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

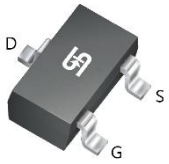
APPLICATIONS

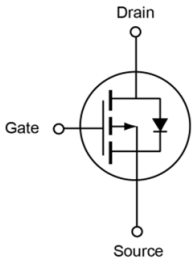
- Battery Pack
- Portable Devices
- High-side loadswitch

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

Pb-Free RoHS COMPLIANT HALOGEN FREE

SOT-23





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}	-20	V
Gate-Source Voltage		V_{GS}	±10	V
Continuous Drain Current	T_A= 25°C	I_D	-6.5	A
	T_A = 100°C		-4.1	
Pulsed Drain Current (Note 1)		I_{DM}	-26	A
Total Power Dissipation @ T_A = 25°C		P_D	1.6	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

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

Notes:

1. Pulse Width ≤ 100μs.
2. Device on a PCB FR4 with 1 in^2 (single layer, 2 oz thickness) copper area for drain connection.

ELECTRICAL SPECIFICATIONS (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}	-20	--	--	V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = -250μA	$V_{GS(TH)}$	-0.3	-0.6	-1.0	V
Gate-Source Leakage Current	V_{GS} = ± 10V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Drain-Source Leakage Current	V_{DS} = -20V, V_{GS} = 0V	I_{DSS}	--	--	-1	μA
	V_{DS} = -16V, T_J = 125°C		--	--	-10	
Drain-Source On-State Resistance (Note 3)	V_{GS} = -4.5V, I_D = -5A	$R_{DS(on)}$	--	18	26	mΩ
	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	gfs	--	16	--	S
Dynamic (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 = 1.0MHz	C_{iss}	--	1645	--	pF
Output Capacitance		C_{oss}	--	209	--	
Reverse Transfer Capacitance		C_{rss}	--	150	--	
Switching (Note 5)						
Turn-On Delay Time	V_{DD} = -10V, R_G = 25Ω, 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	--	
Source-Drain Diode						
Forward Voltage (Note 3)	I_S = -1A, V_{GS} = 0V	V_{SD}	--	--	-1	V

Notes:

3. Pulse test: Pulse Width ≤ 300μs, duty cycle ≤ 2%.
4. Defined by design. Not subject to production test.
5. Switching time is essentially independent of operating temperature.

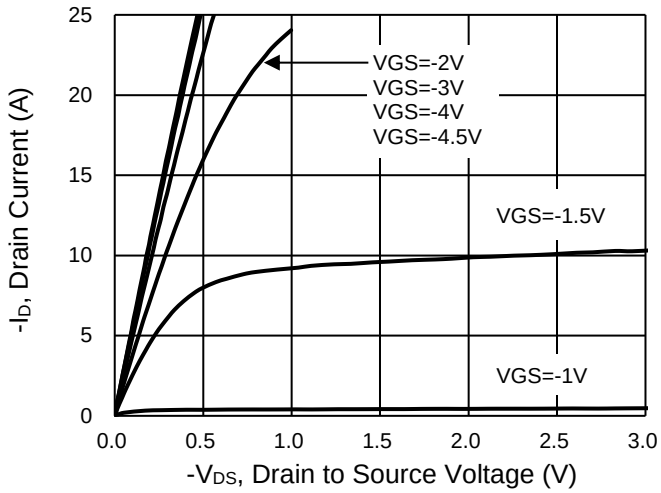
ORDERING INFORMATION

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

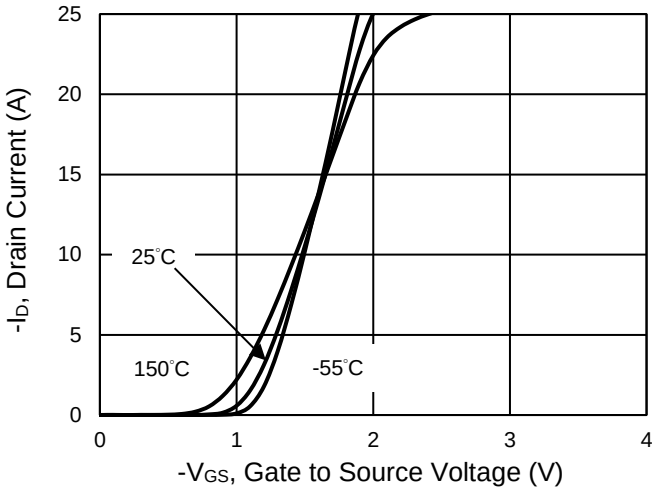
CHARACTERISTICS CURVES (P-Channel)

