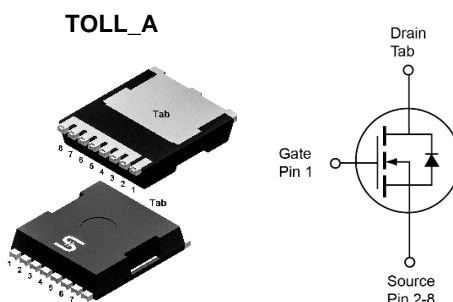# N-Channel Power MOSFET

FEATURES

- Excellent FOM
- Ultra low rdson
- 100% UIS & Rg tested
- RoHS compliant
- Halogen-free

APPLICATIONS

- Solenoid and motor drivers
- DC-DC converters
- Load Switch
- SMPS

KEY PERFORMANCE PARAMETERS

PARAMETER	VALUE	UNIT
V_{DS}	80	V
$R_{DS(on)}$ (max)	1.8	mΩ
$Q_{g,typ}$	179	nC

TOLL_A

Note: MSL 1 (Moisture Sensitivity Level) per J-STD-020

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	80	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current, Silicon limited	T_C = 25°C	I_D	334	A
Continuous Drain Current [Note 1]	T_C = 25°C	I_D	300	A
	T_C = 100°C		211	
Pulsed Drain Current [Note 2]		I_{DM}	1336	A
Total Power Dissipation	T_C = 25°C	P_D	357	W
	T_C = 100°C		143	
Single Pulse Avalanche Energy [Note 3]		E_{AS}	1387	mJ
Single Pulse Avalanche Current [Note 3]		I_{AS}	30.4	A
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	°C

THERMAL PERFORMANCE

PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Case Thermal Resistance	$R_{\Theta JC}$	0.35	°C/W
Junction to Ambient Thermal Resistance [Note 4]	$R_{\Theta JA}$	35	°C/W

Notes:

1. Package current limit.

2. Pulse Width ≤ 100μs.

3. L = 3mH, R_G = 25Ω, Starting T_J = 25°C.

4. Device on a PCB FR4 with 1 in^2 (single layer, 2 oz thickness) copper area for drain connection.

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise noted)

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static (Note 5)						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250µA	BV_{DSS}	80	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250µA	$V_{GS(TH)}$	2.0	2.8	4.1	V
Gate Body Leakage	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS} = 64V, V_{GS} = 0V	I_{DSS}	--	--	1	µA
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 20A	$R_{DS(on)}$	--	1.4	1.8	mΩ
Dynamic (Note 6)						
Total Gate Charge	V_{DS} = 40V, I_D = 20A, V_{GS} = 10V	Q_g	--	179	--	nC
Gate-Source Charge		Q_{gs}	--	57	--	
Gate-Drain Charge		Q_{gd}	--	33	--	
Input Capacitance	V_{DS} = 40V, V_{GS} = 0V, f = 1.0MHz	C_{iss}	--	12182	--	pF
Output Capacitance		C_{oss}	--	2269	--	
Reverse Transfer Capacitance		C_{rss}	--	45	--	
Gate Resistance	f = 1.0MHz	R_g	--	0.4	--	Ω
Switching (Note 7)						
Turn-On Delay Time	V_{DD} = 40V, R_G = 3Ω, I_D = 20A, V_{GS} = 10V	$t_{d(on)}$	--	40	--	ns
Turn-On Rise Time		t_r	--	47	--	
Turn-Off Delay Time		$t_{d(off)}$	--	78	--	
Turn-Off Fall Time		t_f	--	34	--	
Source-Drain Diode						
Forward Voltage (Note 5)	I_S = 20A, V_{GS} = 0V	V_{SD}	--	--	1.2	V
Reverse Recovery Time	I_S = 20A, dI_F/dt = 100A/µs	t_{rr}	--	103	--	ns
Reverse Recovery Charge		Q_{rr}	--	324	--	nC

Notes:

