N-Channel Power MOSFET

600V, 0.55A, 15Ω

FEATURES

- Pb-free plating
- RoHS compliant
- Halogen-free

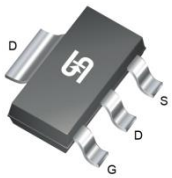
APPLICATIONS

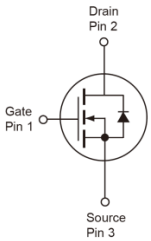
- Lighting
- Charger
- Power Supply
- Switching applications

PRODUCT SUMMARY			
PARAMETER		**VALUE**	**UNIT**
V_{DS}		600	V
$R_{DS(on)}$ (max)	V_{GS} = 10V	15	Ω
Q_g	V_{GS} = 10V	7.5	nC

Pb-Free RoHS COMPLIANT HALOGEN FREE

SOT-223





Note: MSL 3 (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}	600	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current	T_C = 25°C	I_D	0.55	A
	T_C = 100°C		0.35	
	T_A = 25°C		0.23	
Pulsed Drain Current (Note 1)		I_{DM}	2.2	A
Total Power Dissipation	T_C = 25°C	P_D	10.4	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	°C

THERMAL RESISTANCE			
PARAMETER	**SYMBOL**	**MAXIMUM**	**UNIT**
Thermal Resistance – Junction to Case	$R_{\Theta JC}$	12	°C/W
Thermal Resistance – Junction to Ambient (Note 2)	$R_{\Theta JA}$	69	°C/W

Notes:

1. Pulsed width limited by maximum junction temperature pulse Width ≤ 100μs.
2. Device on a PCB FR4 with 1 in^2 (single layer, 2 oz thick) copper area for drain connection.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)						
PARAMETER	**CONDITIONS**	**SYMBOL**	**MIN**	**TYP**	**MAX**	**UNIT**
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	BV_{DSS}	600	--	--	V
Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 250μA	$V_{GS(TH)}$	0.9	1.6	2	V
Gate-Source Leakage Current	V_{GS} = ±30V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Drain-Source Leakage Current	V_{GS} = 0V, V_{DS} = 600V	I_{DSS}	--	--	1	μA
Drain-Source On-State Resistance (Note 3)	V_{GS} = 10V, I_D = 0.27A	$R_{DS(on)}$	--	11	15	Ω
Dynamic						
Total Gate Charge	V_{GS} = 10V, V_{DS} = 480V, I_D = 0.23	Q_g	--	7.5	--	nC
Gate-Source Charge		Q_{gs}	--	0.7	--	
Gate-Drain Charge		Q_{gd}	--	4.3	--	
Input Capacitance	V_{GS} = 0V, V_{DS} = 300V f = 1.0MHz	C_{iss}	--	98	--	pF
Output Capacitance		C_{oss}	--	10	--	
Reverse Transfer Capacitance		C_{rss}	--	8	--	
Switching (Note 4)						
Turn-On Delay Time	V_{GS} = 10V, V_{DS} = 300V, I_D = 0.23A, R_g = 5Ω	$t_{d(on)}$	--	3.6	--	ns
Rise Time		t_r	--	3.9	--	
Turn-Off Delay Time		$t_{d(off)}$	--	15	--	
Fall Time		t_f	--	74	--	
Source-Drain Diode						
Diode Forward Voltage (Note 3)	V_{GS} = 0V, I_S = 0.27A	V_{SD}	--	0.8	1.5	V
Source Current	Integral reverse diode In the MOSFET	I_S	--	--	0.55	A
Source Current (Pulse)		I_{SM}	--	--	2.2	

Notes:

3. Pulse test: Pulse Width ≤ 300μs, duty cycle ≤ 2%.
4. Switching time is essentially independent of operating temperature.

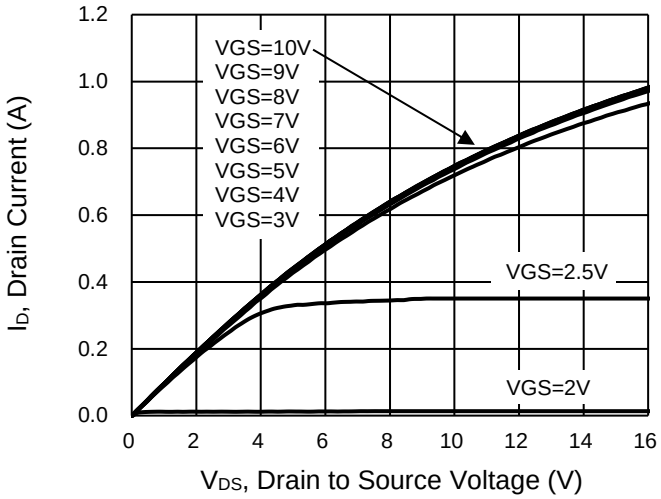
ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
TSM1NB60LCW RPG	SOT-223	2,500 pcs / 13” Reel