(T_A = 25°C unless otherwise noted)

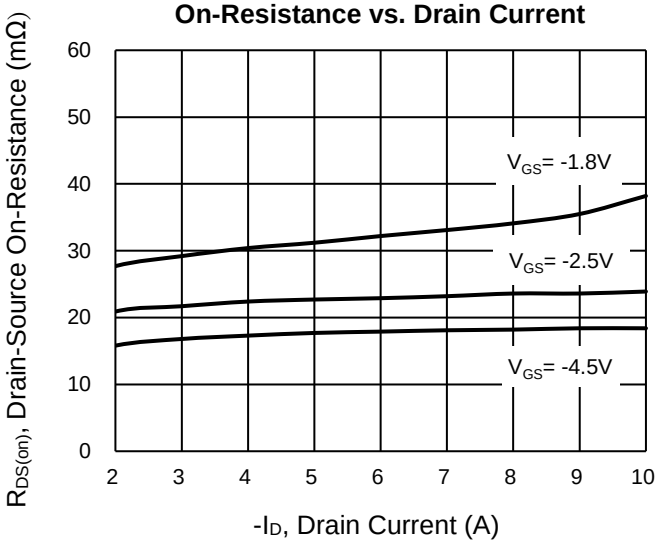
Output Characteristics



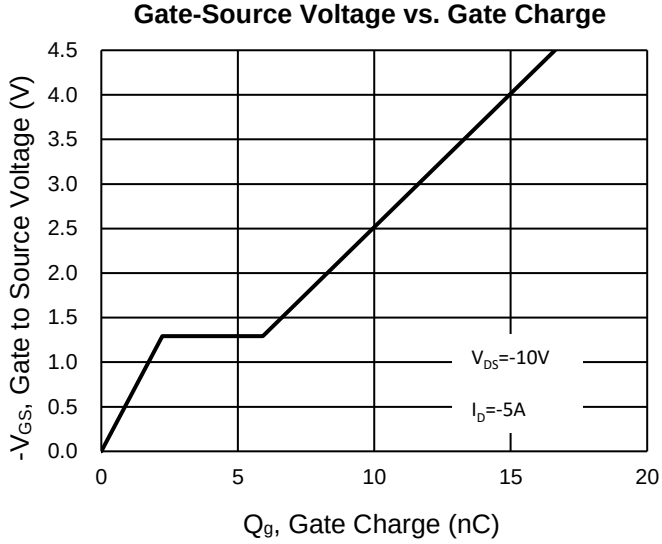
Transfer Characteristics



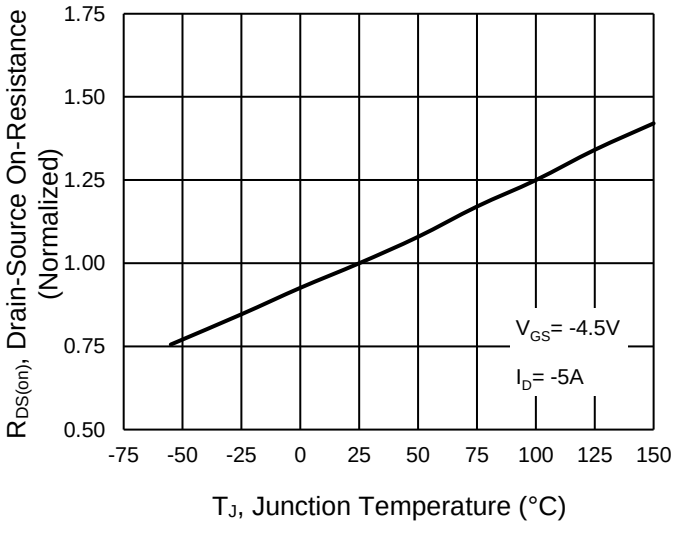
On-Resistance vs. Drain Current



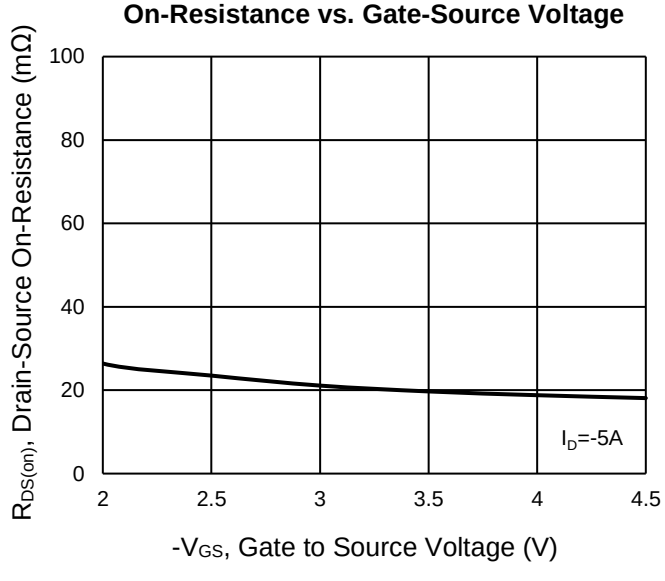