5. Pulse test: Pulse Width ≤ 300µs, duty cycle ≤ 2%.

6. Defined by design. Not subject to production test.

7. Switching time is essentially independent of operating temperature.

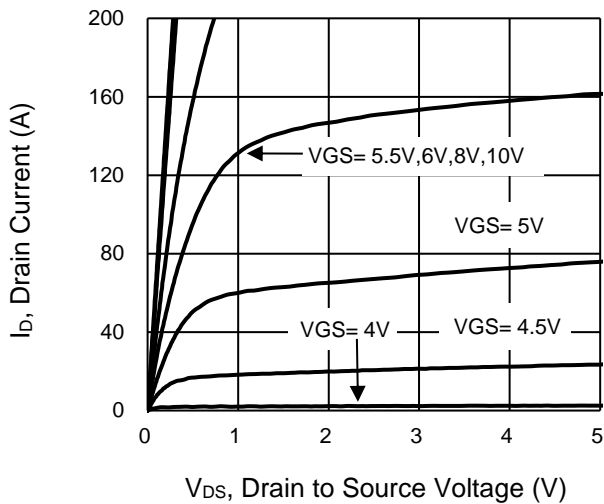## ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TSM018NM08TL RAG	TOLL_A	2000pcs / 13" Reel

CHARACTERISTICS CURVES

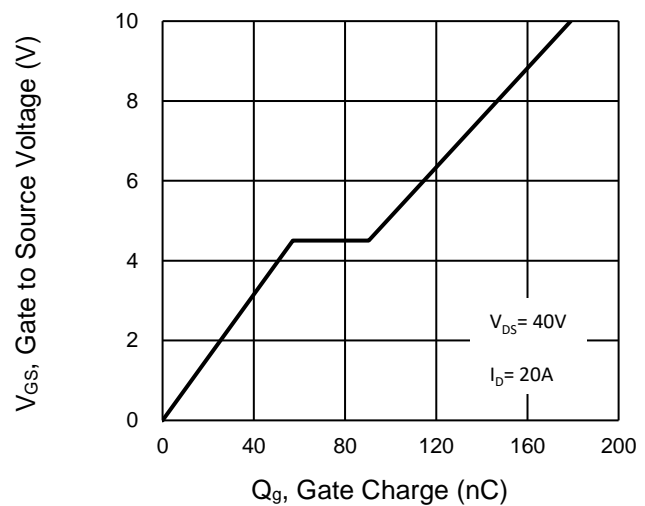(T$_A$ = 25°C unless otherwise noted)

Output Characteristics

I$_D$, Drain Current (A) vs. V$_{DS}$, Drain to Source Voltage (V)

VGS= 5.5V,6V,8V,10V

VGS= 5V

VGS= 4V   VGS= 4.5V

Transfer Characteristics

I$_D$, Drain Current (A) vs. V$_{GS}$, Gate to Source Voltage (V)

25°C

125°C   -55°C
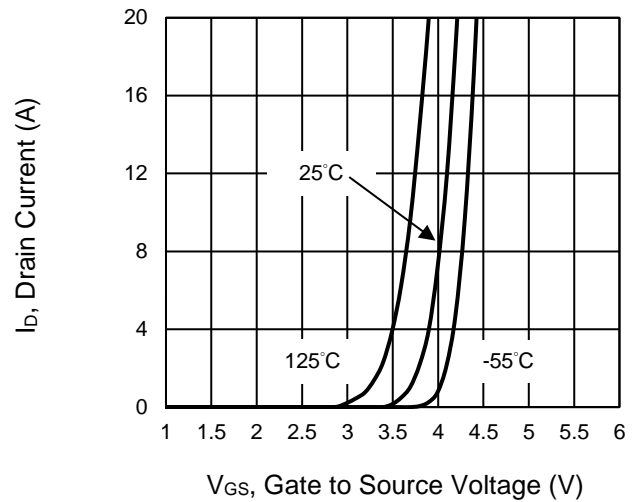
On-Resistance vs. Drain Current

R$_{DS(on)}$, Drain-Source On-Resistance (mΩ) vs. I$_D$, Drain Current (A)

V$_{GS}$= 10V
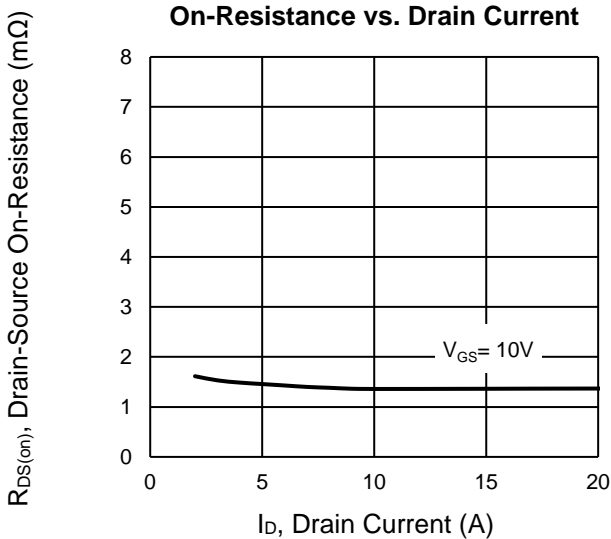
Gate-Source Voltage vs. Gate Charge

