

N-Channel Power MOSFET

600V, 0.55A, 15Ω

FEATURES

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

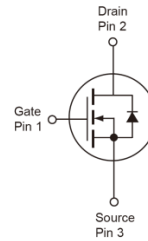
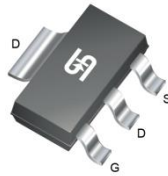
APPLICATIONS

- 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


**HALOGEN
FREE**

SOT-223



Note: MSL 3 (Moisture Sensitivity Level) per J-STD-020

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	$T_C = 25^\circ\text{C}$	I_D	0.55	A
	$T_C = 100^\circ\text{C}$		0.35	
	$T_A = 25^\circ\text{C}$		0.23	
Pulsed Drain Current (Note 1)		I_{DM}	2.2	A
Total Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	10.4	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	- 55 to +150	$^\circ\text{C}$

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

Notes:

1. Pulsed width limited by maximum junction temperature pulse Width $\leq 100\mu\text{s}$.
2. Device on a PCB FR4 with 1 in² (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:

- Pulse test: Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- Switching time is essentially independent of operating temperature.

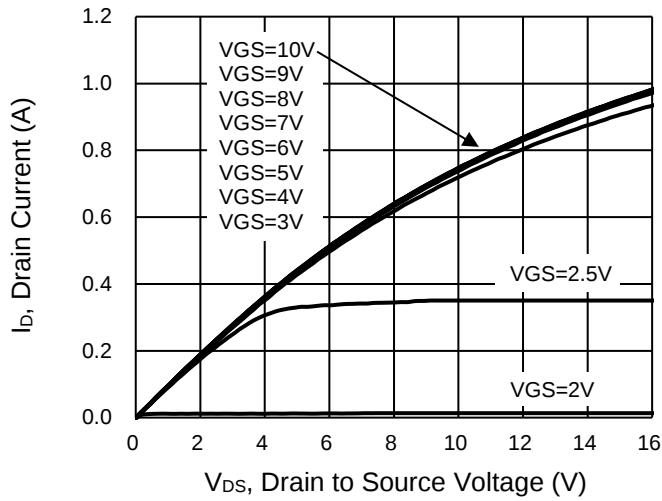
ORDERING INFORMATION

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

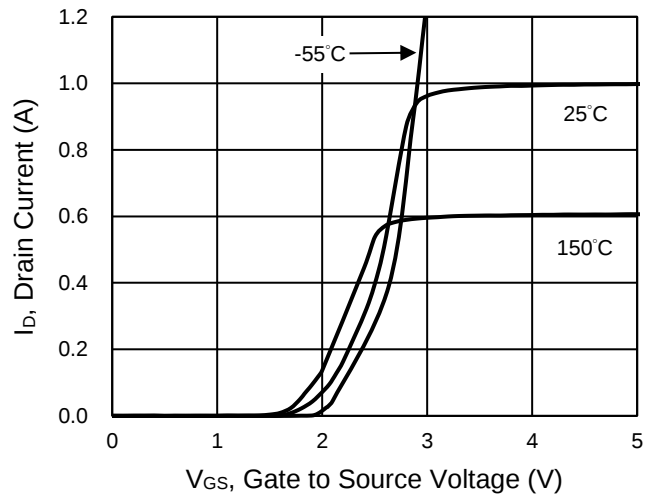
CHARACTERISTICS CURVES

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

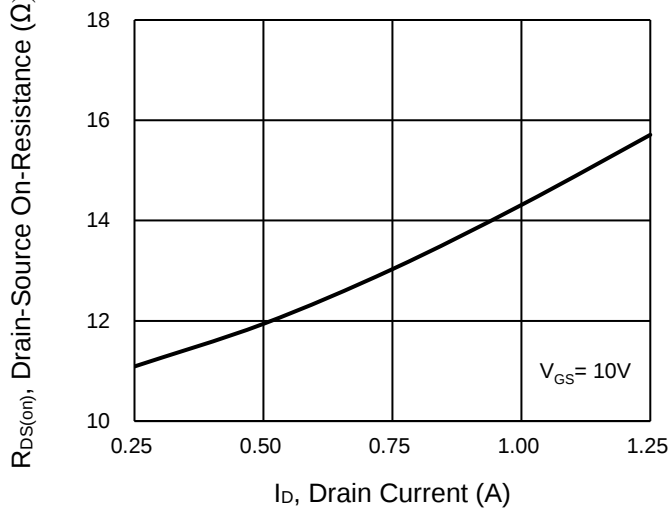
Output Characteristics



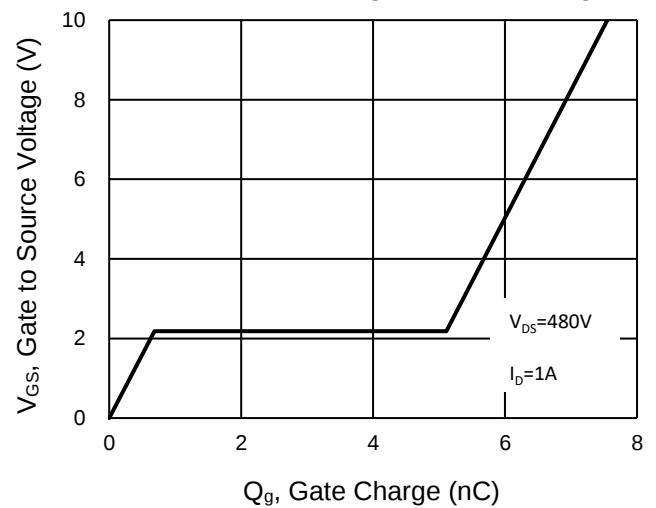
Transfer Characteristics



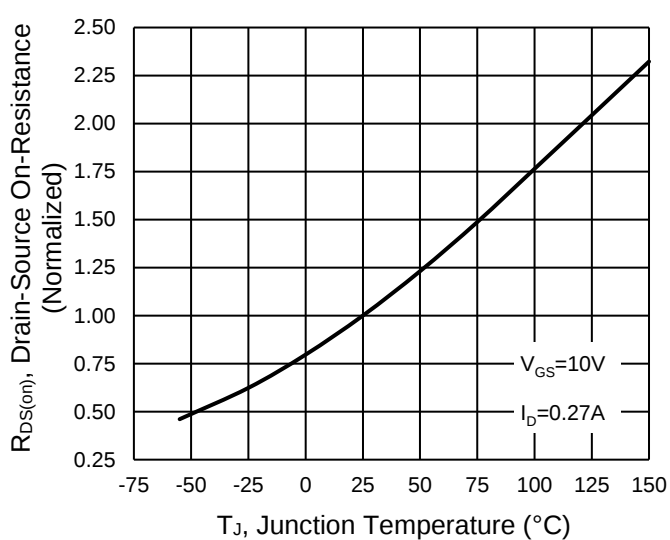
On-Resistance vs. Drain Current



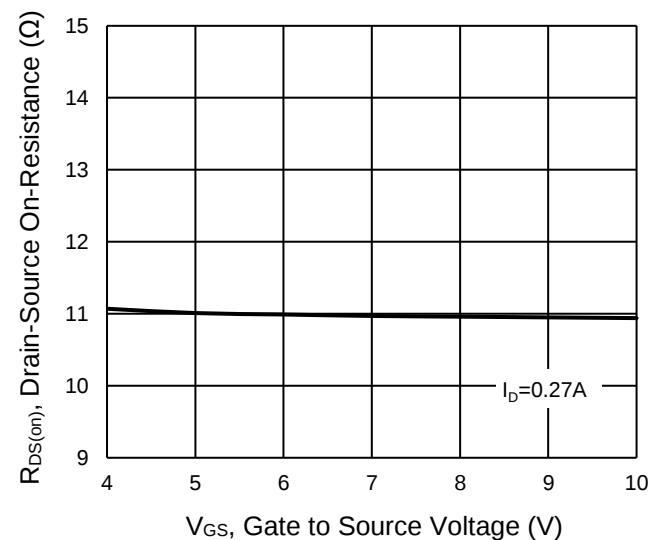
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature

