

N-Channel Power MOSFET

650V, 2.0A, 5Ω

FEATURES

- 100% UIS & R_g tested
- Pb-free plating
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

KEY PERFORMANCE PARAMETERS

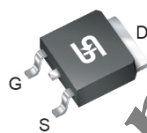
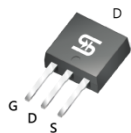
PARAMETER	VALUE	UNIT
V _{DS}	650	V
R _{DS(on)} (max)	5	Ω
Q _g	13	nC

APPLICATION

- Power Supply
- AC/DC LED Lighting



TO-251 (IPAK SL) TO-252 (DPAK)



Notes: MSL 3 (Moisture Sensitivity Level) for TO-252 (D-PAK) per J-STD-020

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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V _{DS}	650	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current	I _D	T _C = 25°C	2.0
		T _C = 100°C	1.4
Pulsed Drain Current (Note 1)	I _{DM}	8.0	A
Total Power Dissipation @ T _C = 25°C	P _{DTOT}	65	W
Single Pulsed Avalanche Energy (Note 2)	E _{AS}	25	mJ
Single Pulsed Avalanche Current (Note 2)	I _{AS}	1.6	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 _{θJC}	1.9	°C/W
Junction to Ambient Thermal Resistance	R _{θJA}	62.5	°C/W

Notes: R_{θJA} is the sum of the junction-to-case and case-to-ambient thermal resistances. The case thermal reference is defined at the solder mounting surface of the drain pins. R_{θJA} is guaranteed by design while R_{θCA} is determined by the user's board design. R_{θJA} shown below for single device operation on FR-4 PCB in still air.

ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ unless otherwise noted)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static (Note 3)						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	BV_{DSS}	650	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	2	2.5	4	V
Gate Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
Zero Gate Voltage Drain Current	$V_{DS} = 650V, V_{GS} = 0V$	I_{DSS}	--	--	10	μA
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 1A$	$R_{DS(ON)}$	--	4	5	Ω
Forward Transfer Conductance	$V_{DS} = 10V, I_D = 1A$	g_{fs}	--	2.5	--	S
Dynamic (Note 4)						
Total Gate Charge	$V_{DS} = 520V, I_D = 2A, V_{GS} = 10V$	Q_g	--	13	--	nC
Gate-Source Charge		Q_{gs}	--	2.2	--	
Gate-Drain Charge		Q_{gd}	--	5	--	
Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V, F = 1.0MHz$	C_{iss}	--	390	--	pF
Output Capacitance		C_{oss}	--	31	--	
Reverse Transfer Capacitance		C_{rs}	--	8	--	
Gate Resistance	$f = 1.0MHz, \text{open drain}$	R_g	0.8	2.5	7.5	Ω
Switching (Note 5)						
Turn-On Delay Time	$V_{GS} = 10V, I_D = 2A, V_{DD} = 325V, R_G = 25\Omega$	$t_{d(on)}$	--	8.2	--	ns
Turn-On Rise Time		t_r	--	23.2	--	
Turn-Off Delay Time		$t_{d(off)}$	--	38	--	
Turn-Off Fall Time		t_f	--	27	--	
Source-Drain Diode (Note 3)						
Diode Forward Voltage	$I_D = 2A, V_{GS} = 0V$	V_{SD}	--	--	1.2	V

Notes:

1. Pulse width limited by the maximum junction temperature
2. $L = 20mH, I_{AS} = 1.6A, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
3. Pulse test: $PW \leq 300\mu s$, duty cycle $\leq 2\%$
4. For DESIGN AID ONLY, not subject to production testing.
5. Essentially Independent of Operating Temperature.

ORDERING INFORMATION

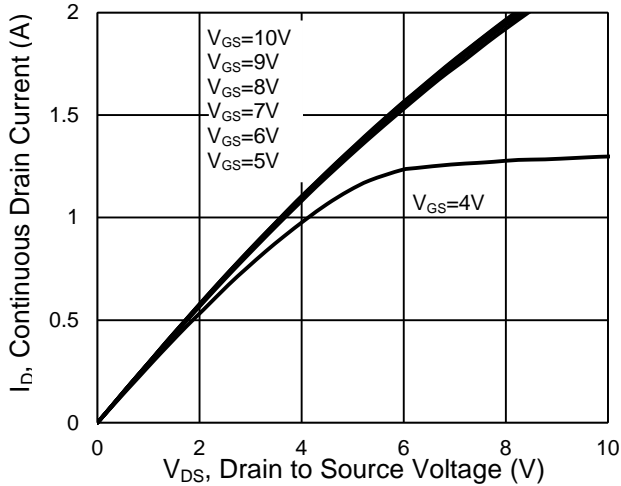
PART NO.	PACKAGE	PACKING
TSM2NB65CH X0G	TO-251S	75pcs / Tube
TSM2NB65CP ROG	TO-252	2,500pcs / 13" Reel

