

## P-Channel Power MOSFET

-20V, -6.5A, 26mΩ

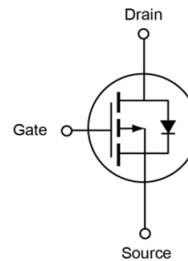
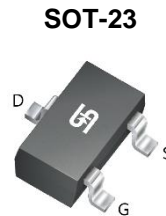
### FEATURES

- Fast switching
- Suitable for -1.8V Gate Drive Applications
- Pb-free plating
- RoHS Compliant
- Halogen-free

### APPLICATIONS

- Battery Pack
- Portable Devices
- High-side loadswitch

KEY PERFORMANCE PARAMETERS		
PARAMETER	VALUE	UNIT
$V_{DS}$	-20	V
$R_{DS(on)}$ (max)	$V_{GS} = -4.5V$	26
	$V_{GS} = -2.5V$	32
	$V_{GS} = -1.8V$	40
$Q_g$	17	nC



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

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 10$	V
Continuous Drain Current	$I_D$	$T_A = 25^\circ C$	-6.5
		$T_A = 100^\circ C$	-4.1
Pulsed Drain Current (Note 1)	$I_{DM}$	-26	A
Total Power Dissipation @ $T_A = 25^\circ C$	$P_D$	1.6	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ C$

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Ambient Thermal Resistance (Note 2)	$R_{\theta JA}$	80	$^\circ C/W$

**Notes:**

1. Pulse Width  $\leq 100\mu s$ .
2. Device on a PCB FR4 with 1 in<sup>2</sup> (single layer, 2 oz thickness) copper area for drain connection.

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

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = -250\mu A$	$BV_{DSS}$	-20	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	$V_{GS(TH)}$	-0.3	-0.6	-1.0	V
Gate-Source Leakage Current	$V_{GS} = \pm 10V, V_{DS} = 0V$	$I_{GSS}$	--	--	$\pm 100$	nA
Drain-Source Leakage Current	$V_{DS} = -20V, V_{GS} = 0V$	$I_{DSS}$	--	--	-1	$\mu A$
	$V_{DS} = -16V, T_J = 125^\circ\text{C}$		--	--	-10	
Drain-Source On-State Resistance (Note 3)	$V_{GS} = -4.5V, I_D = -5A$	$R_{DS(on)}$	--	18	26	m $\Omega$
	$V_{GS} = -2.5V, I_D = -4A$		--	22	32	
	$V_{GS} = -1.8V, I_D = -3A$		--	30	40	
Forward Transconductance (Note 3)	$V_{DS} = -10V, I_D = -5A$	$g_{fs}$	--	16	--	S
<b>Dynamic</b> (Note 4)						
Total Gate Charge	$V_{DS} = -10V, I_D = -5A, V_{GS} = -4.5V$	$Q_g$	--	17	--	nC
Gate-Source Charge		$Q_{gs}$	--	2.4	--	
Gate-Drain Charge		$Q_{gd}$	--	3.7	--	
Input Capacitance	$V_{DS} = -15V, V_{GS} = 0V, f = 1.0\text{MHz}$	$C_{iss}$	--	1645	--	$\mu F$
Output Capacitance		$C_{oss}$	--	209	--	
Reverse Transfer Capacitance		$C_{rss}$	--	150	--	
<b>Switching</b> (Note 5)						
Turn-On Delay Time	$V_{DD} = -10V, R_G = 25\Omega, I_D = -1A, V_{GS} = -4.5V$	$t_{d(on)}$	--	9.6	--	ns
Turn-On Rise Time		$t_r$	--	16	--	
Turn-Off Delay Time		$t_{d(off)}$	--	104	--	
Turn-Off Fall Time		$t_f$	--	50	--	
<b>Source-Drain Diode</b>						
Forward Voltage (Note 3)	$I_S = -1A, V_{GS} = 0V$	$V_{SD}$	--	--	-1	V

**Notes:**

- Pulse test: Pulse Width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
- Defined by design. Not subject to production test.
- Switching time is essentially independent of operating temperature.