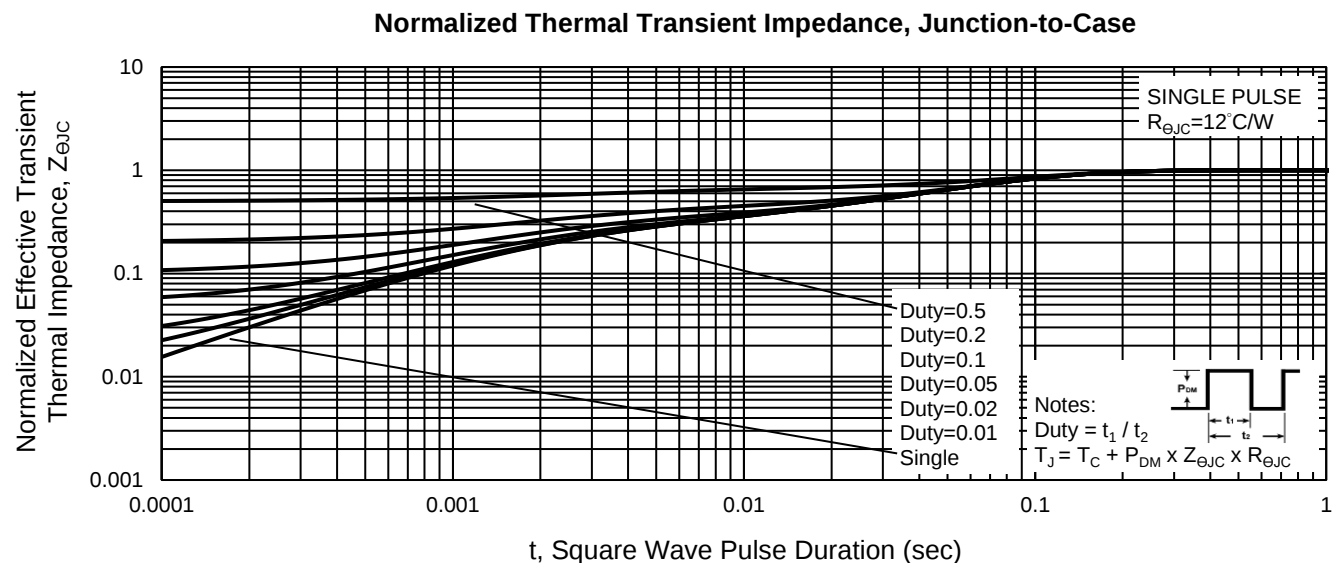
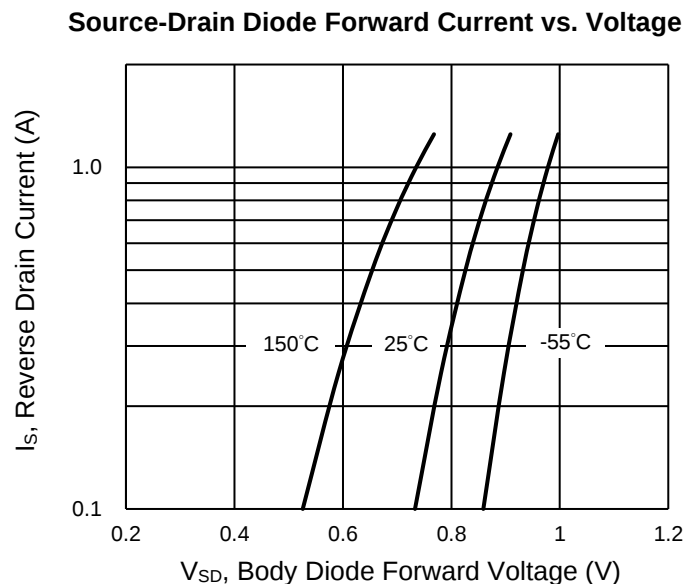
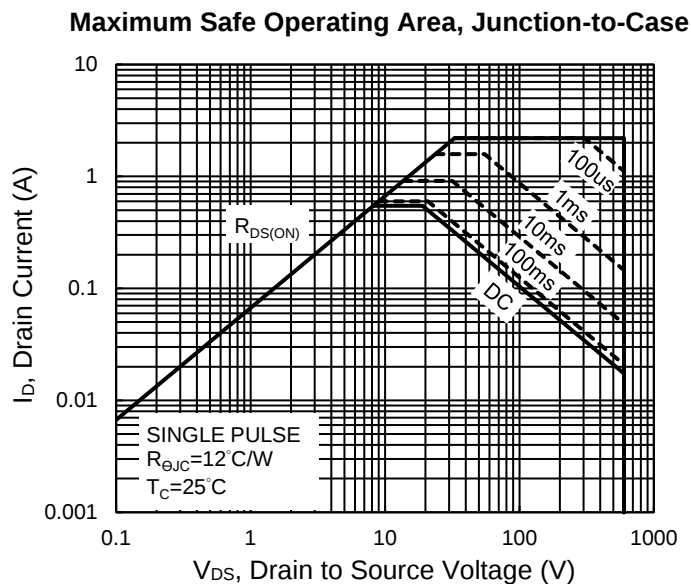