Not Recommended

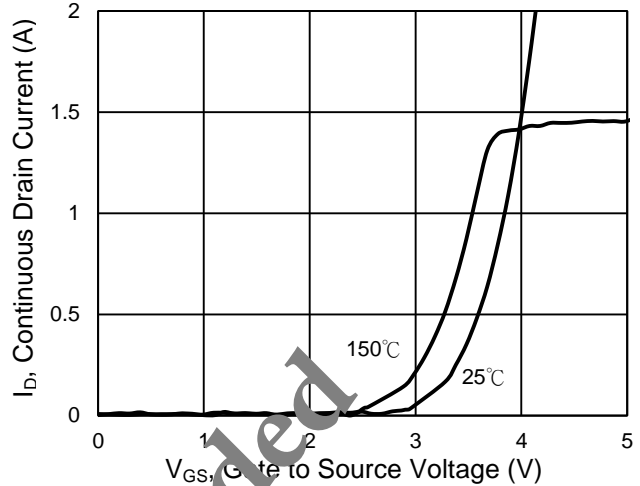
CHARACTERISTICS CURVES

($T_C = 25^\circ\text{C}$ unless otherwise noted)

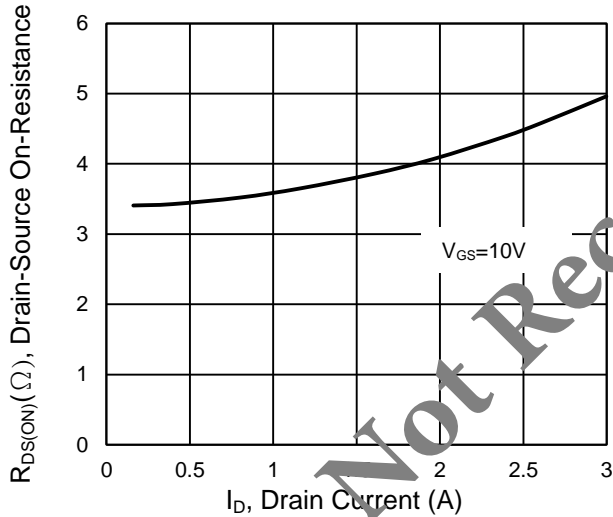
Output Characteristics



