N-Channel Power MOSFET

600V, 0.5A, 10Ω

FEATURES

- 100% Avalanche 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

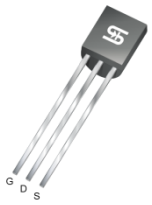
KEY PERFORMANCE PARAMETERS		
PARAMETER	**VALUE**	**UNIT**
V_{DS}	600	V
$R_{DS(on)}$ (max)	10	Ω
Q_g	6.1	nC

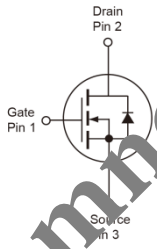
APPLICATIONS

- Power Supply
- AC/DC LED Lighting

Pb-Free RoHS COMPLIANT HALOGEN FREE

TO-92





ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)				
PARAMETER		**SYMBOL**	**LIMIT**	**UNIT**
Drain-Source Voltage		V_{DS}	600	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current (Note 1)	T_C = 25°C	I_D	0.5	A
	T_C = 100°C		0.25	
Pulsed Drain Current (Note 2)		I_{DM}	2	A
Single Pulse Avalanche Energy (Note 3)		E_{AS}	5	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Total Power Dissipation @ T_C = 25°C		P_{DTOT}	2.5	W
Operating Junction Temperature		T_J	150	ºC
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	°C

THERMAL PERFORMANCE			
PARAMETER	**SYMBOL**	**LIMIT**	**UNIT**
Junction to Lead Thermal Resistance	$R_{\Theta JL}$	50	°C/W
Junction to Ambient Thermal Resistance	$R_{\Theta JA}$	110	°C/W

Thermal Performance Note: $R_{\Theta JA}$ 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. $R_{\Theta JA}$ is guaranteed by design while $R_{\Theta CA}$ is determined by the user's board design. $R_{\Theta JA}$ shown below for single device operation on FR-4 PCB with minimum recommended footprint in still air.

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 = 250uA	BV_{DSS}	600	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	$V_{GS(TH)}$	2.5	3.5	4.5	V
Gate Body Leakage	V_{GS} = ±30V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Zero Gate Voltage Drain Current	V_{DS} = 600V, V_{GS} = 0V	I_{DSS}	--	--	10	μA
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 0.25A	$R_{DS(ON)}$	--	8	10	Ω
Forward Transfer Conductance	V_{DS} = 10V, I_D = 0.5A	g_{fs}	--	0.8	--	S
Dynamic (Note 6)						
Total Gate Charge	V_{DS} = 480V, I_D = 0.5A, V_{GS} = 10V	Q_g	--	6.1	--	nC
Gate-Source Charge		Q_{gs}	--	1.4	--	
Gate-Drain Charge		Q_{gd}	--	3.3	--	
Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, F = 1.0MHz	C_{iss}	--	138	--	pF
Output Capacitance		C_{oss}	--	17.1	--	
Reverse Transfer Capacitance		C_{rss}	--	4.2	--	
Switching (Note 7)						
Turn-On Delay Time	V_{GS} = 10V, I_D = 0.5A, V_{DD} = 300V, R_G = 25Ω	$t_{d(on)}$	--	7.7	--	ns
Turn-On Rise Time		t_r	--	6.8	--	
Turn-Off Delay Time		$t_{d(off)}$	--	15.3	--	
Turn-Off Fall Time		t_f	--	14.9	--	
Source-Drain Diode (Note 5)						
Source Current	Integral reverse diode in the MOSFET	I_S	--	--	0.5	A
Source Current (Pulse)		I_{SM}	--	--	2	A
Diode Forward Voltage	I_S =0.5A, V_{GS} = 0V	V_{SD}	--	0.9	1.4	V

Notes:

1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3. V_{DD} = 50V, I_{AS}=0.5A, L=10mH, R_G =25Ω, Starting T_J=25ºC
4. I_{SD}≤0.5A, di/dt≤200A/uS, V_{DD}≤BV_{DSS}, Starting T_J=25ºC
5. Pulse test: PW ≤ 300μs, duty cycle ≤ 2%
6. For DESIGN AID ONLY, not subject to production testing.
7. Essentially Independent of Operating Temperature.