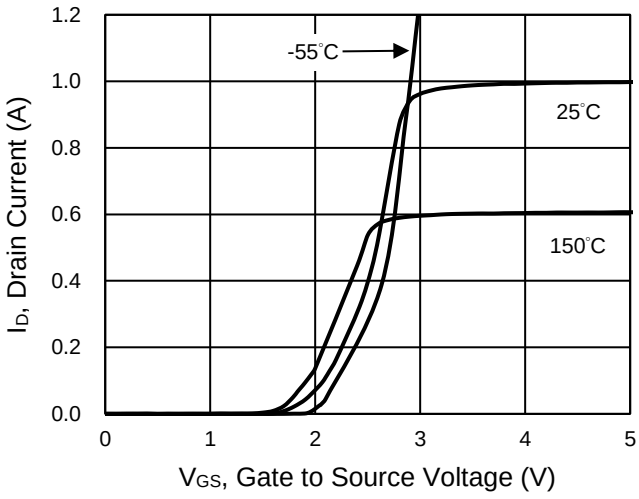
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

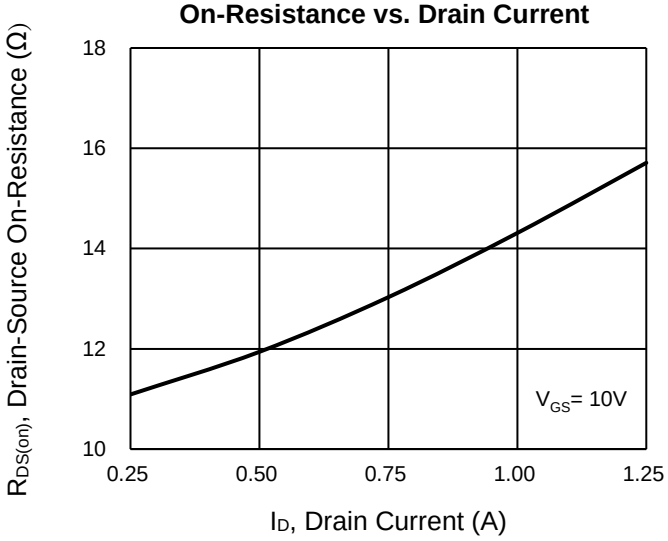
Output Characteristics



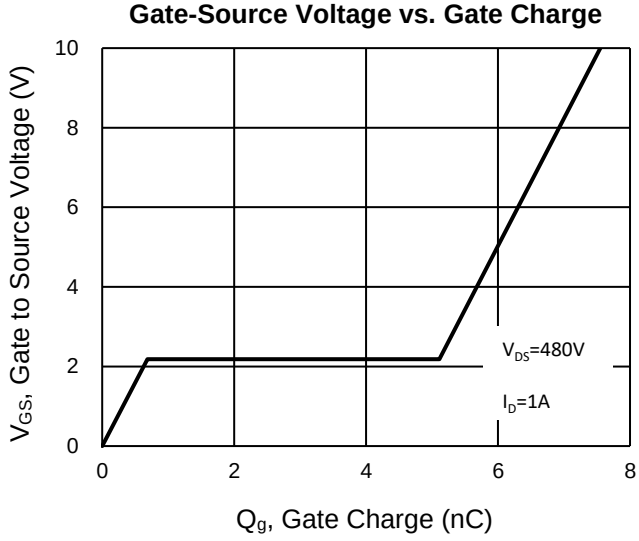
Transfer Characteristics



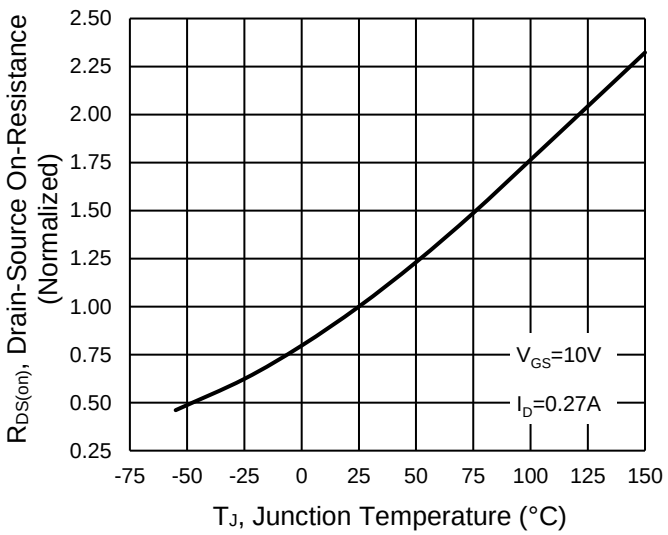
On-Resistance vs. Drain Current