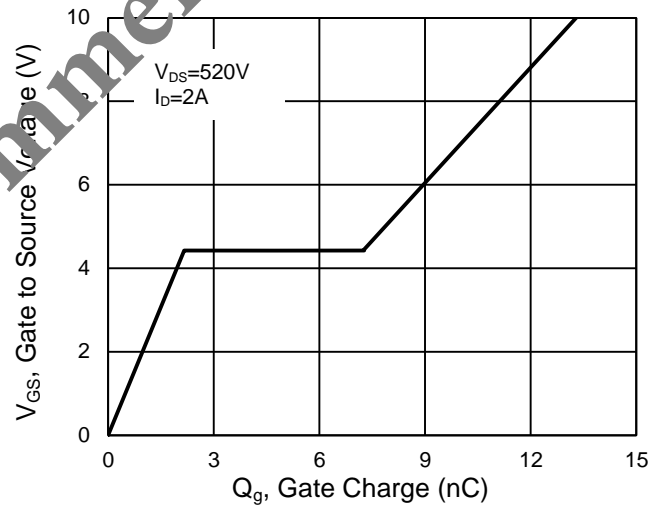
Transfer Characteristics



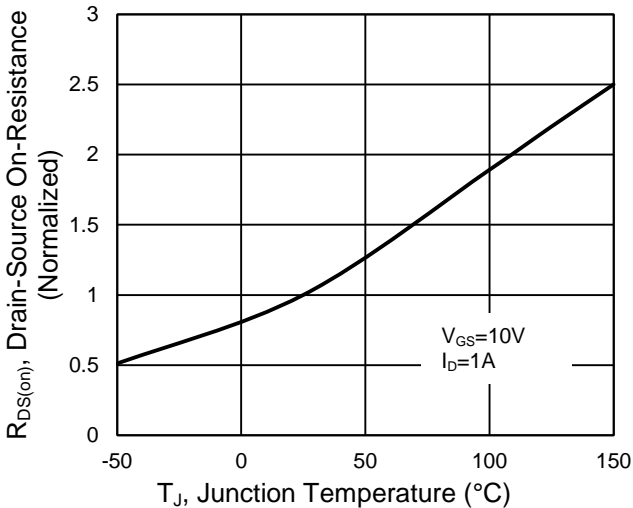
On-Resistance vs. Drain Current



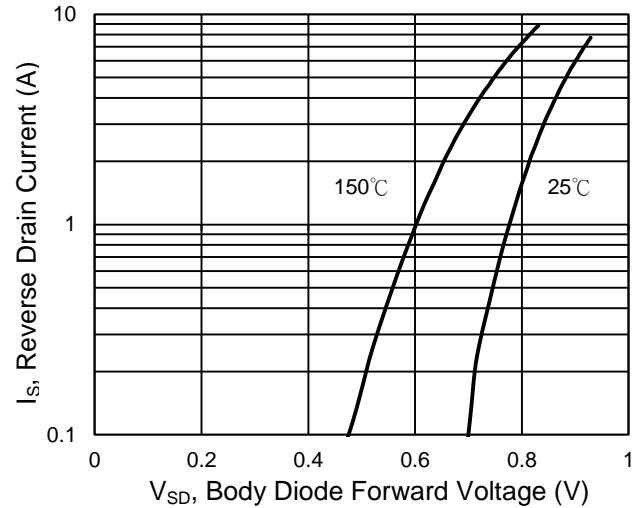