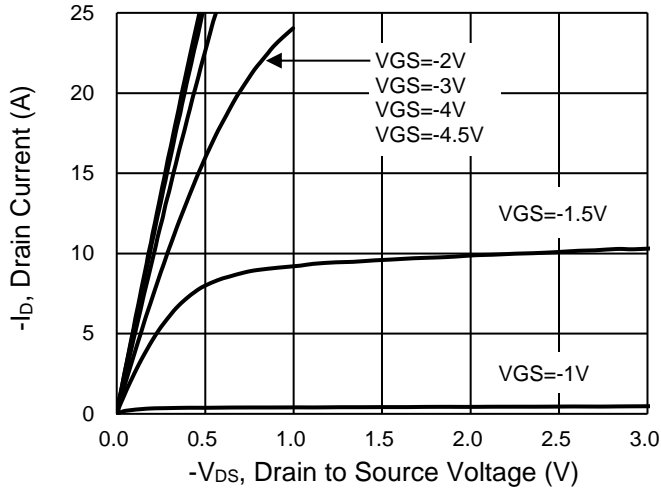
**ORDERING INFORMATION**

ORDERING CODE	PACKAGE	PACKING
TSM260P02CX RFG	SOT-23	3000pcs / 7" Reel

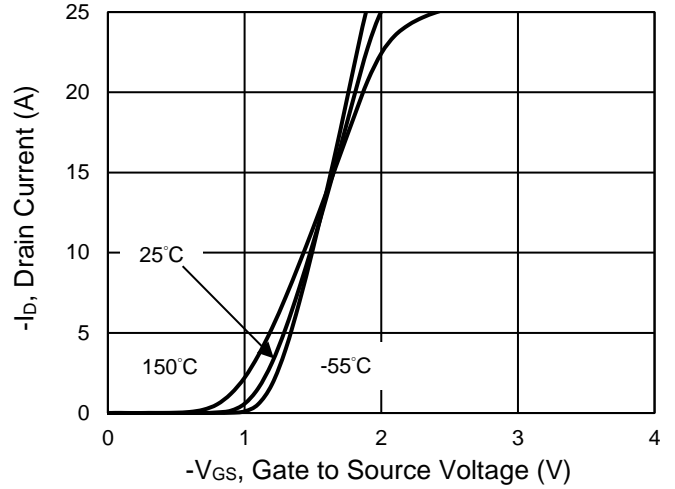