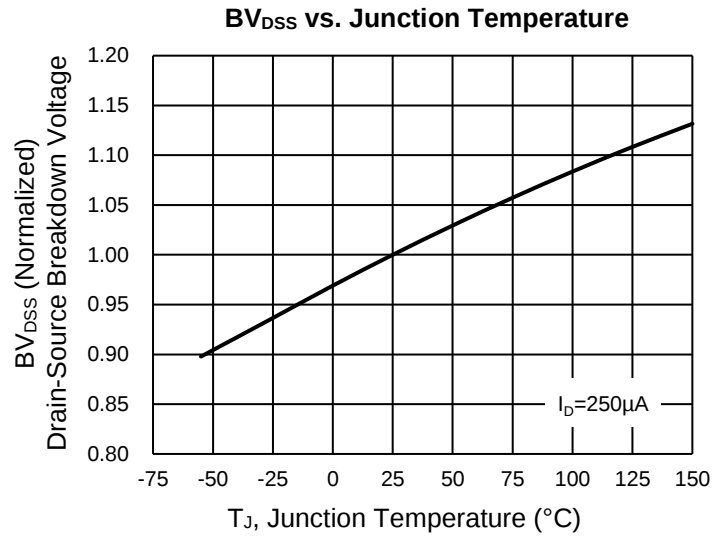
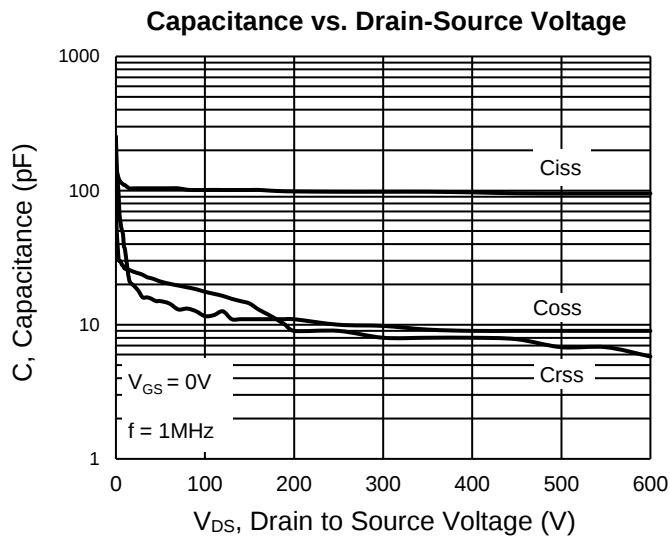