V$_{GS}$, Gate to Source Voltage (V) vs. Q$_g$, Gate Charge (nC)

V$_{DS}$= 40V

I$_D$= 20A

On-Resistance vs. Junction Temperature

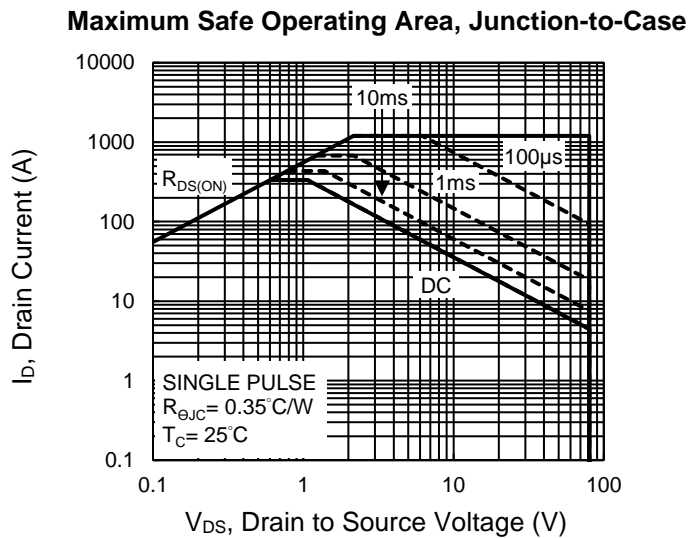R$_{DS(on)}$, Drain-Source On-Resistance (Normalized) vs. T$_J$, Junction Temperature (°C)

V$_{GS}$= 10V

I$_D$= 20A
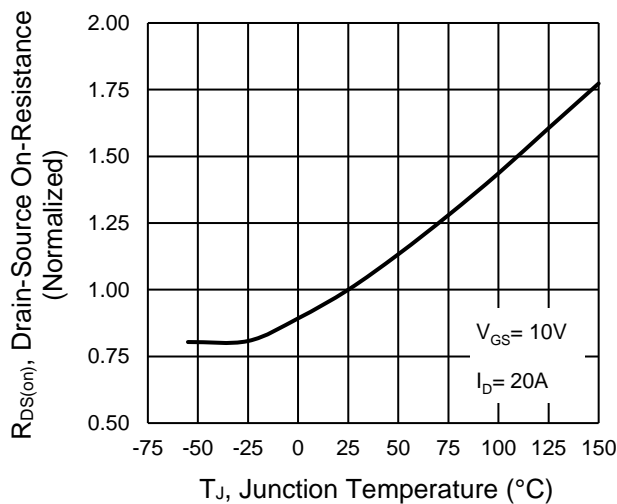
On-Resistance vs. Gate-Source Voltage
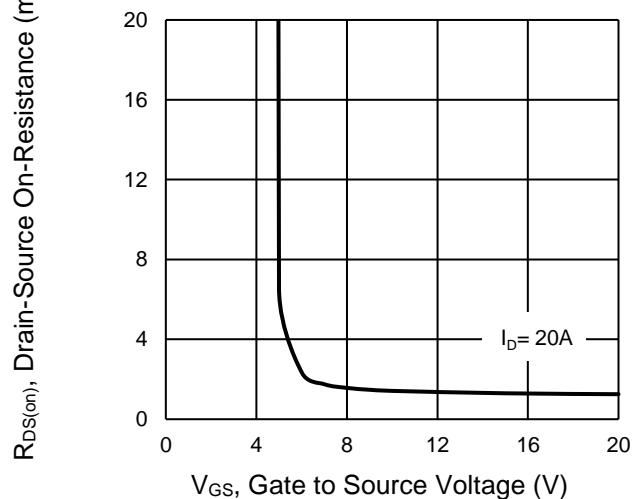
R$_{DS(on)}$, Drain-Source On-Resistance (mΩ) vs. V$_{GS}$, Gate to Source Voltage (V)