**CHARACTERISTICS CURVES (P-Channel)**

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

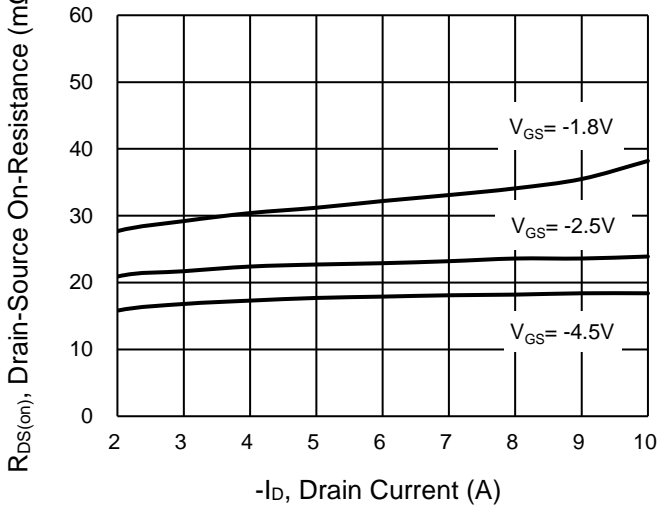
**Output Characteristics**



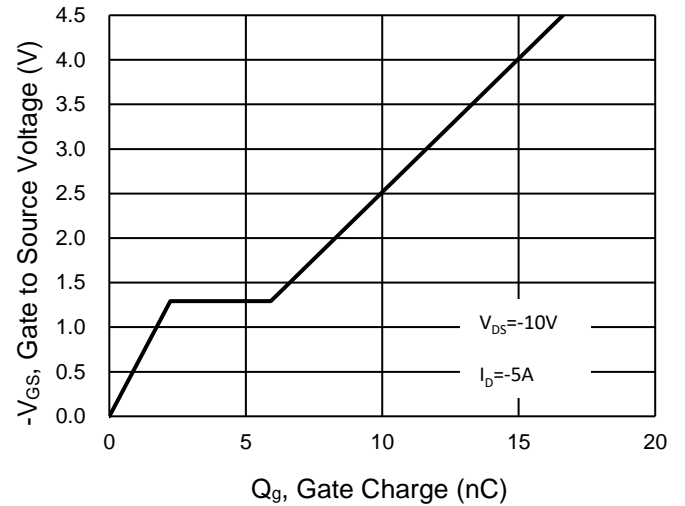