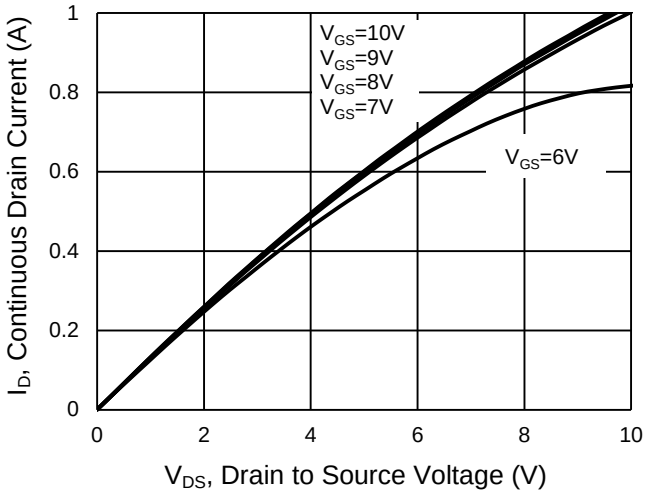
ORDERING INFORMATION

PART NO.	PACKAGE	PACKING
TSM1NB60SCT B0	TO-92	1,000pcs / Bulk
TSM1NB60SCT A3	TO-92	2,000pcs / Ammo
TSM1NB60SCT B0G	TO-92	1,000pcs / Bulk
TSM1NB60SCT A3G	TO-92	2,000pcs / Ammo

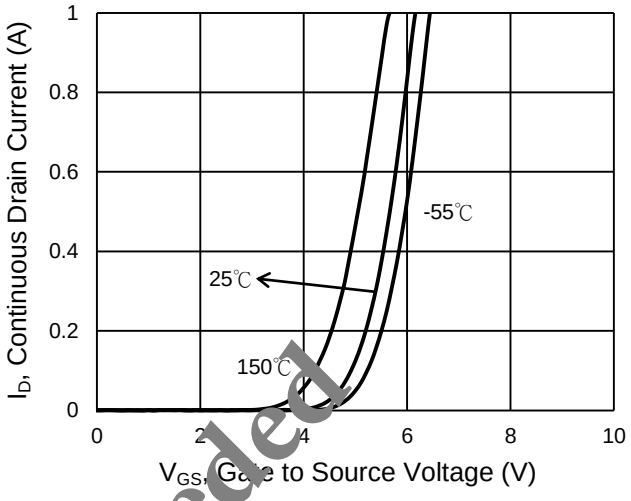
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

