

P-Channel 20-V(D-S) MOSFET
FEATURES

TrenchFET Power MOSFET

APPLICATIONS

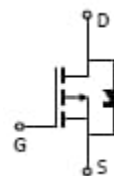
- Load Switch for Portable Devices
- DC/DC Converter
- **Pb-Free package is available**
RoHS product for packing code suffix "G"
Halogen free product for packing code suffix "H"

MECHANICAL DATA

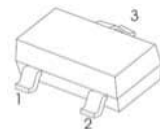
- Case : Molded plastic, SOT-23
- Polarity : Shown above
- Terminals : Plated terminals, solderable per MIL-STD-750, Method 2026
- Epoxy : UL94-V0 rated flame retardant

SCHEMATIC DIAGRAM

SOT-23 PACKAGE


SOT-23

1. GATE
2. SOURCE
3. DRAIN


Maximum ratings ($T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 8	
Continuous Drain Current	I_D	-2.3	A
Pulsed Drain Current	I_{DM}	-10	
Continuous Source-Drain Diode Current	I_S	-0.72	
Maximum Power Dissipation	P_D	0.35	W
Thermal Resistance from Junction to Ambient($t \leq 5s$)	$R_{\theta JA}$	357	$^\circ\text{C/W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 ~ +150	



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Electrical characteristics (T_a=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Static						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-20			V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D = -250μA	-0.4		-1	
Gate-source leakage	I _{GSS}	V _{DS} =0V, V _{GS} =±8V			±100	nA
Zero gate voltage drain current	I _{DSS}	V _{DS} = -20V, V _{GS} =0V			-1	μA
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} = -4.5V, I _D = -2.8A		0.090	0.112	Ω
		V _{GS} = -2.5V, I _D = -2.0A		0.110	0.142	
Forward transconductance ^a	g _{fs}	V _{DS} = -5V, I _D = -2.8A		6.5		S
Dynamic ^b						
Input capacitance	C _{iSS}	V _{DS} = -10V, V _{GS} =0V, f =1MHz		405		pF
Output capacitance	C _{oSS}			75		
Reverse transfer capacitance	C _{rSS}			55		
Total gate charge	Q _g	V _{DS} = -10V, V _{GS} = -4.5V, I _D = -3A		5.5	10	nC
		V _{DS} = -10V, V _{GS} = -2.5V, I _D = -3A		3.3	6	
Gate-source charge	Q _{gs}			0.7		
Gate-drain charge	Q _{gd}			1.3		
Gate resistance	R _g	f =1MHz		6.0		Ω
Turn-on delay time	t _{d(on)}	V _{DD} = -10V, R _L =10Ω, I _D = -1A, V _{GEN} = -4.5V, R _g =1Ω		11	20	ns
Rise time	t _r			35	60	
Turn-off delay time	t _{d(off)}			30	50	
Fall time	t _f			10	20	
Drain-source body diode characteristics						
Continuous source-drain diode current	I _S	T _C =25°C			-1.3	A
Pulse diode forward current ^a	I _{SM}				-10	
Body diode voltage	V _{SD}	I _S = -0.7A		-0.8	-1.2	V