I$_D$= 20A

CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

Capacitance vs. Drain-Source Voltage

BV$_{DSS}$ vs. Junction Temperature

Maximum Safe Operating Area, Junction-to-Case

Source-Drain Diode Forward Current vs. Voltage

Normalized Thermal Transient Impedance, Junction-to-Case

CHARACTERISTICS CURVES

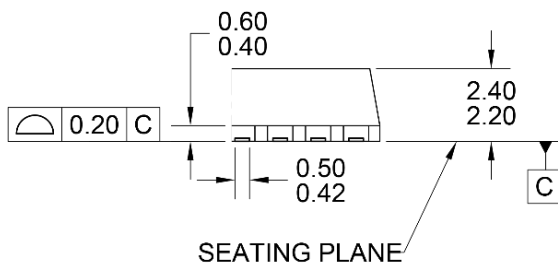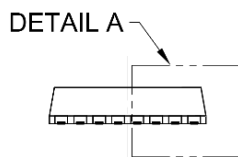(T_A = 25°C unless otherwise noted)

Power Dissipation
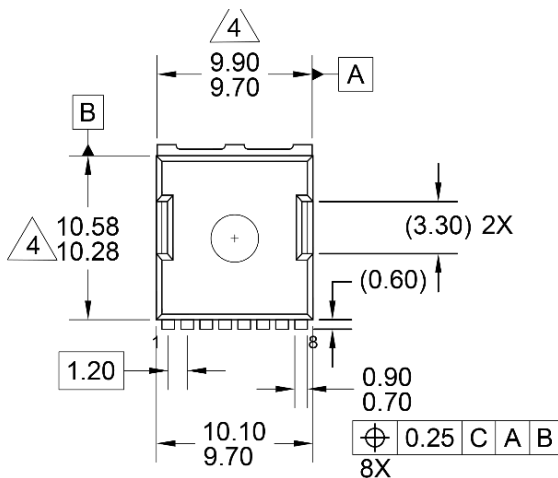

Drain Current
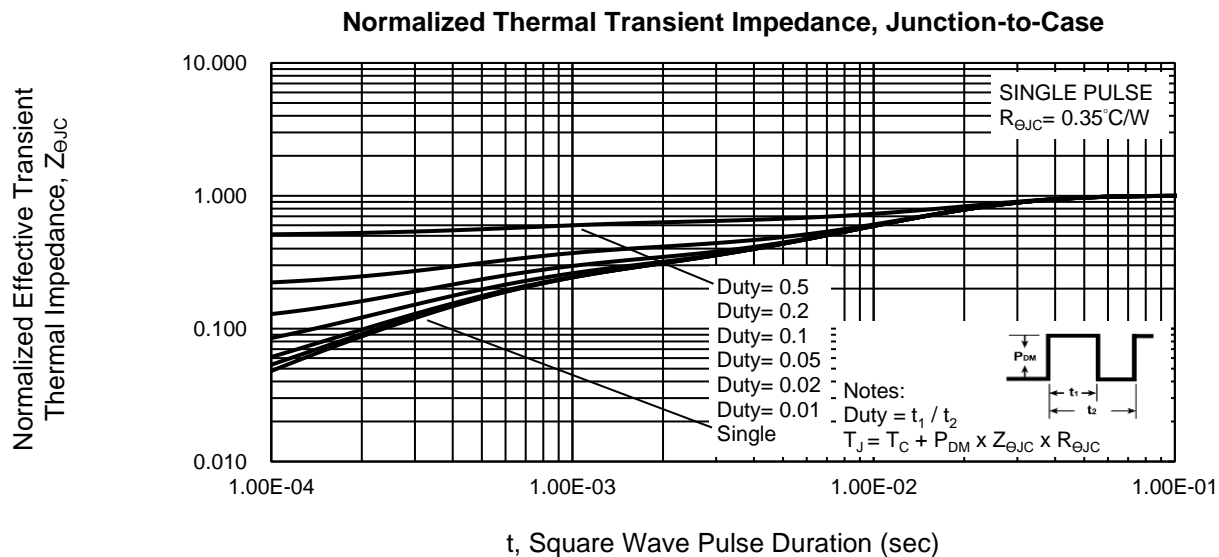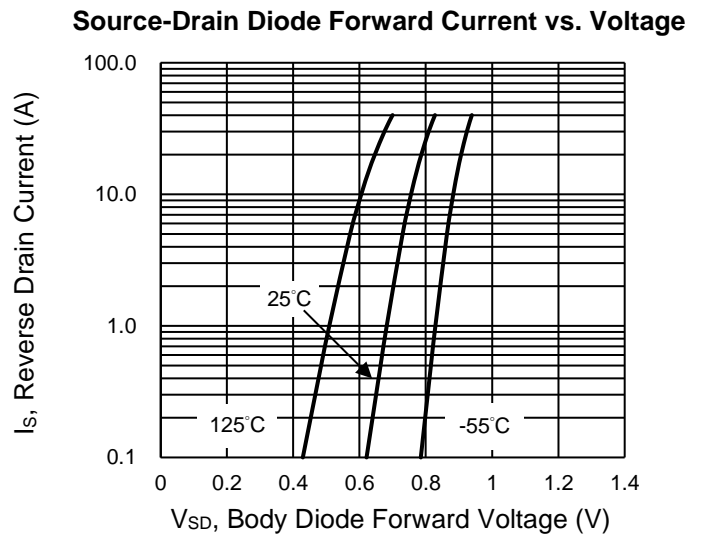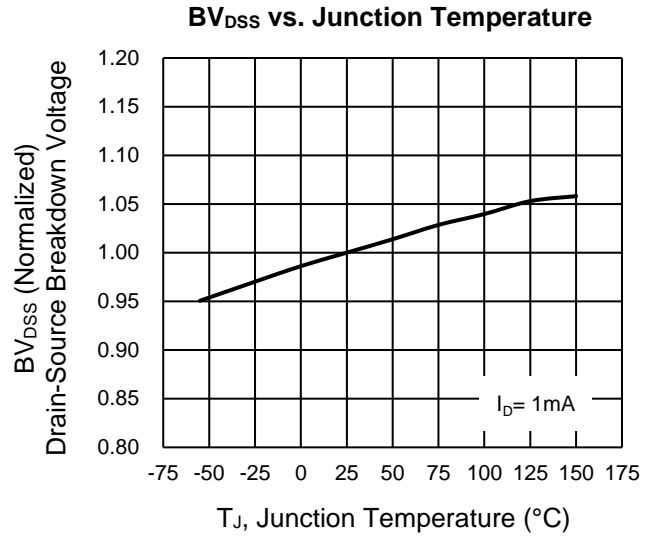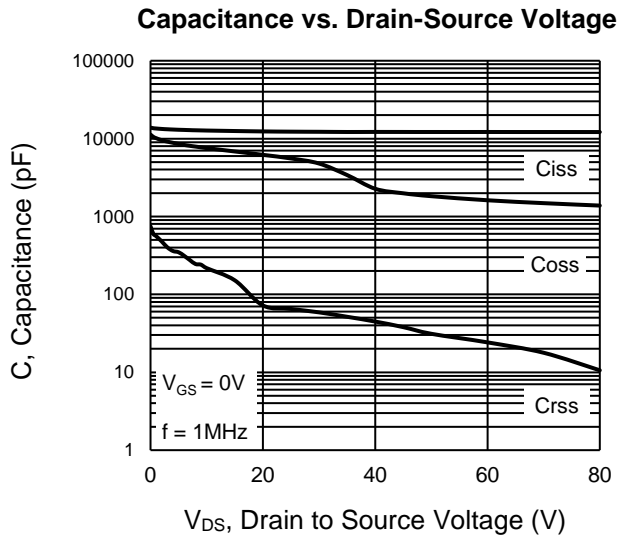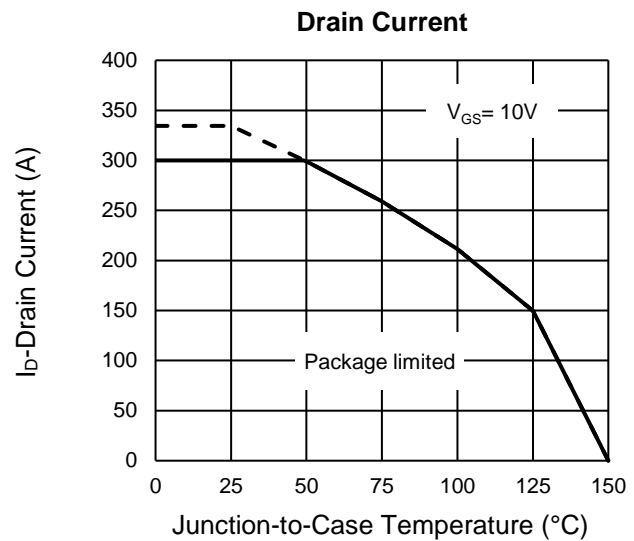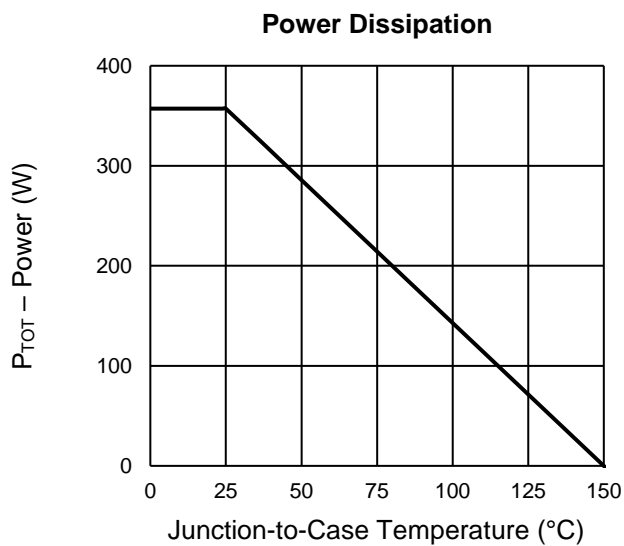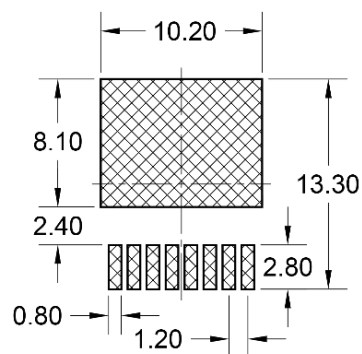