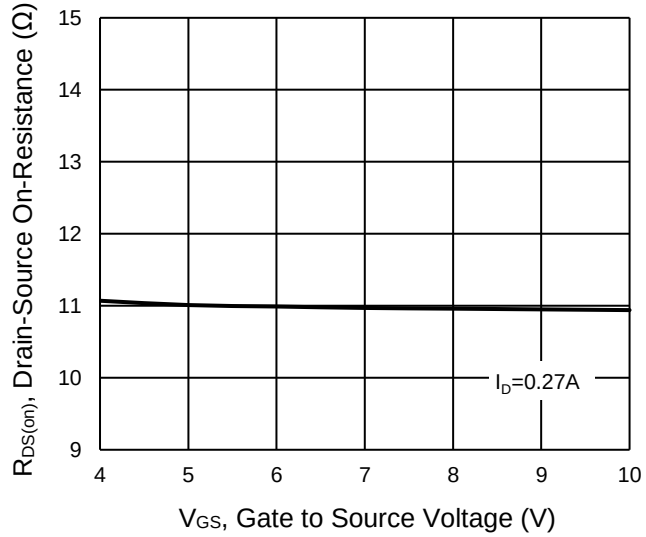
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



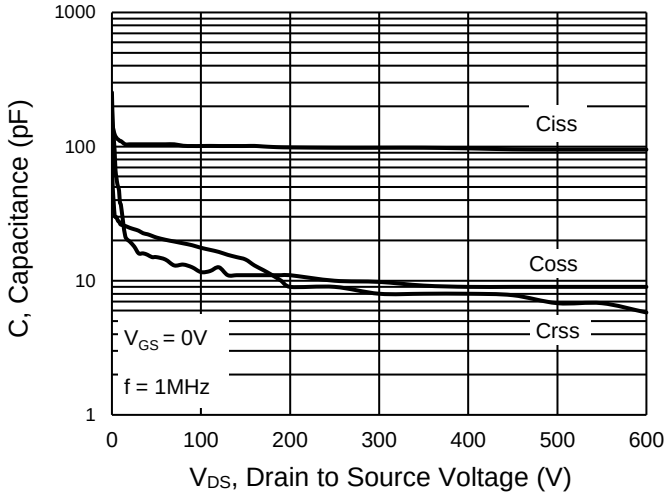
On-Resistance vs. Gate-Source Voltage



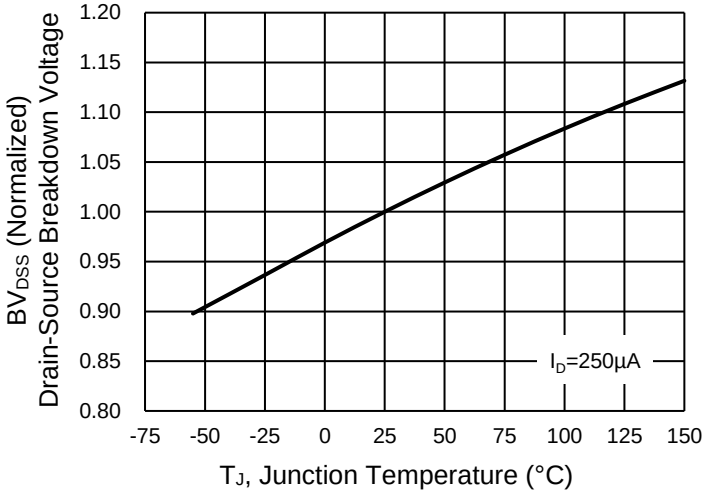
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

