



TO-92



Pin Definition:

1. Gate
2. Drain
3. Source

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
600	10 @ V _{GS} =10V	0.25

General Description

The TSM1NB60S N-Channel Power MOSFET is produced by new advance planar process. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

Features

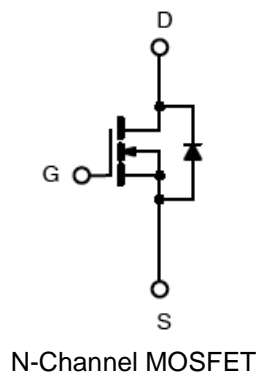
- Low R_{DS(ON)} 8Ω (Typ.)
- Low gate charge typical @ 6.1nC (Typ.)
- Low Crss typical @ 4.2pF (Typ.)

Ordering Information

Part No.	Package	Packing
TSM1NB60SCT B0	TO-92	1Kpcs / Bulk
TSM1NB60SCT B0G	TO-92	1Kpcs / Bulk
TSM1NB60SCT A3	TO-92	2Kpcs / Ammo
TSM1NB60SCT A3G	TO-92	2Kpcs / Ammo

Note: "G" denotes for Halogen Free

Block Diagram



Absolute Maximum Rating (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	I _D	T _C =25°C	0.5
		T _C =100°C	0.25
Pulsed Drain Current *	I _{DM}	2	A
Single Pulse Avalanche Energy (Note 2)	E _{AS}	5	mJ
Peak Diode Recovery dv/dt (Note 3)	dv/dt	4.5	V/ns
Total Power Dissipation @ T _C = 25°C	P _{TOT}	2.5	W
Operating Junction Temperature	T _J	150	°C
Storage Temperature Range	T _{STG}	-55 to +150	°C

Note: Limited by maximum junction temperature

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance - Junction to Lead	Rθ _{JL}	50	°C/W
Thermal Resistance - Junction to Ambient	Rθ _{JA}	110	°C/W

Electrical Specifications (Ta = 25°C unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	BV_{DSS}	600	--	--	V
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 0.25A$	$R_{DS(ON)}$	--	8	10	Ω
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	2.5	3.5	4.5	V
Zero Gate Voltage Drain Current	$V_{DS} = 600V, V_{GS} = 0V$	I_{DSS}	--	--	10	μA
Gate Body Leakage	$V_{GS} = \pm 30V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
Forward Transfer Conductance	$V_{DS} = 10V, I_D = 0.5A$	g_{fs}	--	0.8	--	S
Dynamic						
Total Gate Charge	$V_{DS} = 480V, I_D = 0.5A,$ $V_{GS} = 10V$ (Note 4,5)	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						
Turn-On Delay Time	$V_{GS} = 10V, I_D = 0.5A,$ $V_{DD} = 300V, R_G = 25\Omega$ (Note 4,5)	$t_{d(on)}$	--	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 Ratings and Characteristic						
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

Note 1: Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

Note 2: $V_{DD} = 50V, I_{AS} = 0.5A, L = 10mH, R_G = 25\Omega$, Starting $T_J = 25^\circ C$

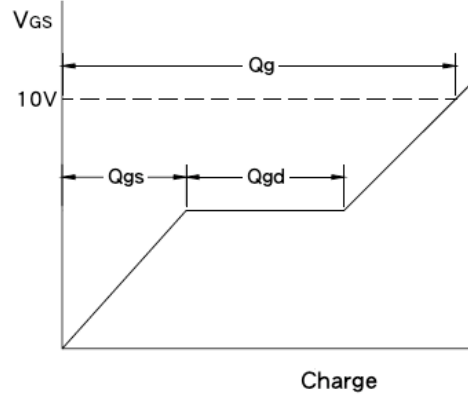
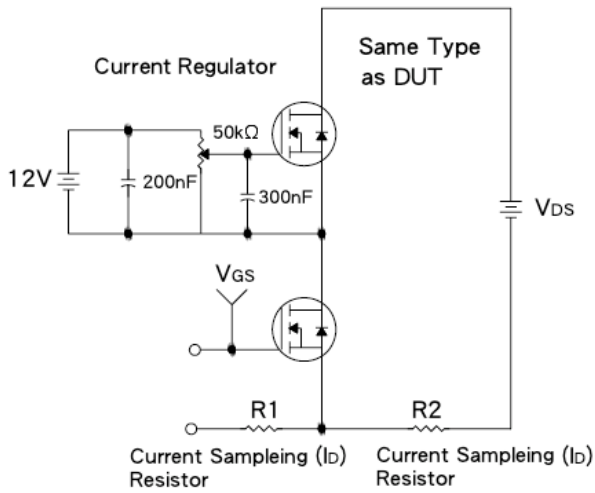
Note 3: $I_{SD} \leq 0.5A, di/dt \leq 200A/\mu S, V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ C$