**Transfer Characteristics**



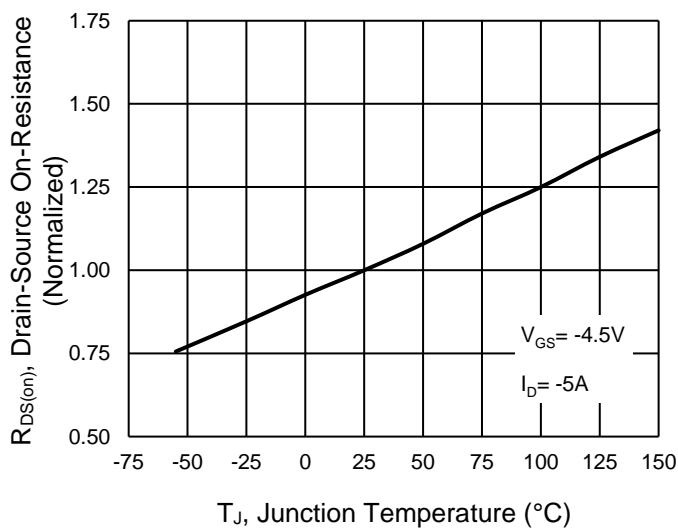
**On-Resistance vs. Drain Current**



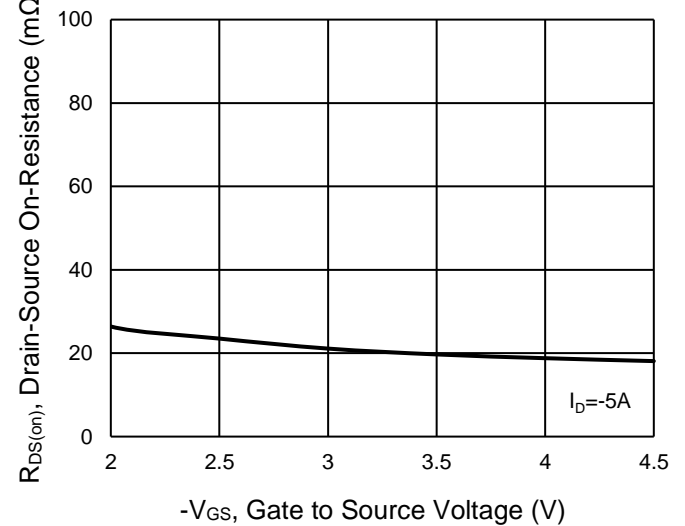
**Gate-Source Voltage vs. Gate Charge**



**On-Resistance vs. Junction Temperature**