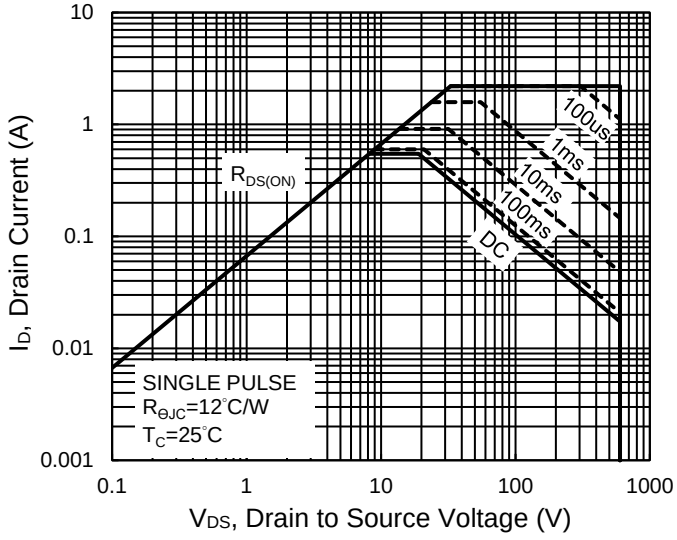
Capacitance vs. Drain-Source Voltage



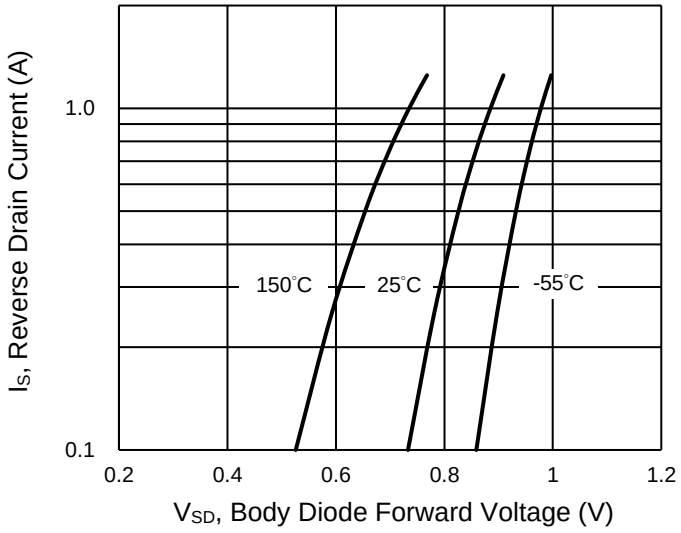
BV_{DSS} vs. Junction Temperature



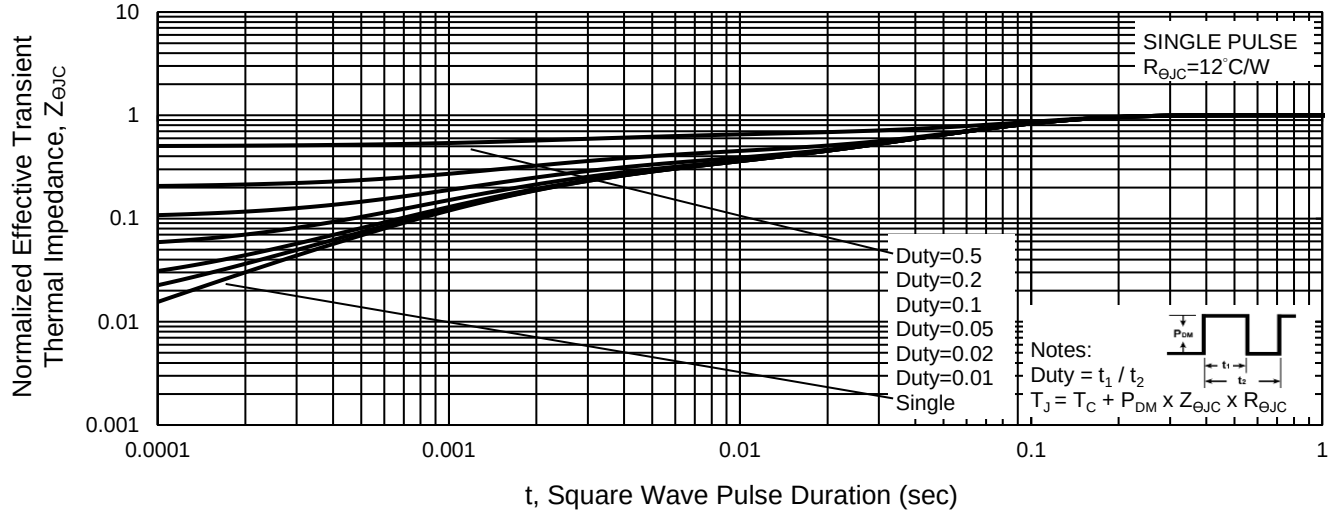
Maximum Safe Operating Area, Junction-to-Case