On-Resistance vs. Gate-Source Voltage



CHARACTERISTICS CURVES

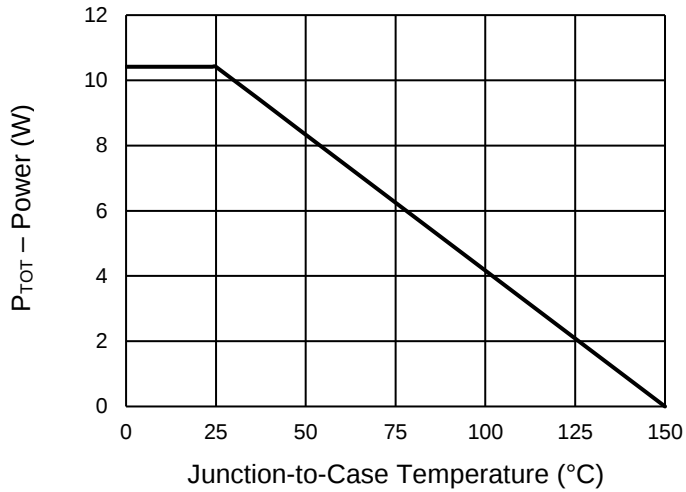
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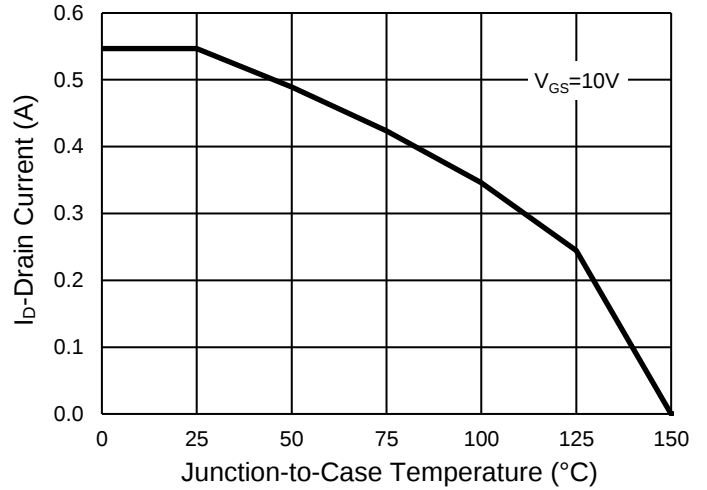
CHARACTERISTICS CURVES

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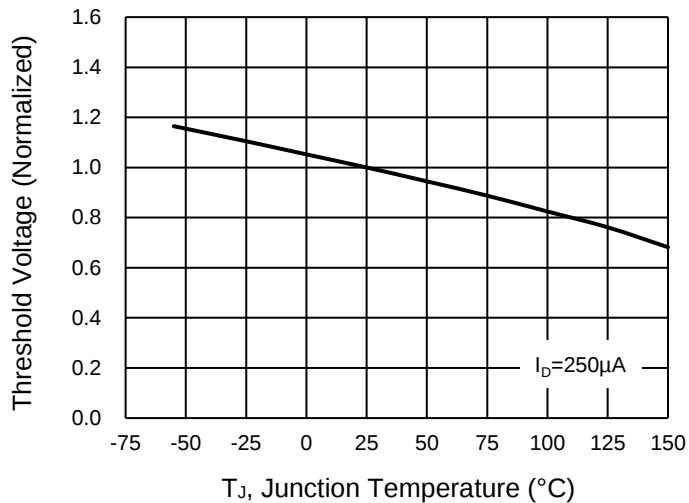
Power Dissipation