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



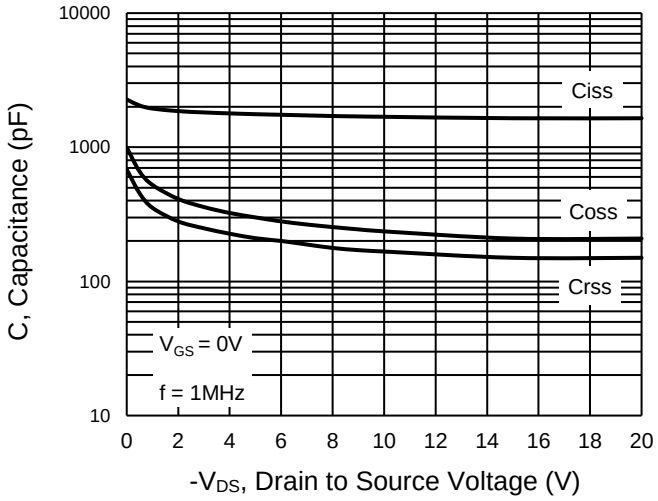
On-Resistance vs. Gate-Source Voltage



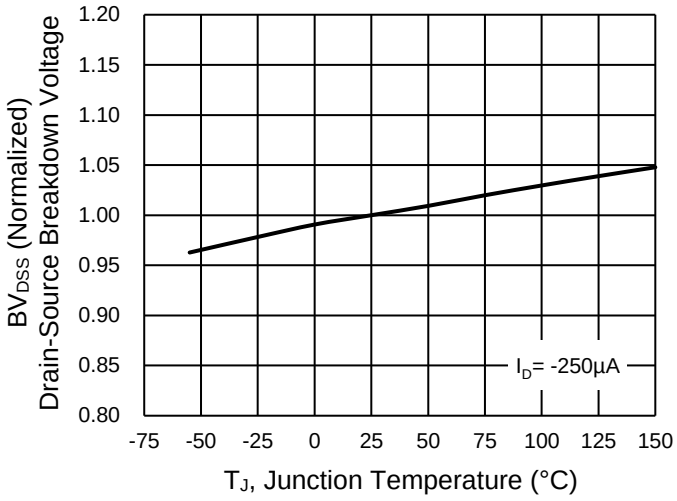
CHARACTERISTICS CURVES (P-Channel)

(T_A = 25°C unless otherwise noted)

