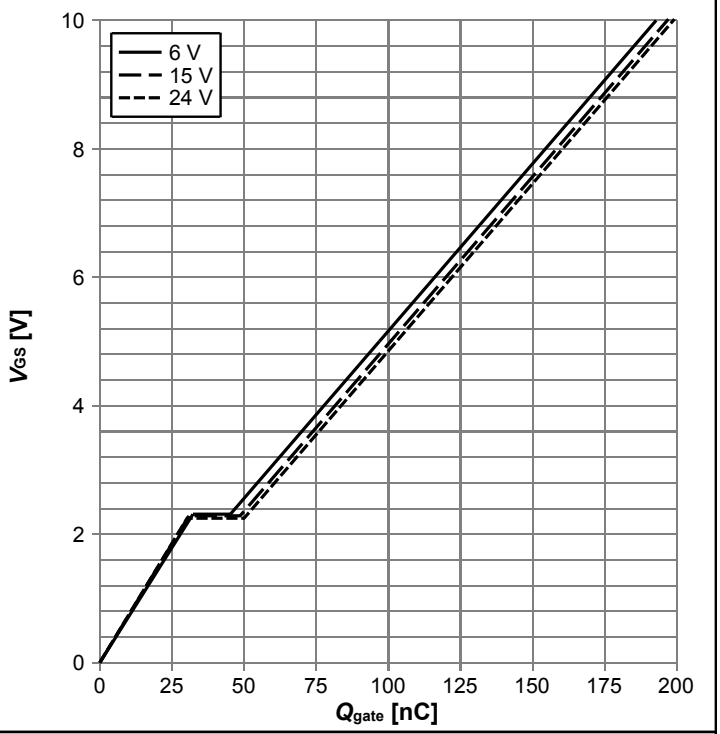
I_F=f(V_{SD}); parameter: T_j

Diagram 13: Avalanche characteristics



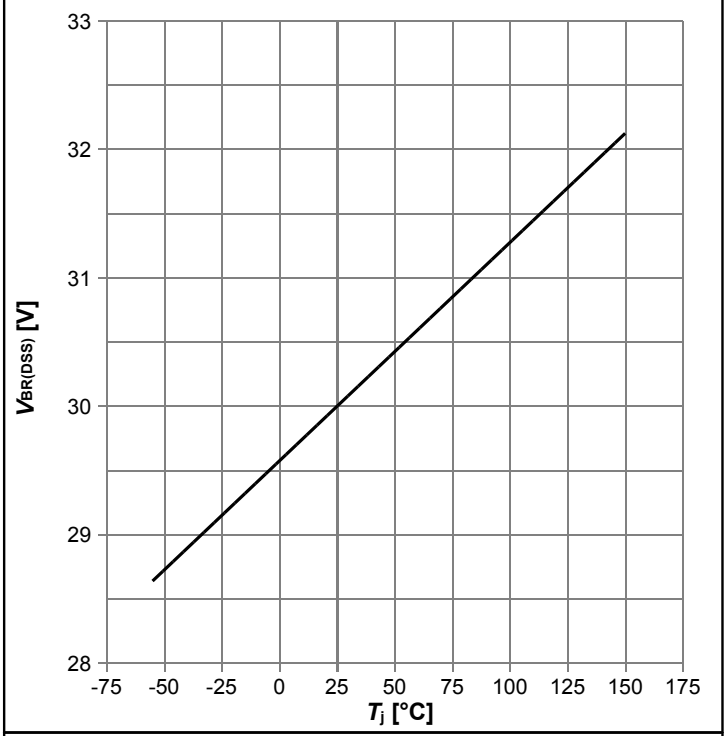
I_{AS}=f(t_{AV}); R_{GS}=25 Ω; parameter: $T_{j,start}$

Diagram 14: Typ. gate charge



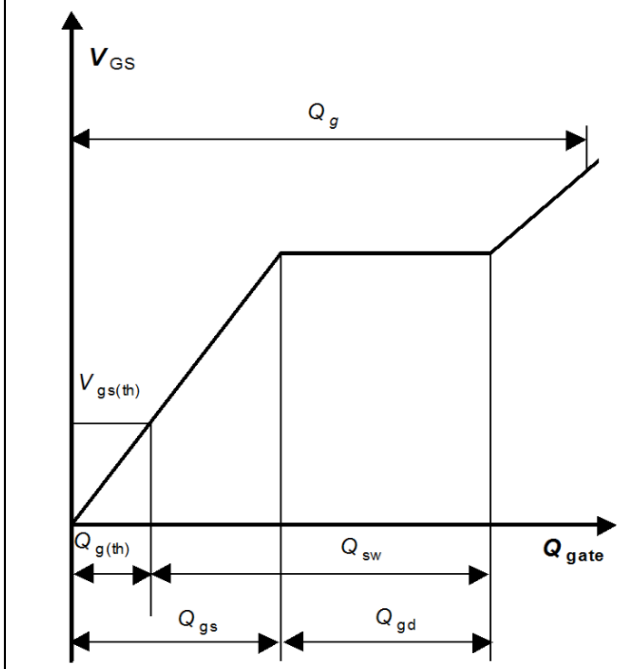
V_{GS}=f(Q_{gate}), I_D=50 A pulsed, T_j=25 °C; parameter: V_{DD}