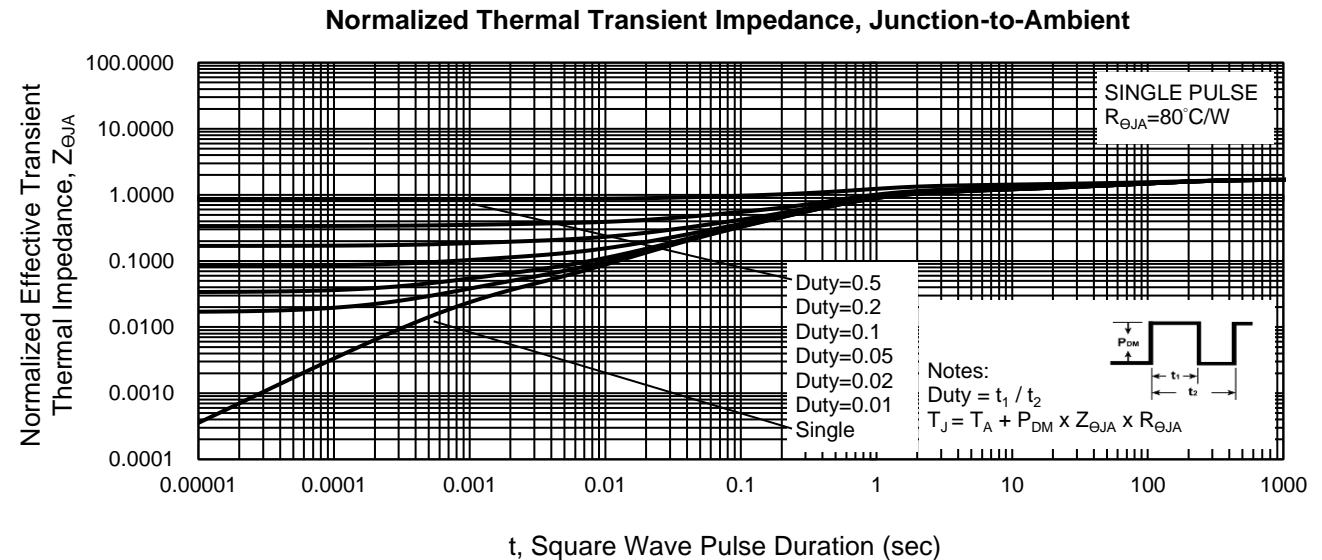
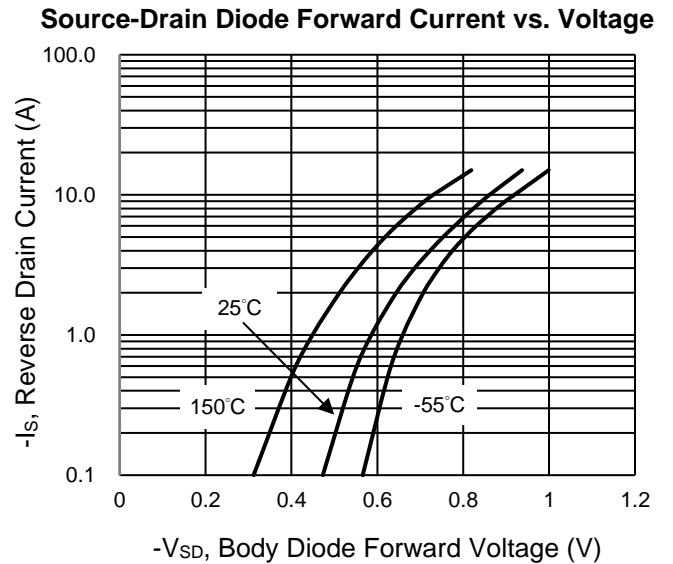
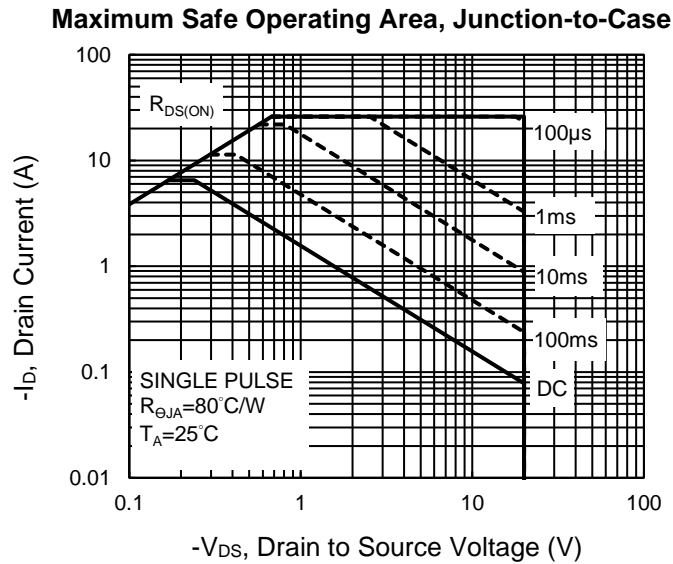
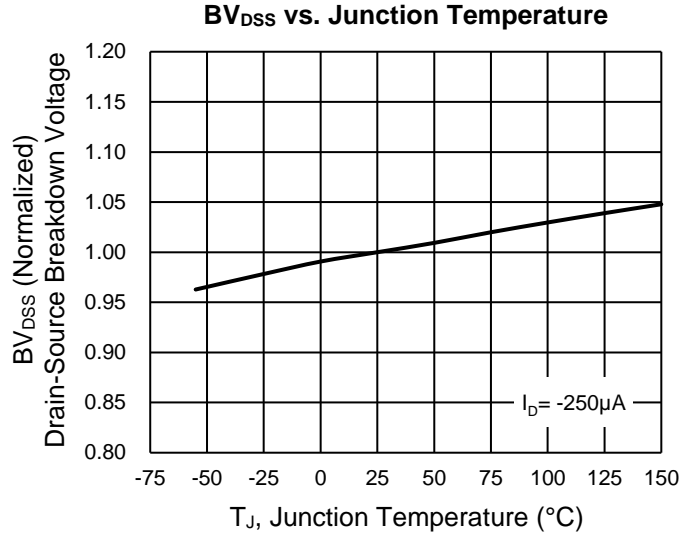
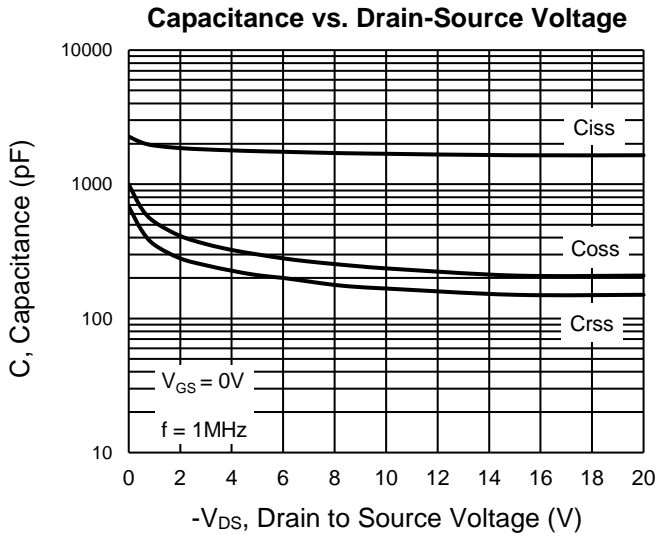