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature

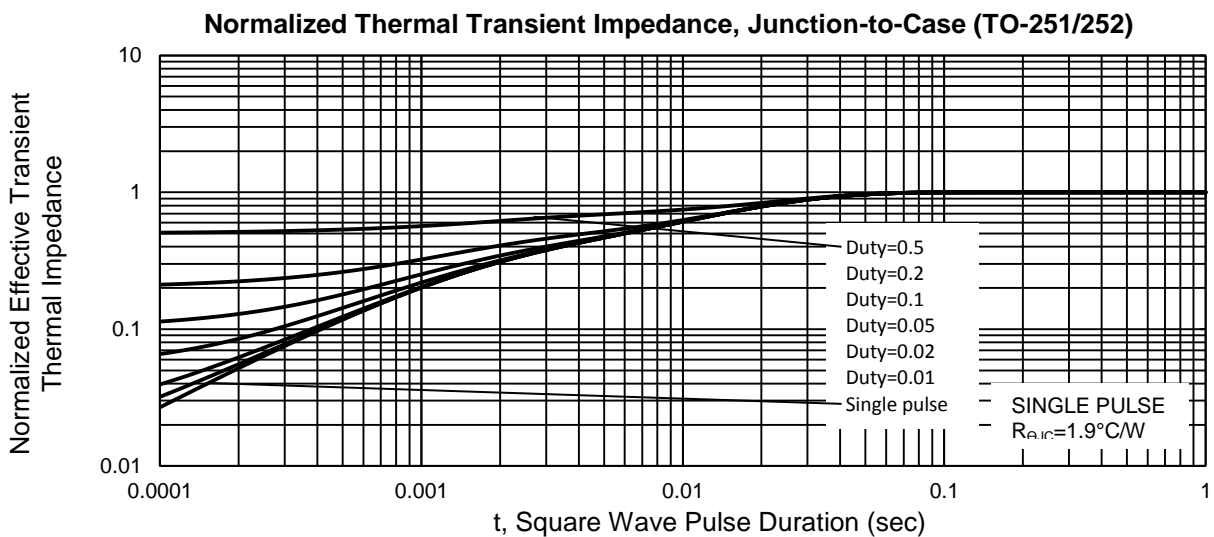
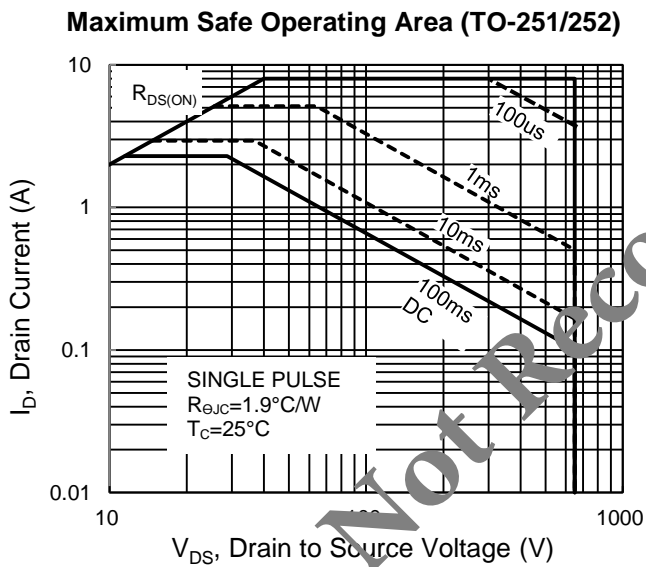
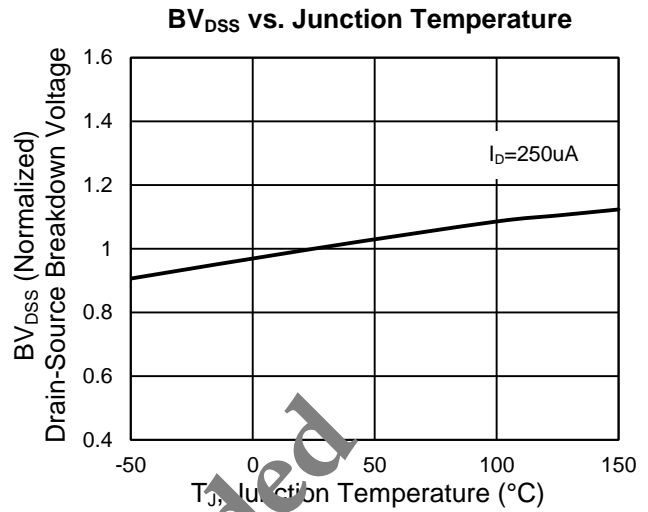
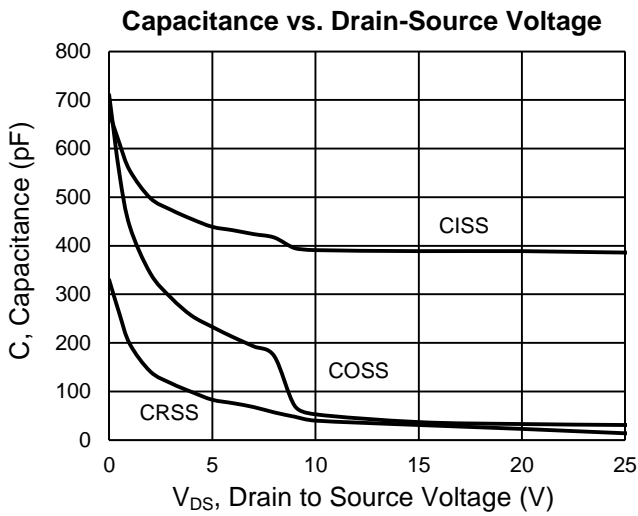