Diagram 15: Min. drain-source breakdown voltage



$V_{BR(DSS)}$=f(T_j); I_D=1 mA

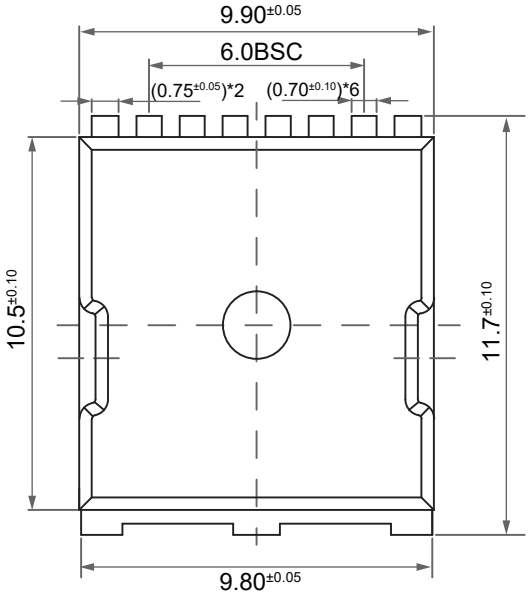
Diagram Gate charge waveforms



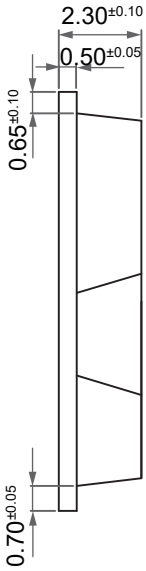
Package Outline

TOLL

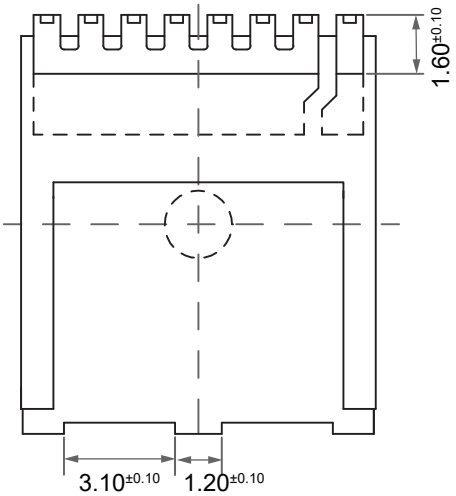
Dimensions in mm



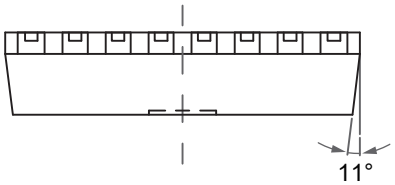
TOP VIEW



SIDE VIEW



BOTTOM VIEW



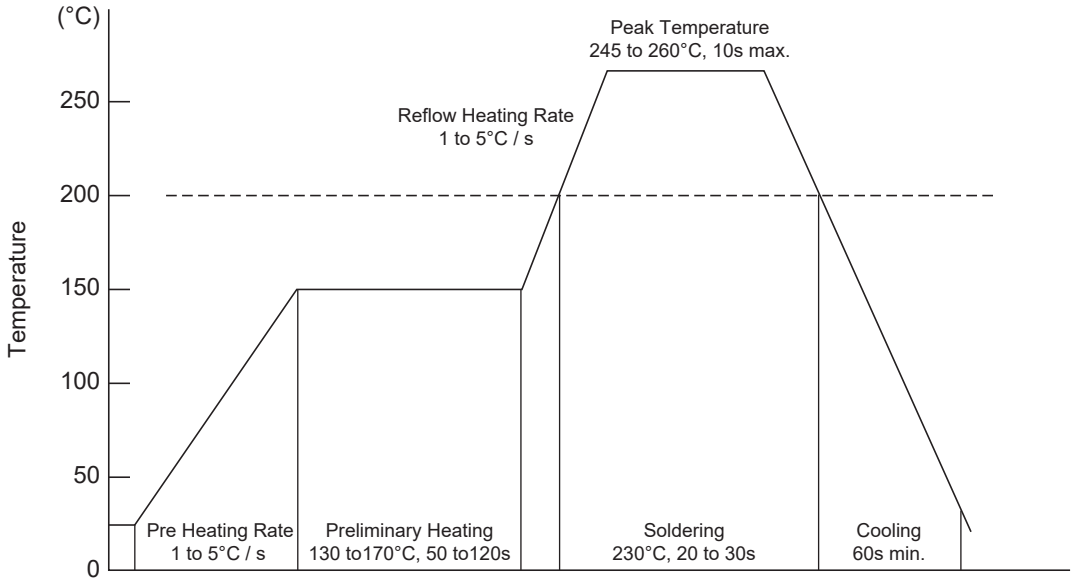
FRONT VIEW

Ordering Information

Device	Package	Shipping