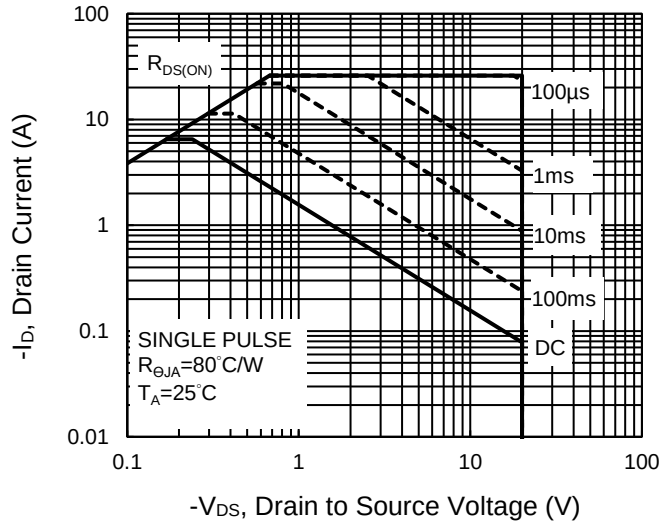
Capacitance vs. Drain-Source Voltage



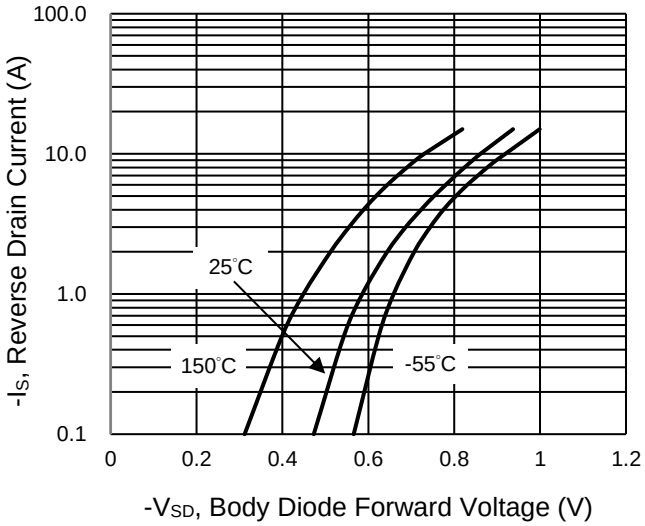
BV_{DSS} vs. Junction Temperature



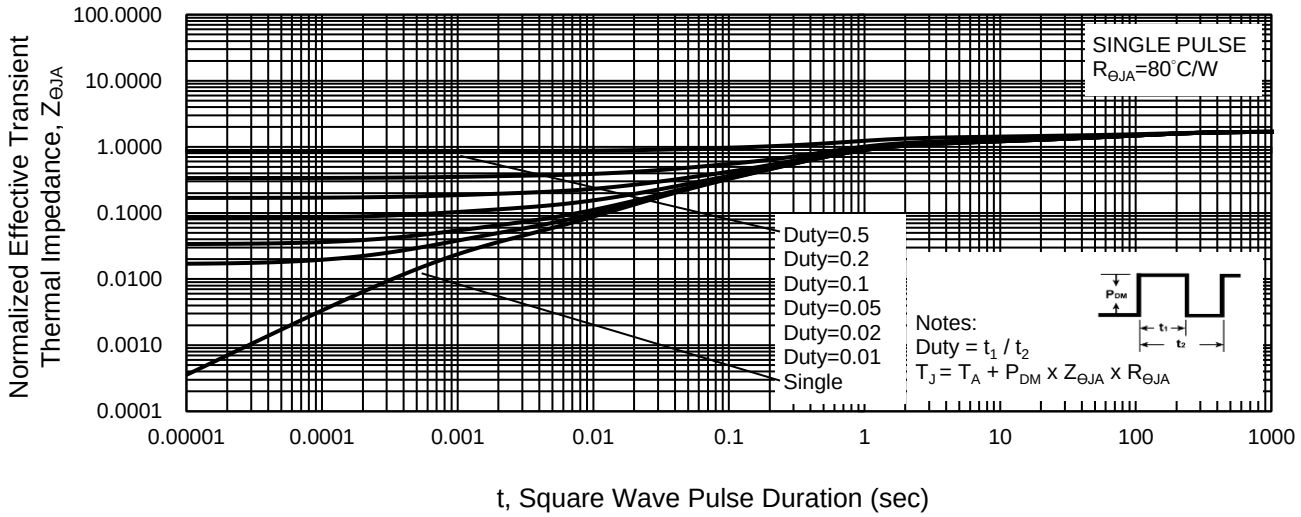
Maximum Safe Operating Area, Junction-to-Case