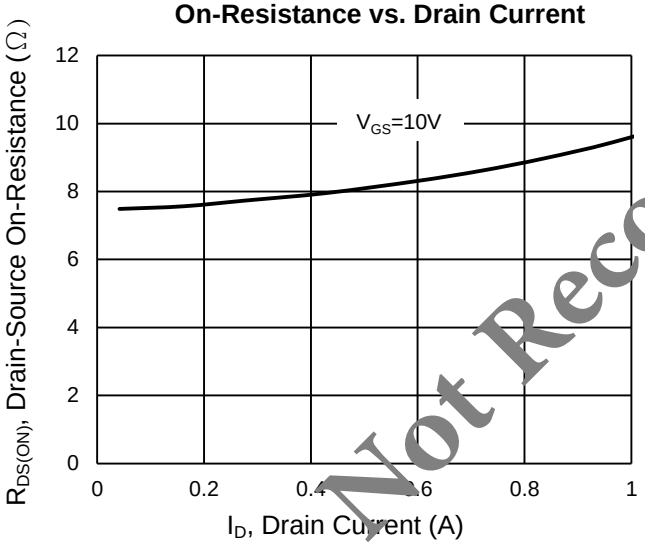
Output Characteristics



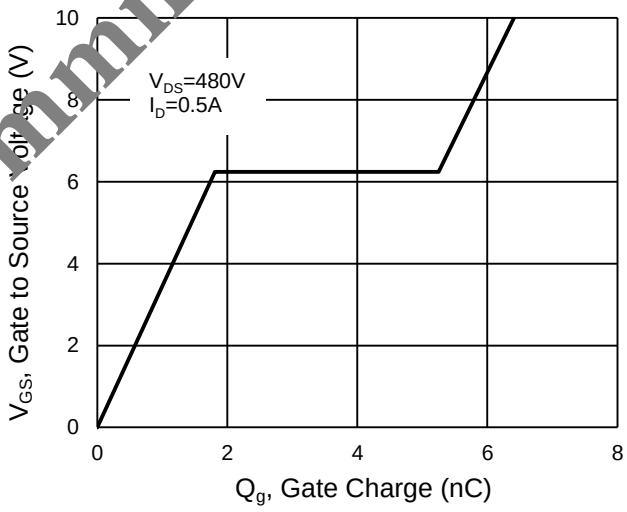
Transfer Characteristics



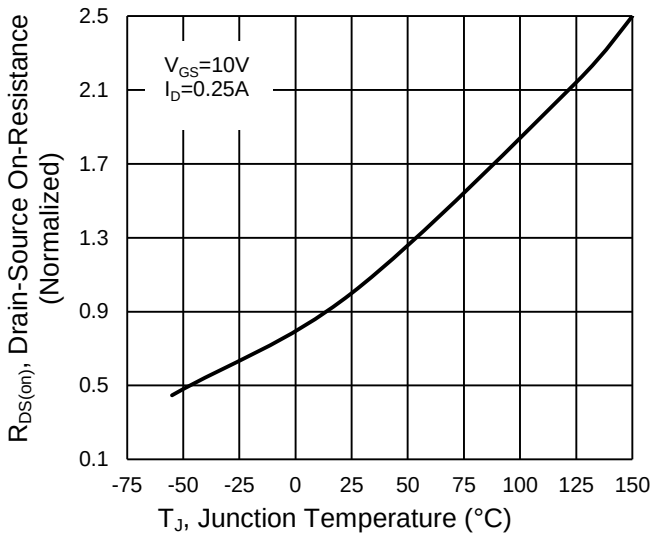
On-Resistance vs. Drain Current



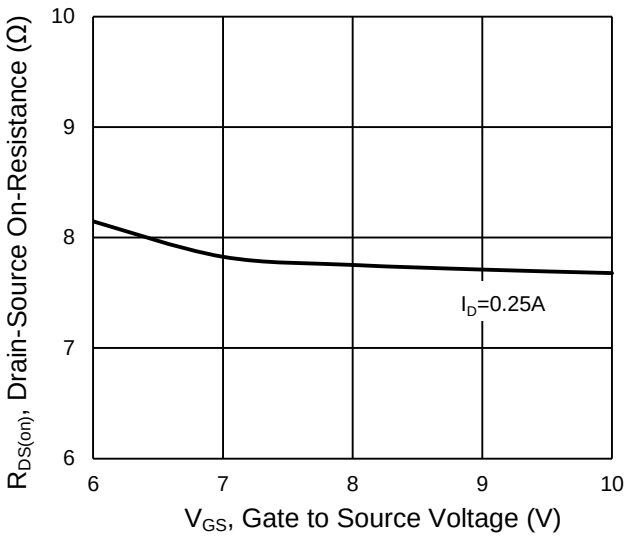
Gate Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



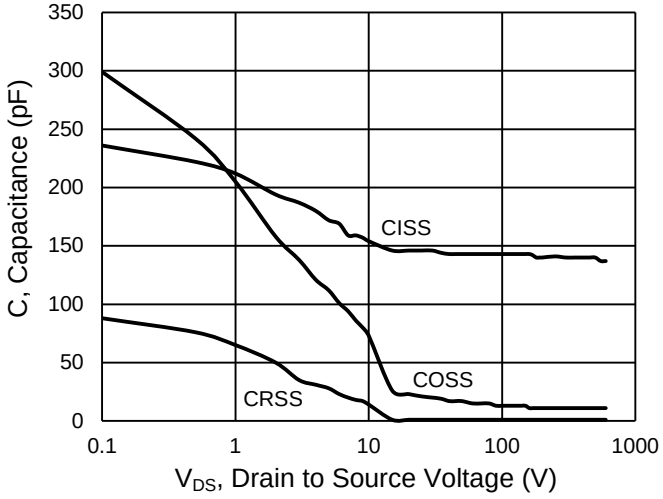
On-Resistance vs. Gate-Source Voltage



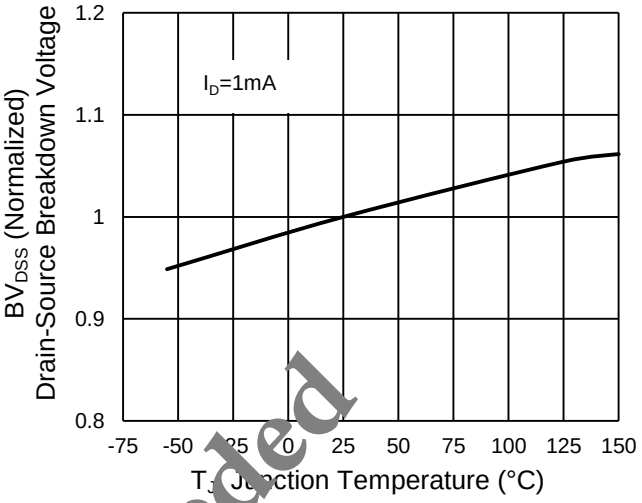
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