TNG700N30TL	TOLL	2,000PCS/Reel&13inches

Conditions of Soldering and Storage

◆ Recommended condition of reflow soldering



Recommended peak temperature is over 245°C. If peak temperature is below 245°C, you may adjust the following parameters:

- Time length of peak temperature (longer)
- Time length of soldering (longer)
- Thickness of solder paste (thicker)

◆ Conditions of hand soldering

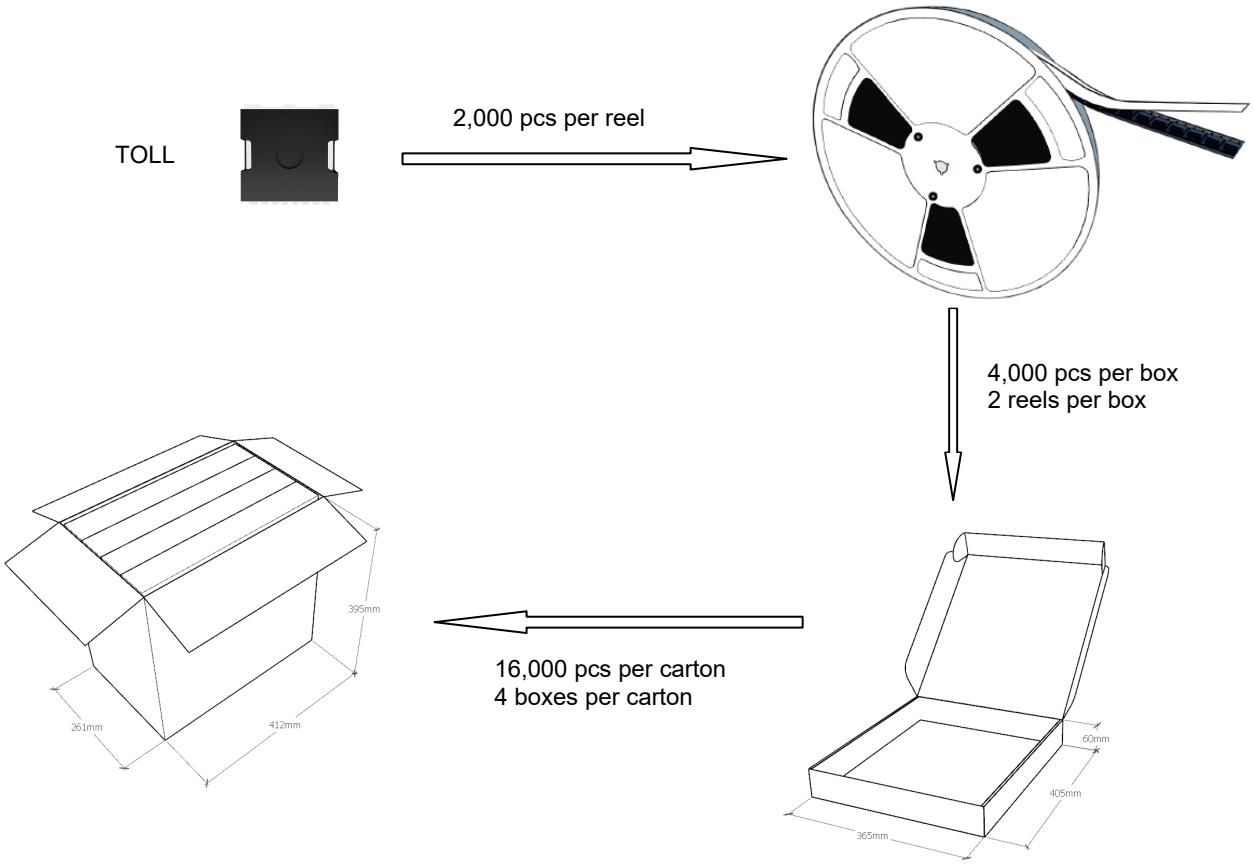
- Temperature: 300°C
- Time: 3s max.
- Times: one time