Source-Drain Diode Forward Current vs. Voltage



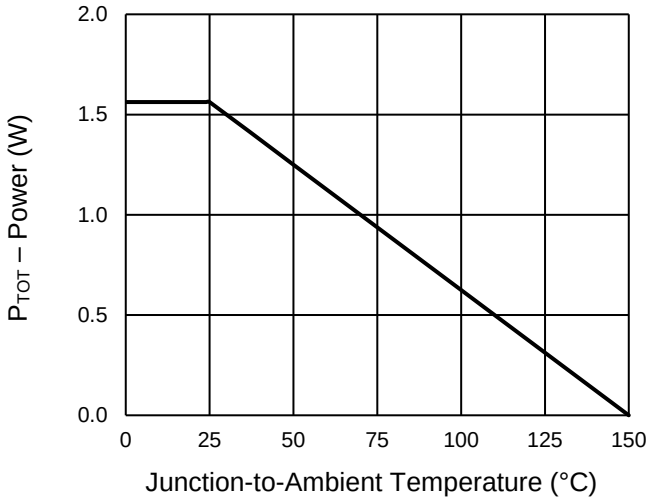
Normalized Thermal Transient Impedance, Junction-to-Ambient



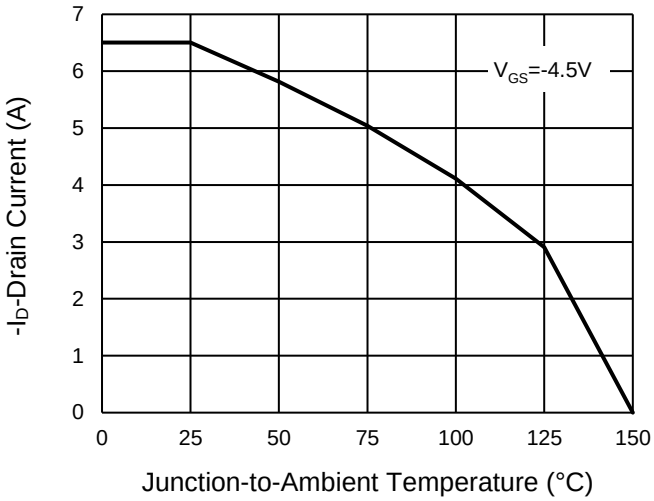
CHARACTERISTICS CURVES (P-Channel)

(T_A = 25°C unless otherwise noted)