Drain Current

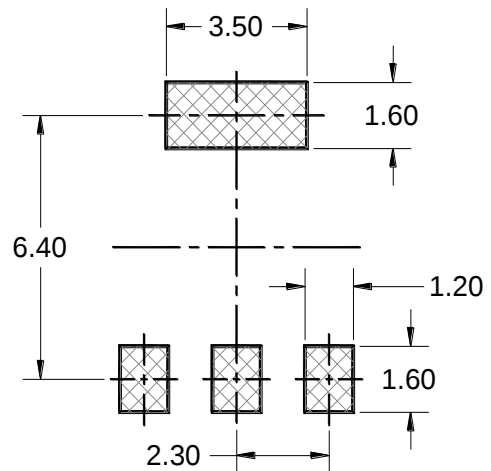
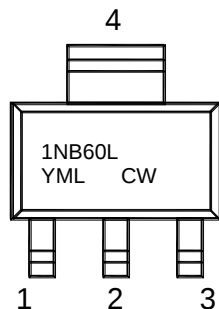
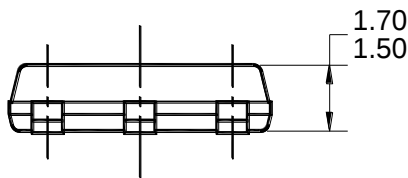
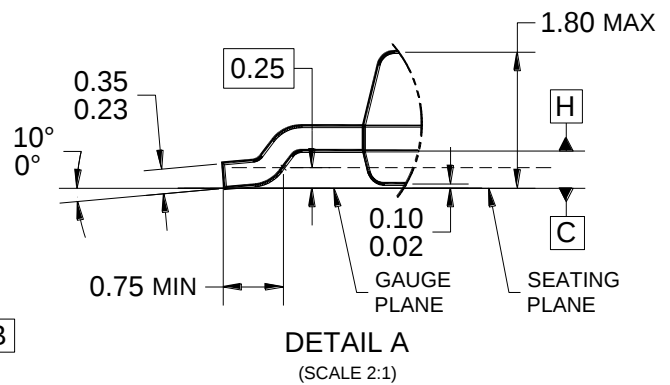
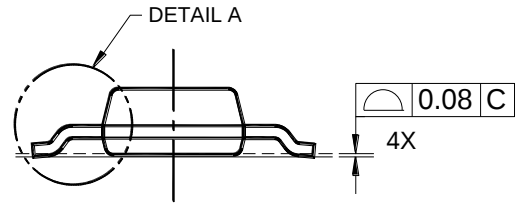
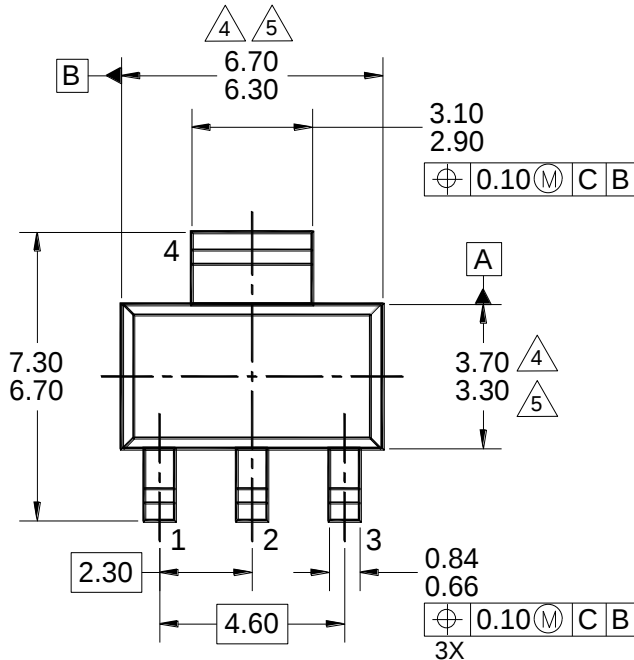


Normalized gate threshold voltage vs Temperature



PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

SOT-223



SUGGESTED PAD LAYOUT

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

P/N = MARKING CODE

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

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