Source-Drain Diode Forward Current vs. Voltage



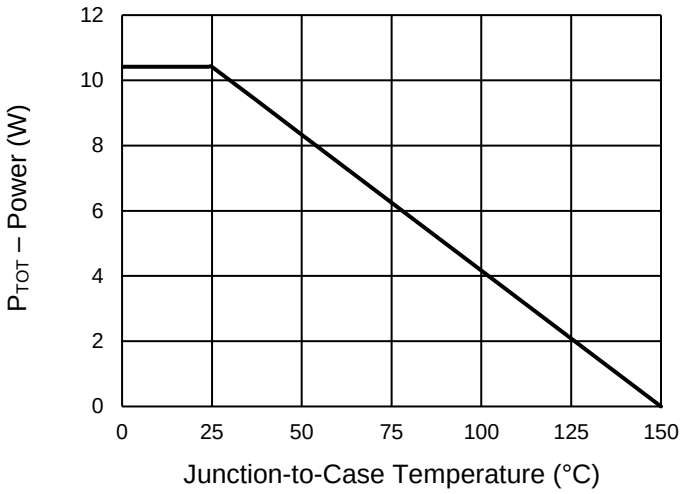
Normalized Thermal Transient Impedance, Junction-to-Case



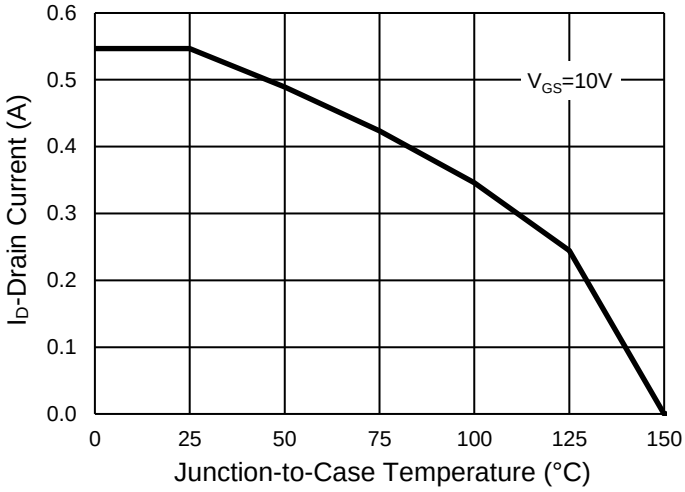
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