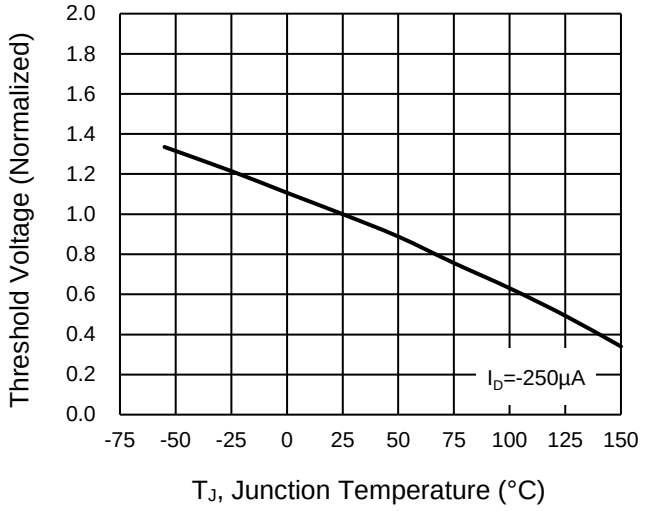
Power Dissipation



Drain Current

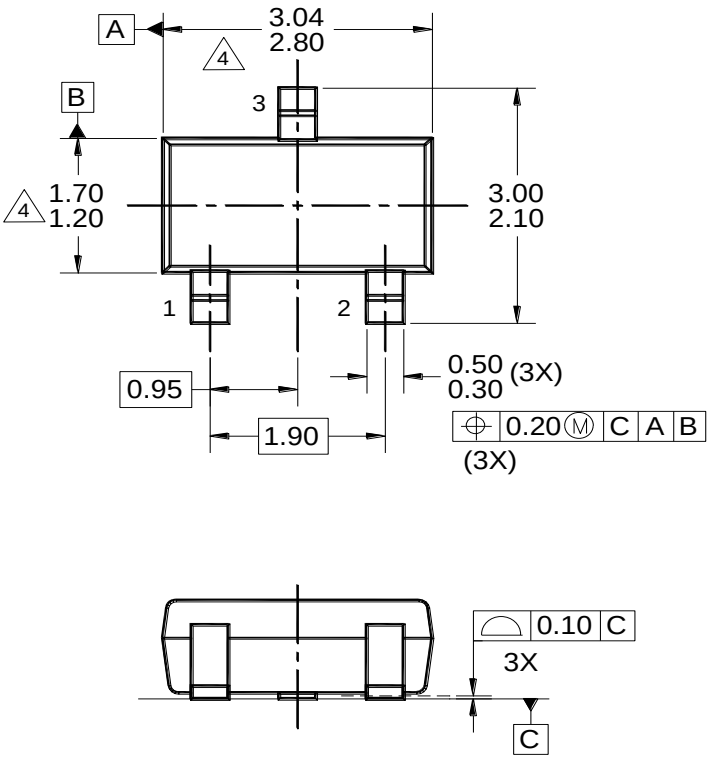


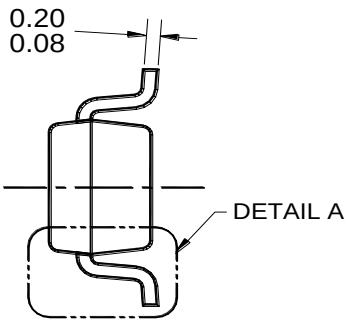
Normalized gate threshold voltage vs Temperature

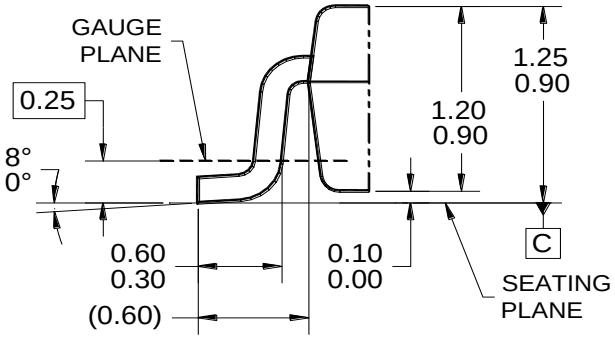


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

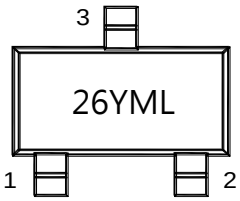
SOT-23



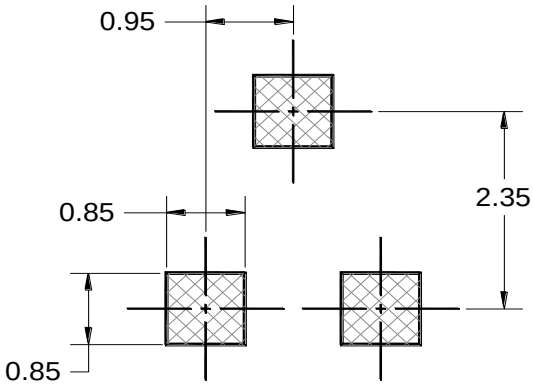




DETAIL A, ROTATED -90°
(SCALE 2:1)



MARKING DIAGRAM



SUGGESTED PAD LAYOUT

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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