Source-Drain Diode Forward Current vs. Voltage

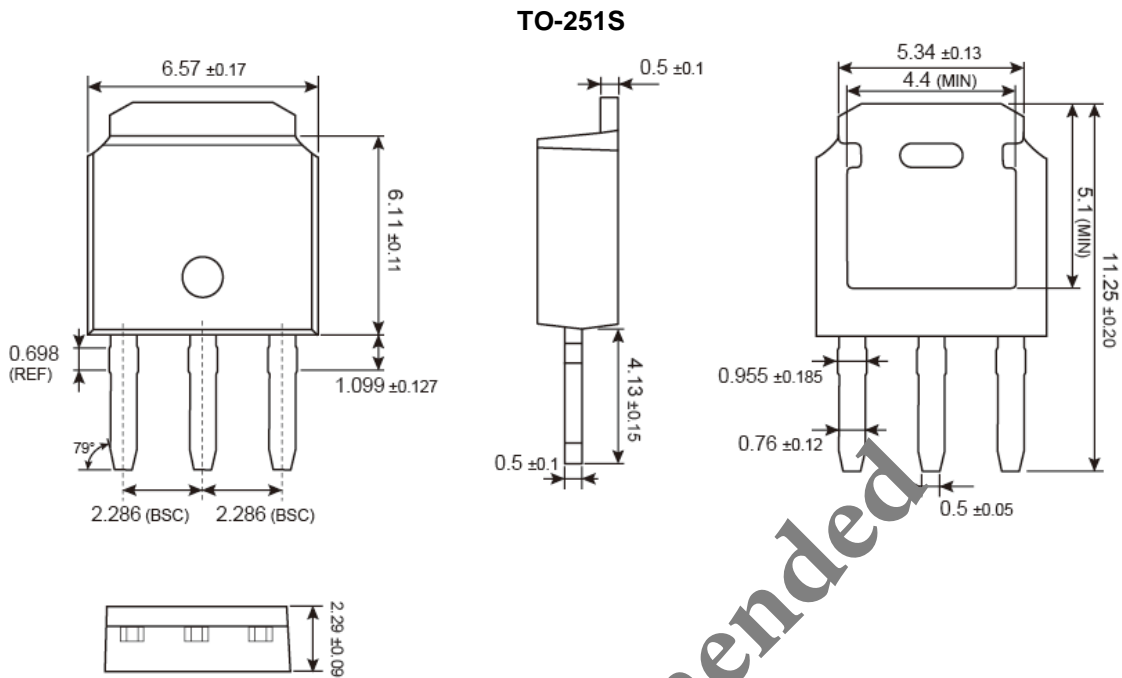


CHARACTERISTICS CURVES

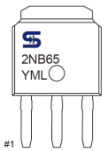
($T_C = 25^\circ\text{C}$ unless otherwise noted)



PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)



MARKING DIAGRAM

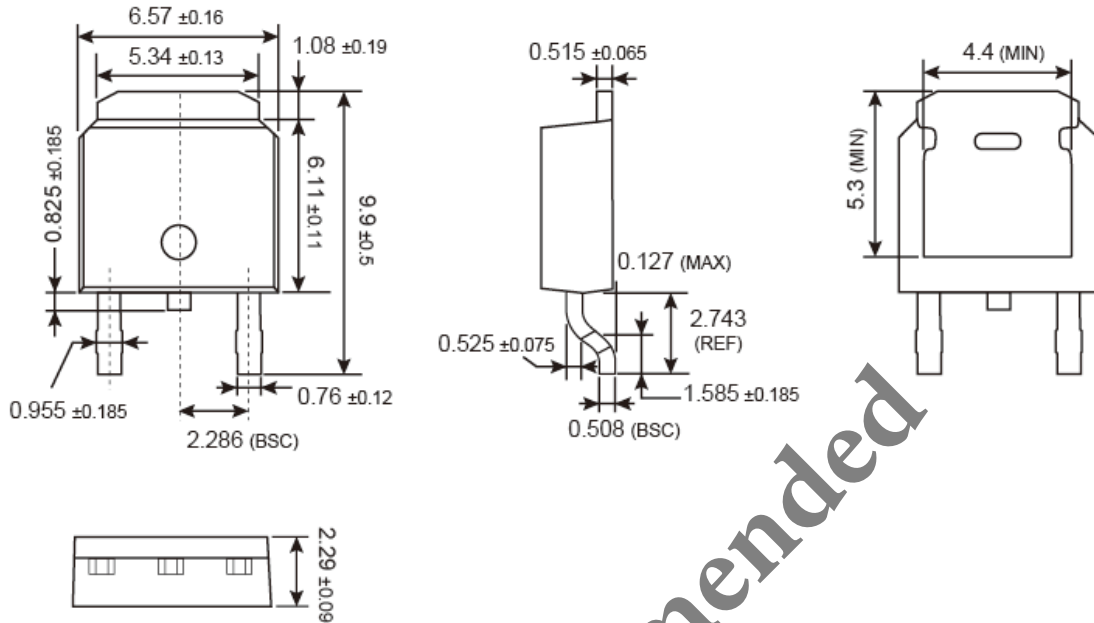


- Y** = Year Code
- M** = Month Code for Halogen Free Product
 - O** =Jan
 - P** =Feb
 - Q** =Mar
 - R** =Apr
 - S** =May
 - T** =Jun
 - U** =Jul
 - V** =Aug
 - W** =Sep
 - X** =Oct
 - Y** =Nov
 - Z** =Dec
- L** = Lot Code (1-9, A-Z)

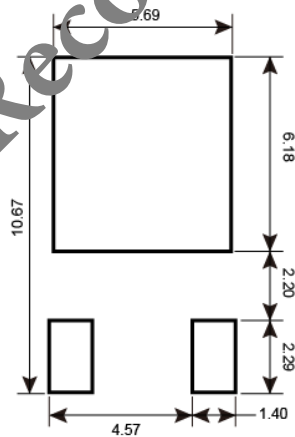
Not Recommended

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-252



SUGGESTED PAD LAYOUT (Unit: Millimeters)



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Not Recommended

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