◆ Storage conditions

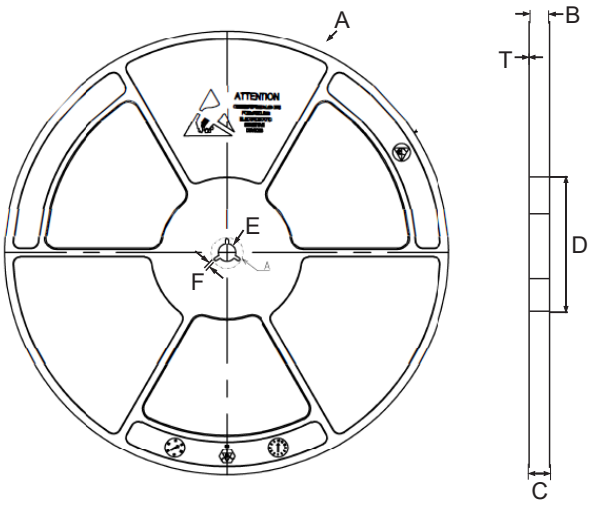
- **Temperature**
  5 to 40°C
- **Humidity**
  30 to 80% RH
- **Recommended period**
  One year after manufacturing

Package Specifications

- The method of packaging



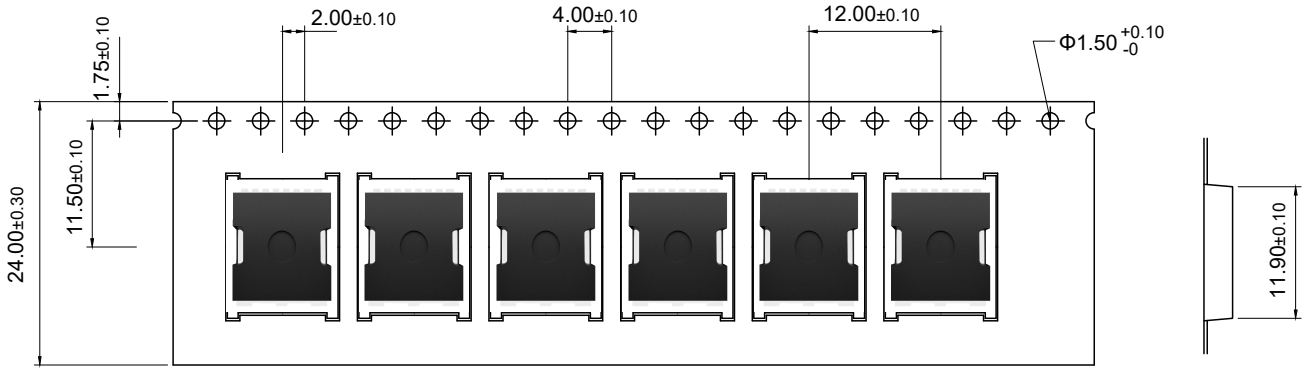
◆ **reel data**



Reel (13")

Symbol	Value(unit:mm)
A	Φ330.2±1
B	25±0.5
C	29.2±2
D	Φ100±0.5
E	Φ13.4±0.2
F	2.3±0.2
T	2.1±0.2

◆ Embossed tape data



Contact Information

TANI website: **http://www.tanisemi.com** Email:tani@tanisemi.com

For additional information, please contact your local Sales Representative.

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Product Specification Statement

The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.

The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. TANI shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and TANI assumes no responsibility for the application of the product. TANI strives to provide accurate and up -to- date information to the best of our ability. However, due to technical, human, or other reasons, TANI cannot guarantee that the information provided in the product specification is entirely accurate and error-free. TANI shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications.

TANI reserves the right to revise or update the product specification and the products at any time without prior notice, and the user's continued use of the product specification is considered an acceptance of these revisions and updates. Prior to purchasing and using the product, users should verify the above information with TANI to ensure that the prod uct specification is the most current, effective, and complete. If users are particularly concerned about product parameters, please consult TANI in detail or request relevant product test reports. Any data not explicitly mentioned in the product specification shall be subject to separate agreement.

Users are advised to pay attention to the parameter limit values specified in the product specification and maintain a certain margin in design or application to ensure that the product does not exceed the parameter limit values defined in the product specification. This precaution should be taken to avoid exceeding one or more of the limit values, which may result in permanent irreversible damage to the product, ultimately affecting the quality and reliability of the system or equipment.

The design of the product is intended to meet civilian needs and is not guaranteed for use in harsh environments or precision equipment. It is not recommended for use in systems or equipment such as medical devices, aircraft, nuclear power, and similar systems, where failures in these systems or equipment could reasonably be expected to result in personal injury. TANI shall assume no responsibility for any consequences resulting from such usage.

Users should also comply with relevant laws, regulations, policies, and standards when using the product specification. Users are responsible for the risks and liabilities arising from the use of the product specification and must ensure that it is not used for illegal purposes. Additionally, users should respect the intellectual property rights related to the product specification and refrain from infringing upon any third- party legal rights. TANI shall assume no responsibility for any disputes or controv ersies arising from the above-mentioned issues in any form.