**On-Resistance vs. Gate-Source Voltage**



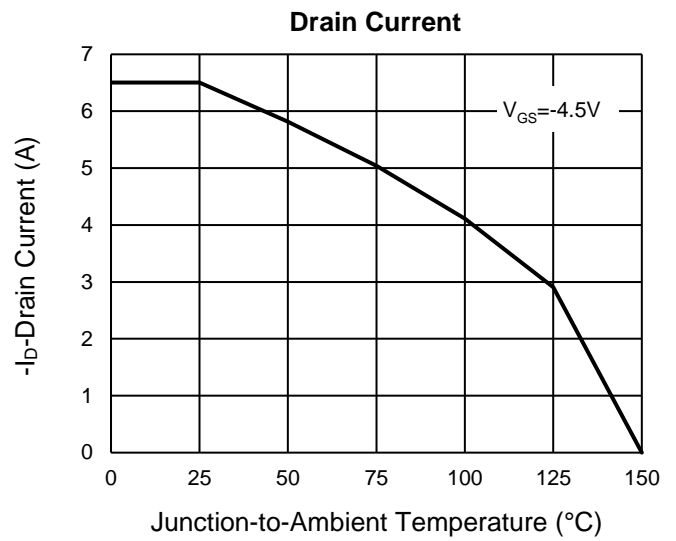
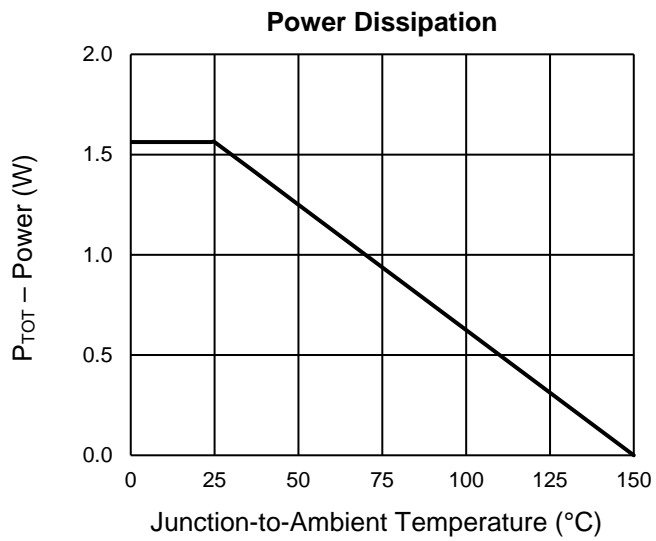
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( $T_A = 25^\circ\text{C}$  unless otherwise noted)