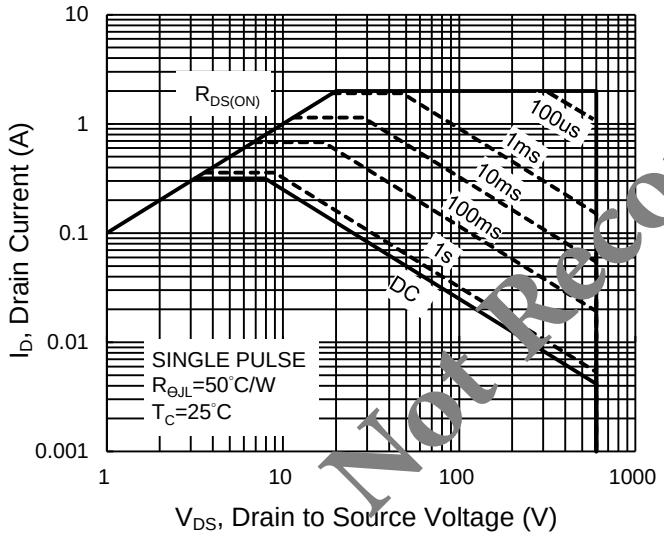
Capacitance vs. Drain-Source Voltage



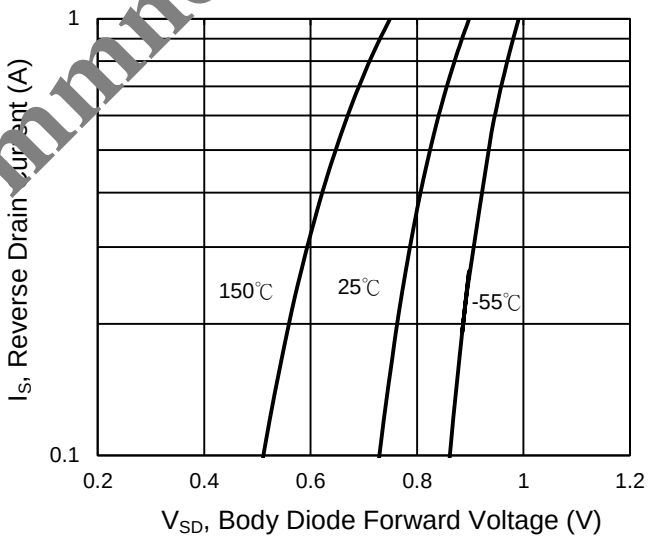
BV_{DSS} vs. Junction Temperature



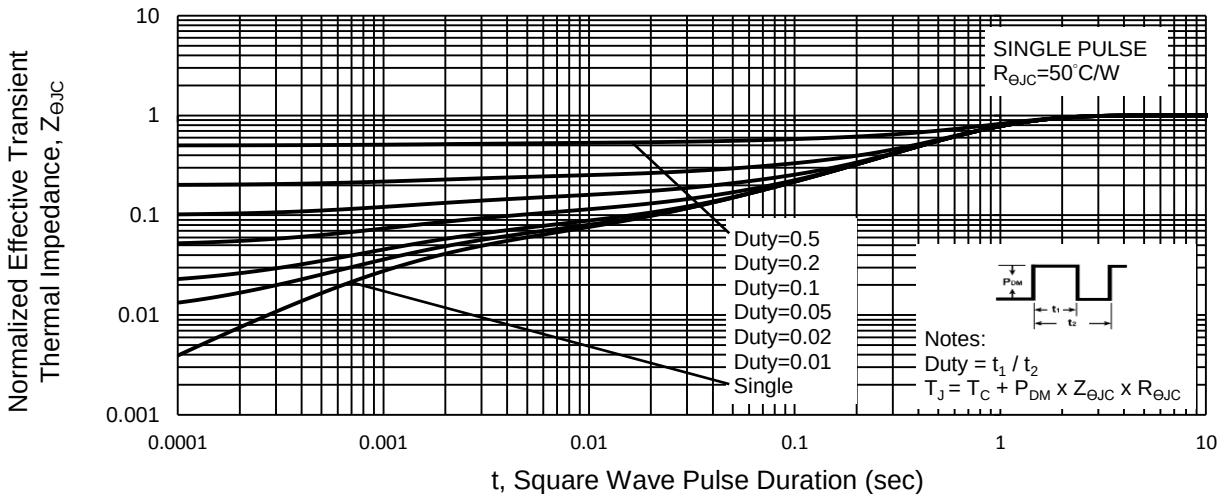
Maximum Safe Operating Area, Junction-to-Case



