

N-Channel Power MOSFET

600V, 0.5A, 10Ω

FEATURES

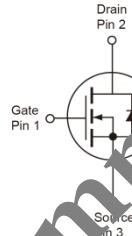
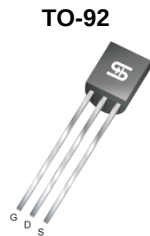
- 100% Avalanche Tested
- Pb-free plating
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

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



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, 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)	I_D	$T_C = 25^\circ\text{C}$	A
		$T_C = 100^\circ\text{C}$	
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 @ $T_C = 25^\circ\text{C}$	P_{DTOT}	2.5	W
Operating Junction Temperature	T_J	150	$^\circ\text{C}$
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150	$^\circ\text{C}$

THERMAL PERFORMANCE

PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Lead Thermal Resistance	$R_{\theta JL}$	50	$^\circ\text{C/W}$
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	110	$^\circ\text{C/W}$

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 ($T_A = 25^\circ\text{C}$ 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 = 5Ω	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:

- Current limited by package
- Pulse width limited by the maximum junction temperature
- $V_{DD} = 50V, I_{AS} = 0.5A, L = 10mH, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
- $I_{SD} \leq 0.5A, di/dt \leq 200A/\mu S, V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$
- Pulse test: $PW \leq 300\mu s$, duty cycle $\leq 2\%$
- For DESIGN AID ONLY, not subject to production testing.
- Essentially Independent of Operating Temperature.

ORDERING INFORMATION

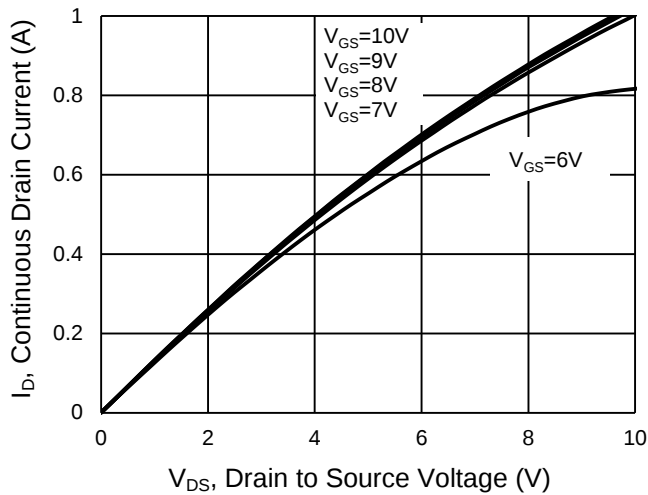
PART NO.	PACKAGE	PACKING
TSM1NB60SCT B0	TO-92	1,000pcs / Bulk
TSM1NB60SCT A3	TO-92	2,000pcs / Ammo
TSM1NB60SCT B0G	TO-92	1,000pcs / Bulk
TSM1NB60SCT A3G	TO-92	2,000pcs / Ammo