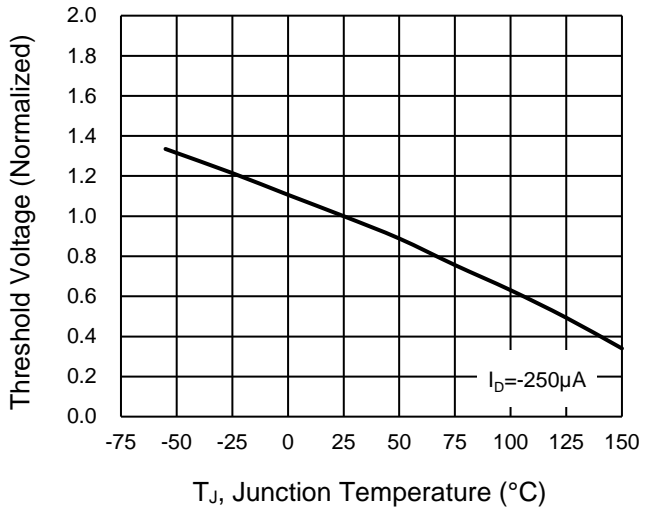


**CHARACTERISTICS CURVES (P-Channel)**

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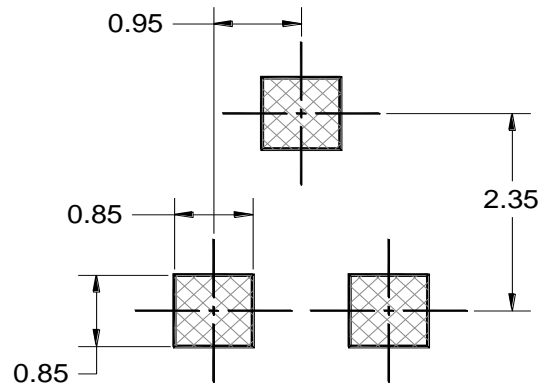
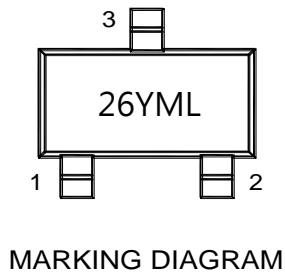
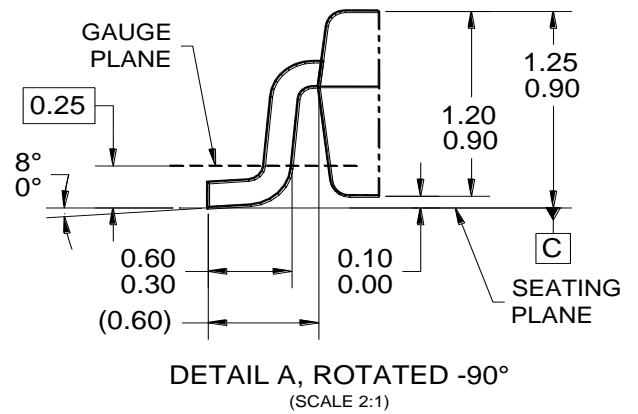
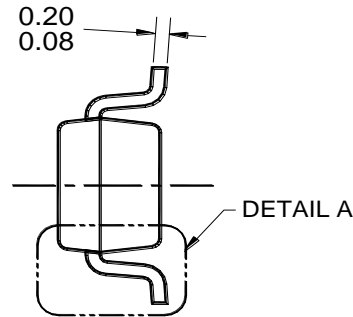
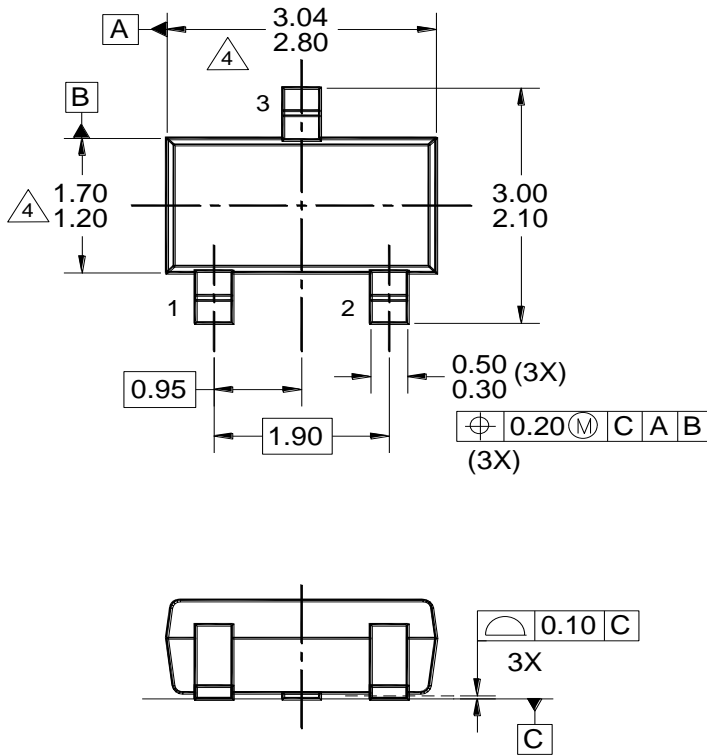


**Normalized gate threshold voltage vs Temperature**



**PACKAGE OUTLINE DIMENSIONS** (Unit: Millimeters)

**SOT-23**



- 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

- NOTES: UNLESS OTHERWISE SPECIFIED**
1. ALL DIMENSIONS ARE IN MILLIMETERS.
  2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
  3. PACKAGE OUTLINE REFERENCE: JEDEC TO-236, ISSUE H, VARIATION AA.
  4. MOLDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
  5. DWG NO. REF: HQ2SD07-SOT23-025 REV A.

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