Source-Drain Diode Forward Current vs. Voltage

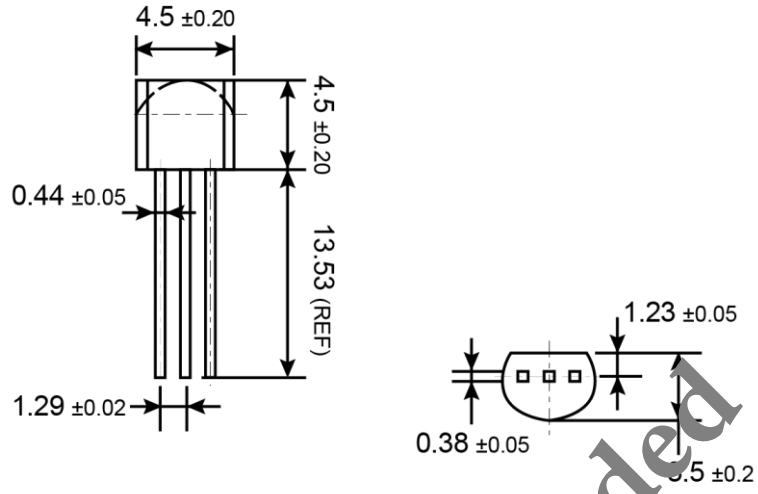


Normalized Thermal Transient Impedance, Junction-to-Case



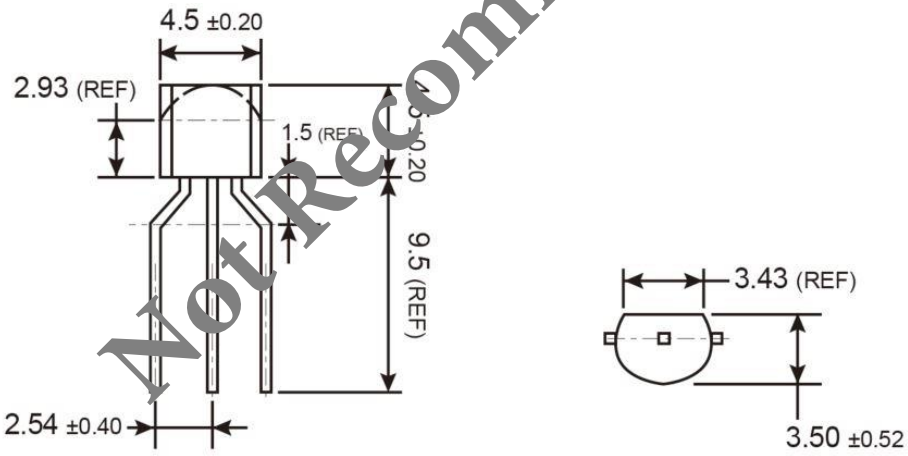
PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-92

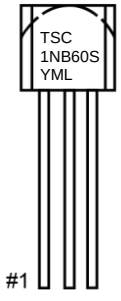


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-92 AMMO PACK



MARKING DIAGRAM



Y = Year Code
M = Month Code
(**A**=Jan, **B**=Feb, **C**=Mar, **D**=Apl, **E**=May, **F**=Jun, **G**=Jul, **H**=Aug, **I**=Sep, **J**=Oct, **K**=Nov, **L**=Dec)
= Month Code for Halogen Free Product
(**O**=Jan, **P**=Feb, **Q**=Mar, **R**=Apl, **S**=May, **T**=Jun, **U**=Jul, **V**=Aug, **W**=Sep, **X**=Oct, **Y**=Nov, **Z**=Dec)
L = Lot Code

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.

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.