Not Recommended

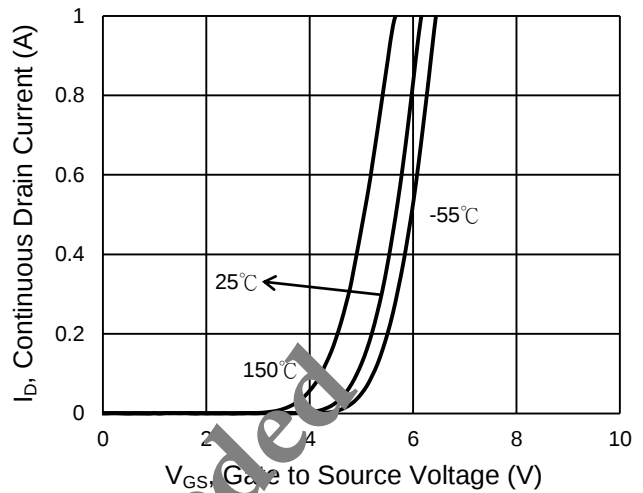
CHARACTERISTICS CURVES

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

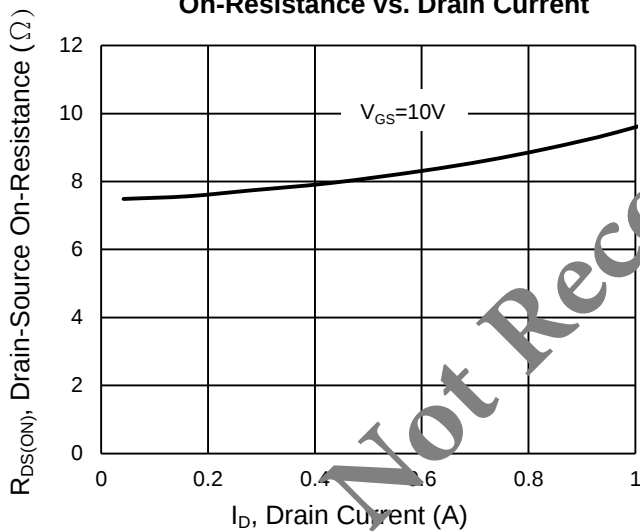
Output Characteristics



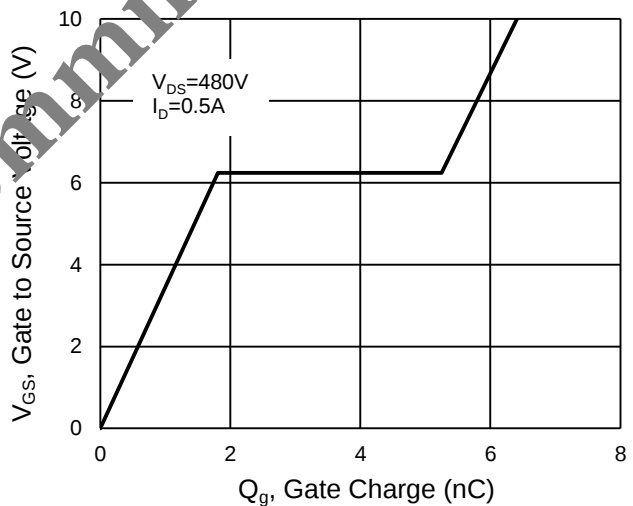
Transfer Characteristics



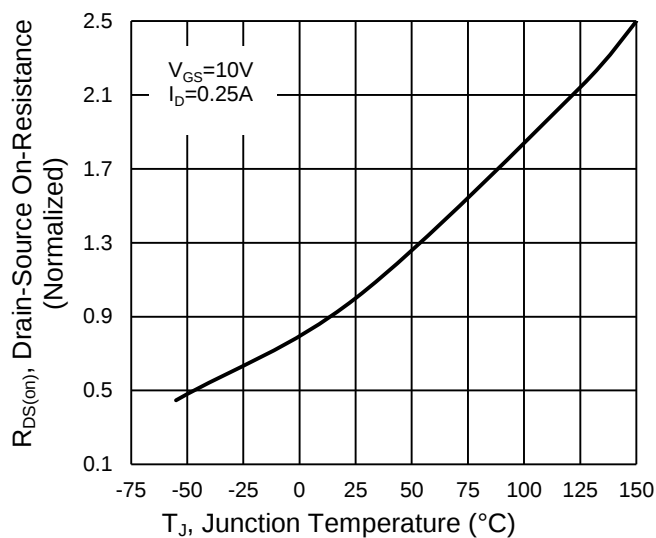
On-Resistance vs. Drain Current



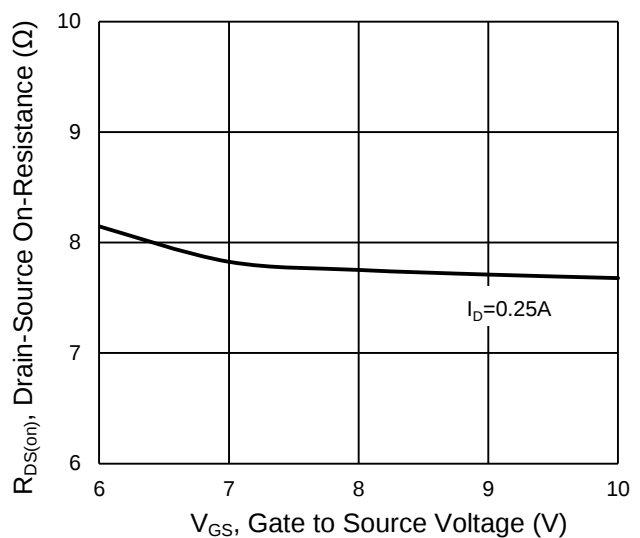
Gate Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