Note 4: Pulse test: pulse width $\leq 300\mu S$, duty cycle $\leq 2\%$

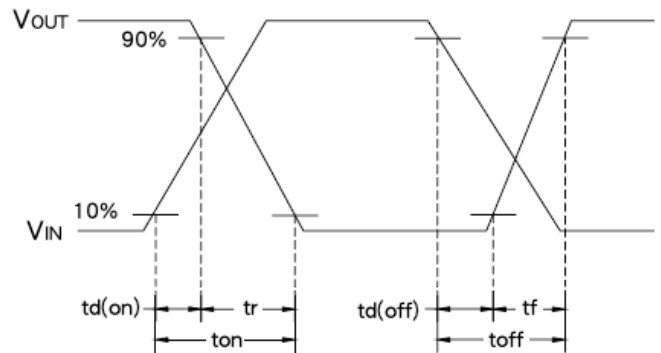
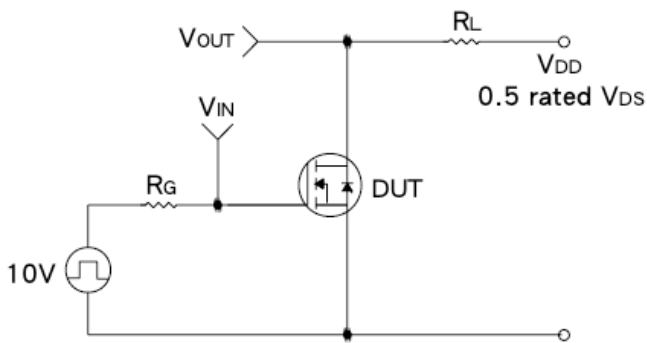
Note 5: Essentially Independent of Operating Temperature



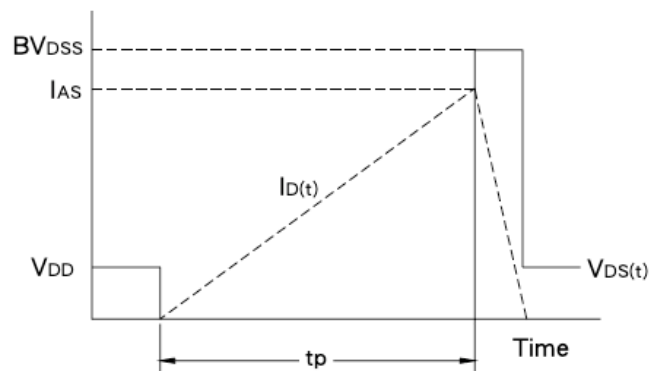
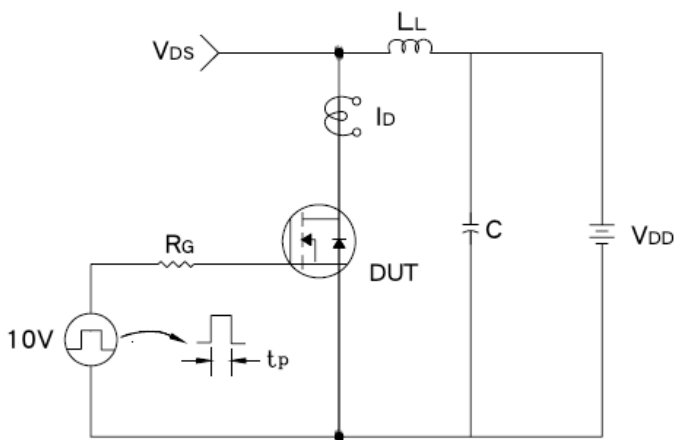
Gate Charge Test Circuit & Waveform