Normalized gate threshold voltage vs Temperature
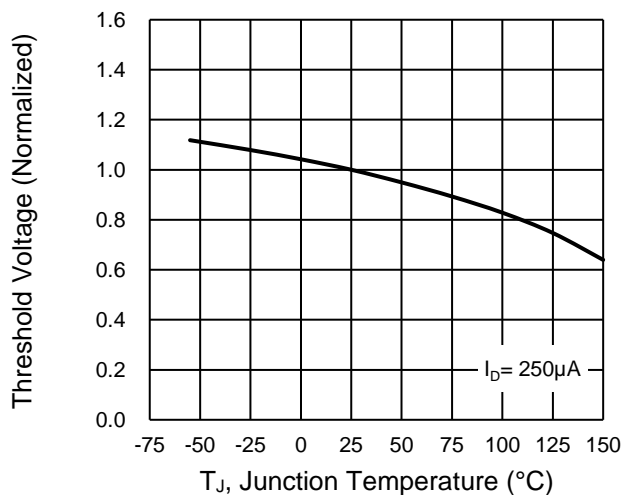
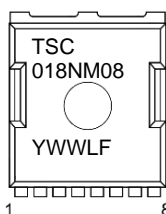## PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TOLL_A

DETAIL A

DETAIL A
(SCALE 2:1)

SEATING PLANE
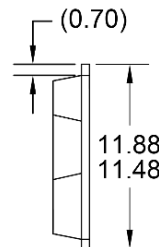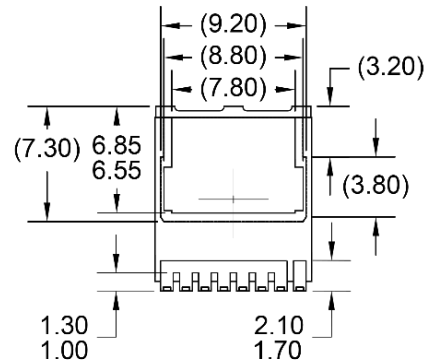
SUGGESTED PAD LAYOUT

TSC
018NM08

YWWLF

1   8

MARKING DIAGRAM

018NM08 = Device marking
Y   = Year Code
WW   = Week Code (01~52)
L   = Lot Code (1~9,A~Z)
F   = Factory Code

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING
   PER ASME Y14.5M-1994.
3. THE PACKAGE OUTLINE REFERENCE:
   JEDEC MO-299B, ISSUE B.
4. MOLDED PLASTIC BODY DIMENSIONS DO NOT
   INCLUDE MOLD FLASH. THESE DIMENSIONS ARE
   MEASURED AT THE OUTERMOST EXTREME OF
   THE PLASTIC BODY.
5. DWG NO. REF: HQ2SD07-TOLL-141 REV A.

Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Purchasers are solely responsible for the choice, selection, and use of TSC products and TSC assumes no liability for application assistance or the design of Purchasers' products.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.

Version: A2505