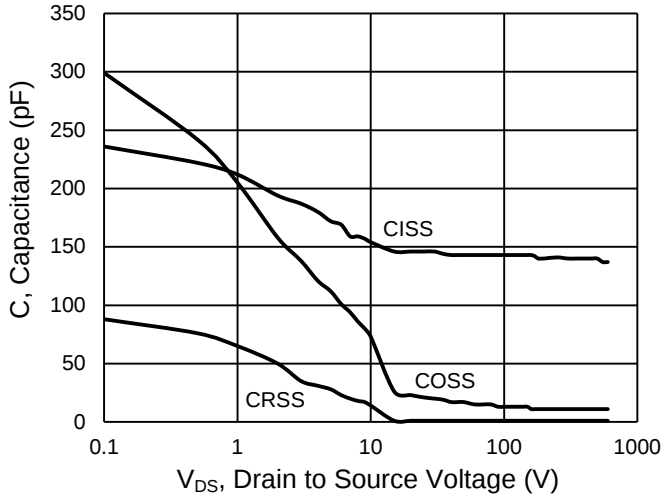
On-Resistance vs. Gate-Source Voltage



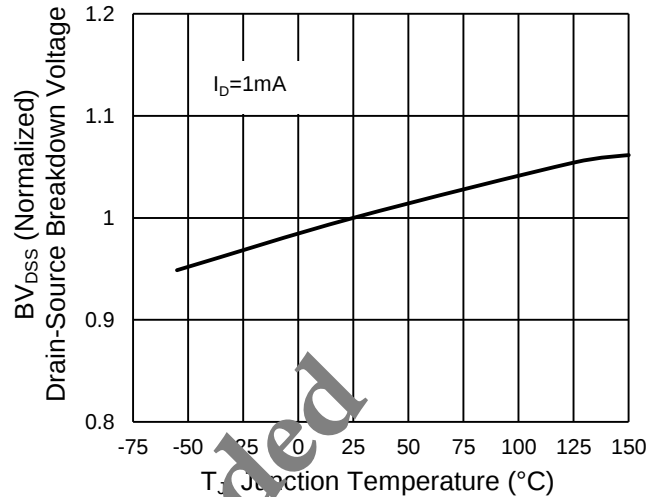
CHARACTERISTICS CURVES

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

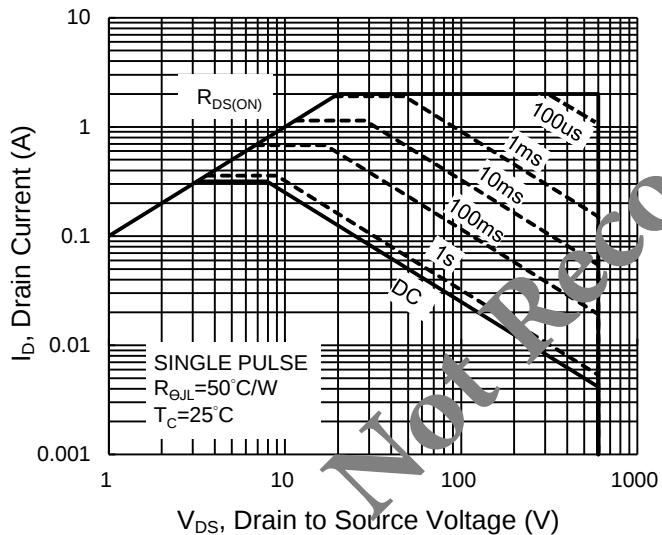
Capacitance vs. Drain-Source Voltage



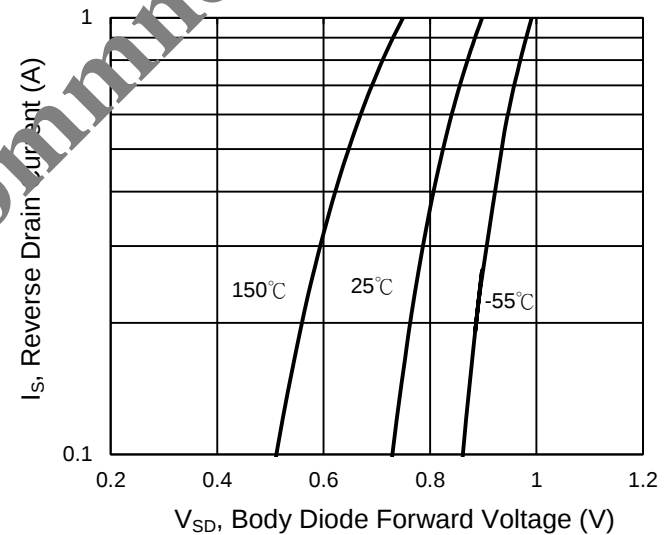
BV_{DSS} vs. Junction Temperature



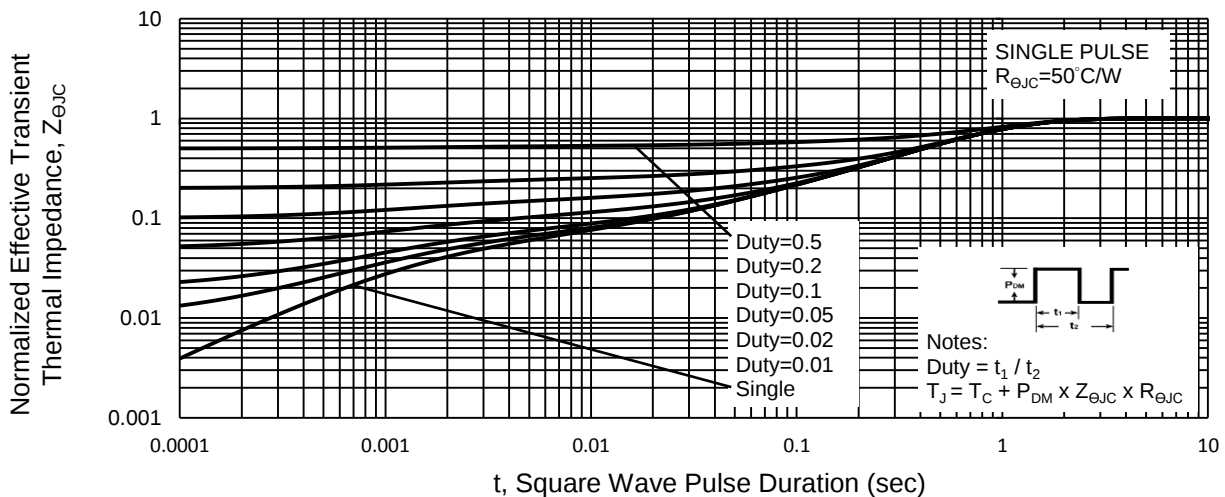
Maximum Safe Operating Area, Junction-to-Case