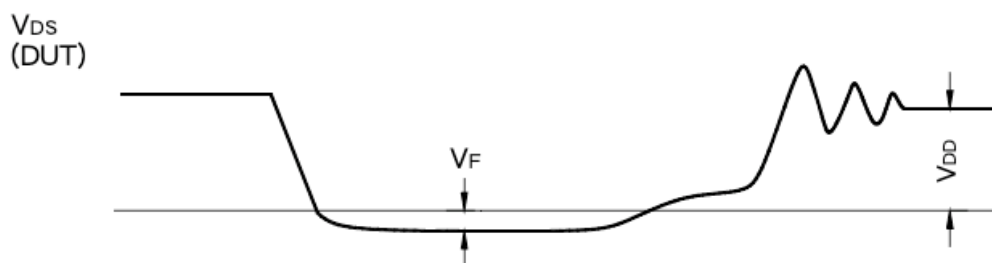
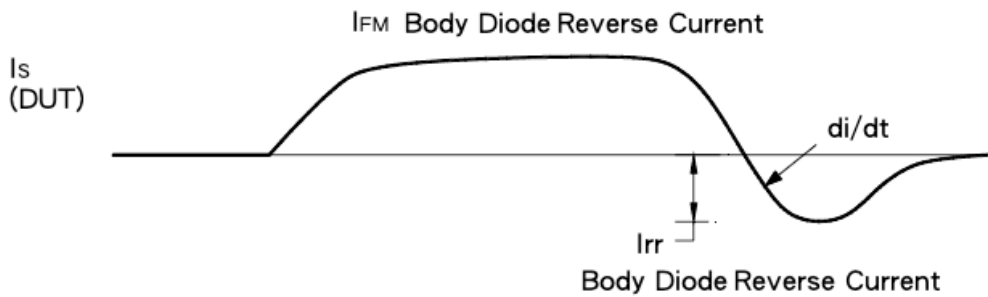
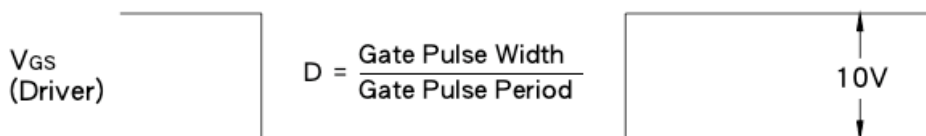
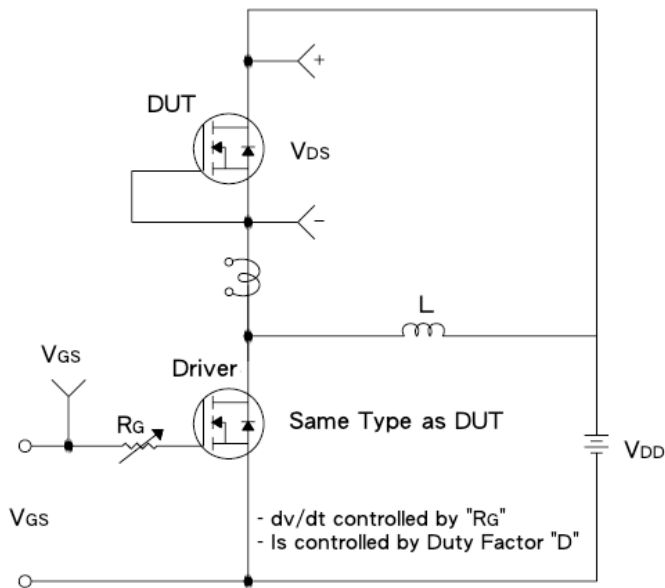
Resistive Switching Test Circuit & Waveform



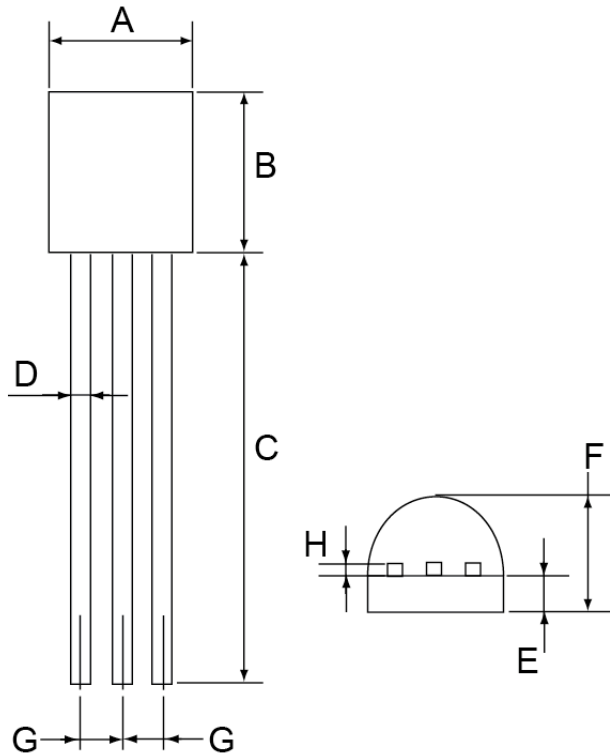
E_{AS} Test Circuit & Waveform



Diode Reverse Recovery Time Test Circuit & Waveform

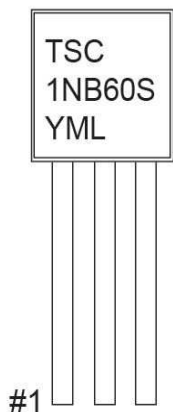


TO-92 Mechanical Drawing



TO-92 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.70	0.169	0.185
B	4.30	4.70	0.169	0.185
C	13.53 (typ)		0.532 (typ)	
D	0.39	0.49	0.015	0.019
E	1.18	1.28	0.046	0.050
F	3.30	3.70	0.130	0.146
G	1.27	1.31	0.050	0.051
H	0.33	0.43	0.013	0.017

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.