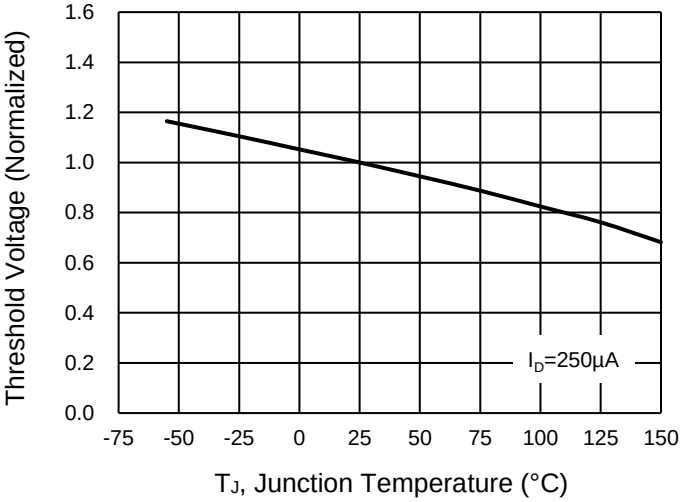
Power Dissipation



Drain Current

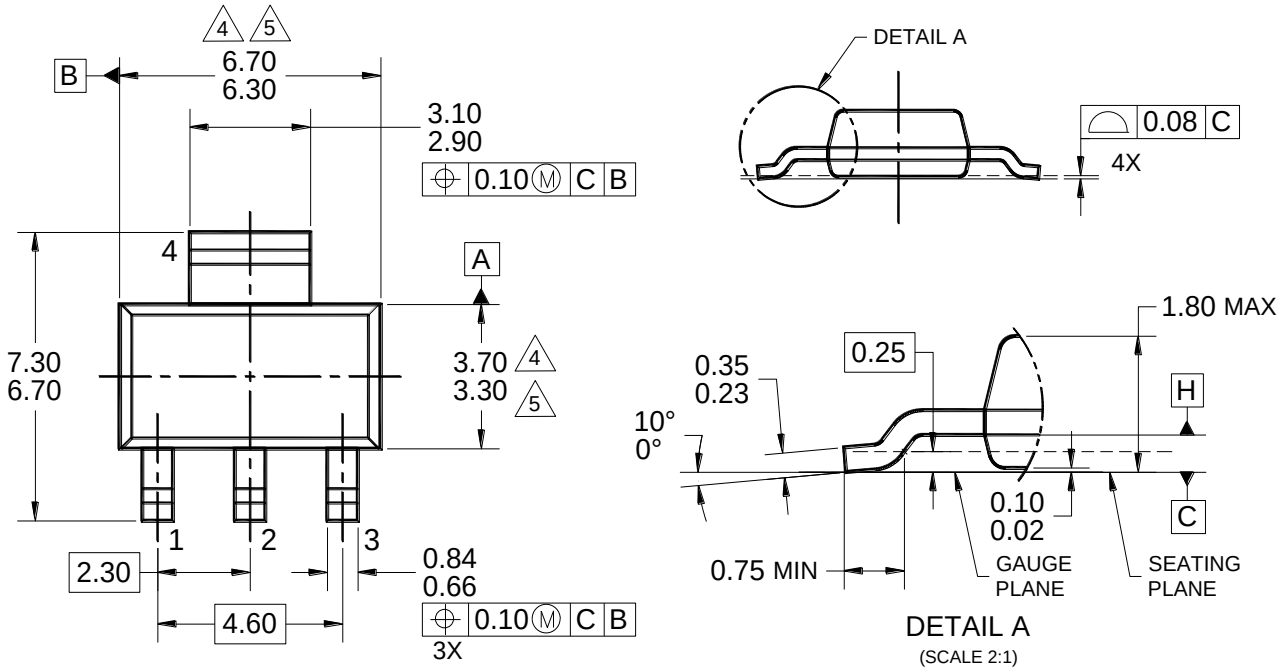


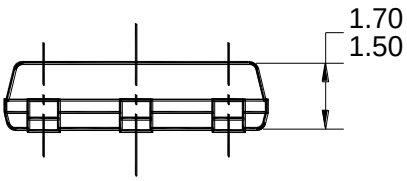
Normalized gate threshold voltage vs Temperature

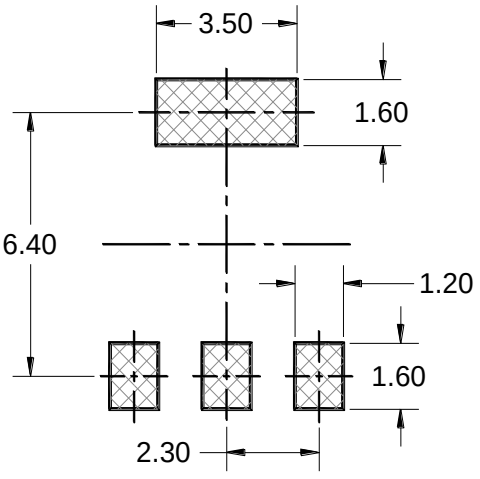


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

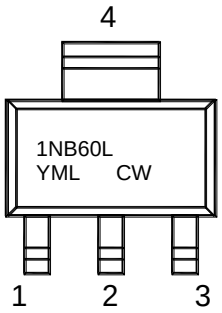
SOT-223







SUGGESTED PAD LAYOUT



P/N = MARKING CODE
Y = YEAR CODE
M = MONTH CODE FOR HALOGEN FREE PRODUCT

O =JAN	P =FEB	Q=MAR	R = APRI
S =MAY	T =JUN	U=JUL	V = AUG
W =SEP	X =OCT	Y=NOV	Z = DEC

L = LOT CODE

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. PACKAGE OUTLINE REFERENCE:TO-261, VARIATION AA.
4. MOLDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH.
5. MOLDED PLASTIC BODY LATERAL DIMENSIONS TO BE DETERMINED AT DATUM PLANE H.
6. DWG NO. REF: HQ2SD07-SOT223-001 REV A

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