Source-Drain Diode Forward Current vs. Voltage

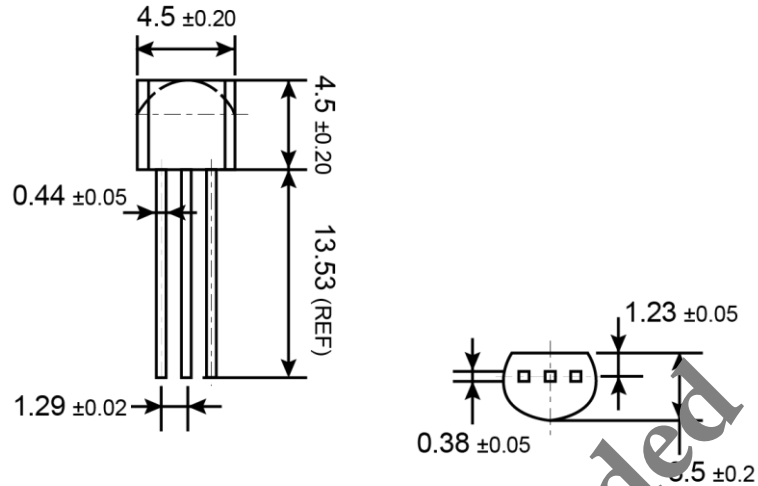


Normalized Thermal Transient Impedance, Junction-to-Case



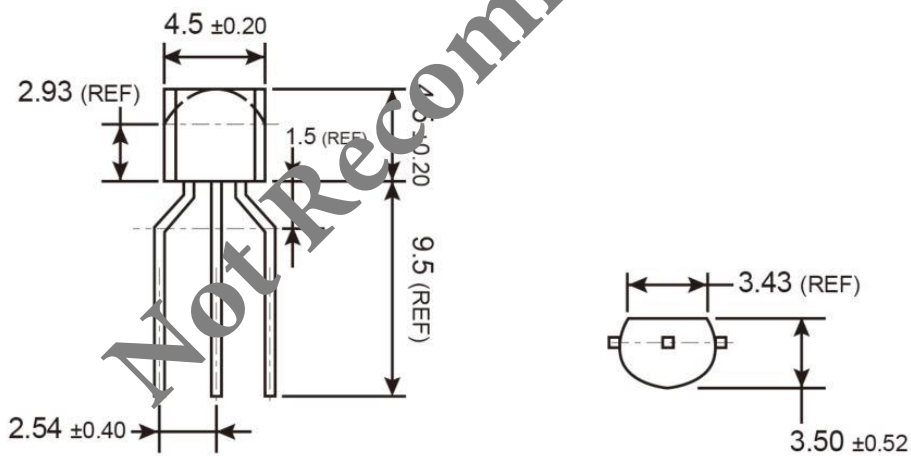
PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-92

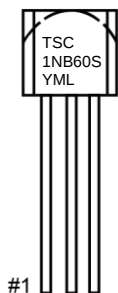


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

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

Not Recommended

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