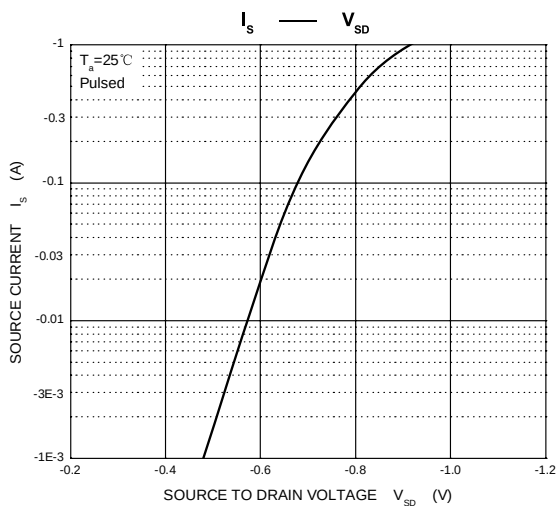
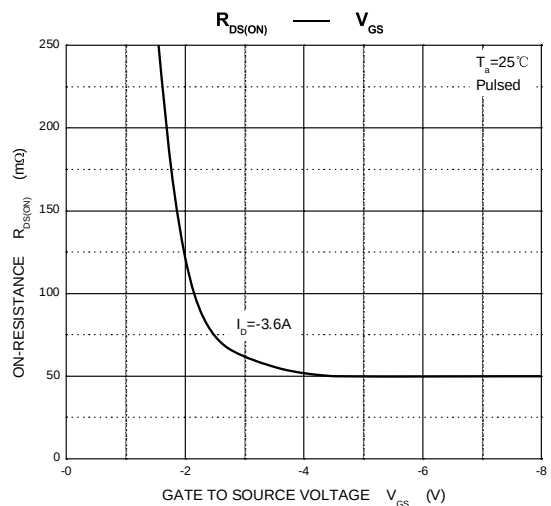
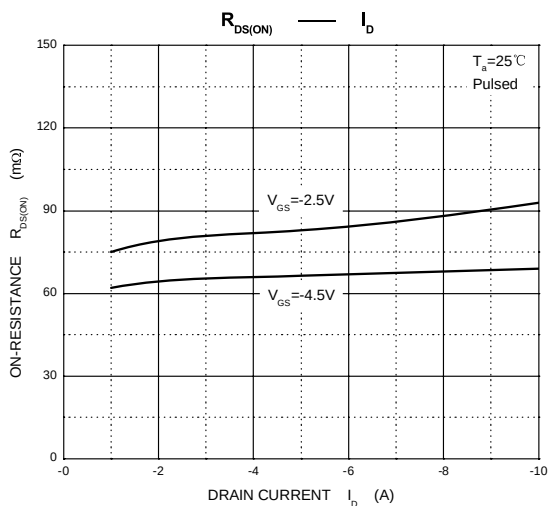
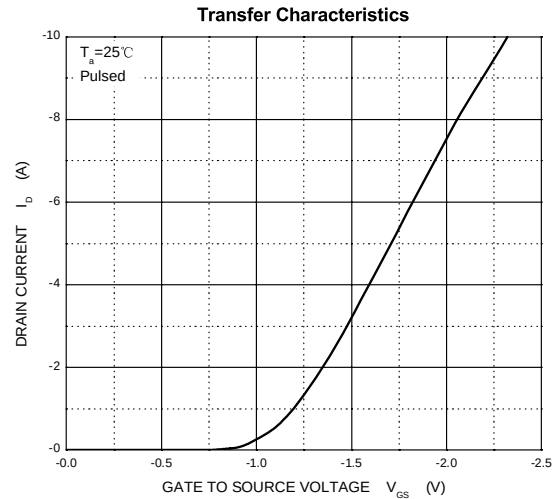
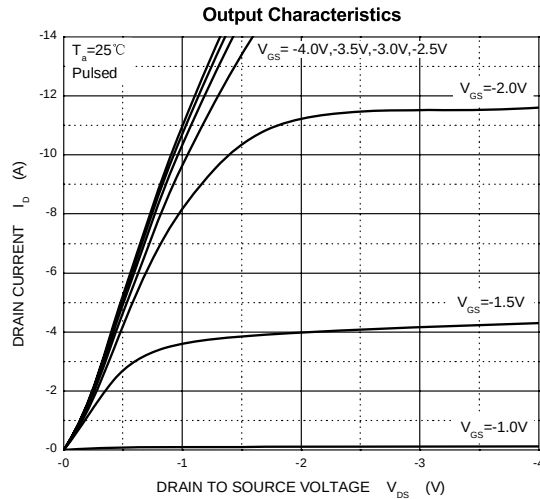
Notes :

a. Pulse Test : Pulse Width < 300μs, Duty Cycle ≤ 2%.

b. Guaranteed by design, not subject to production testing.



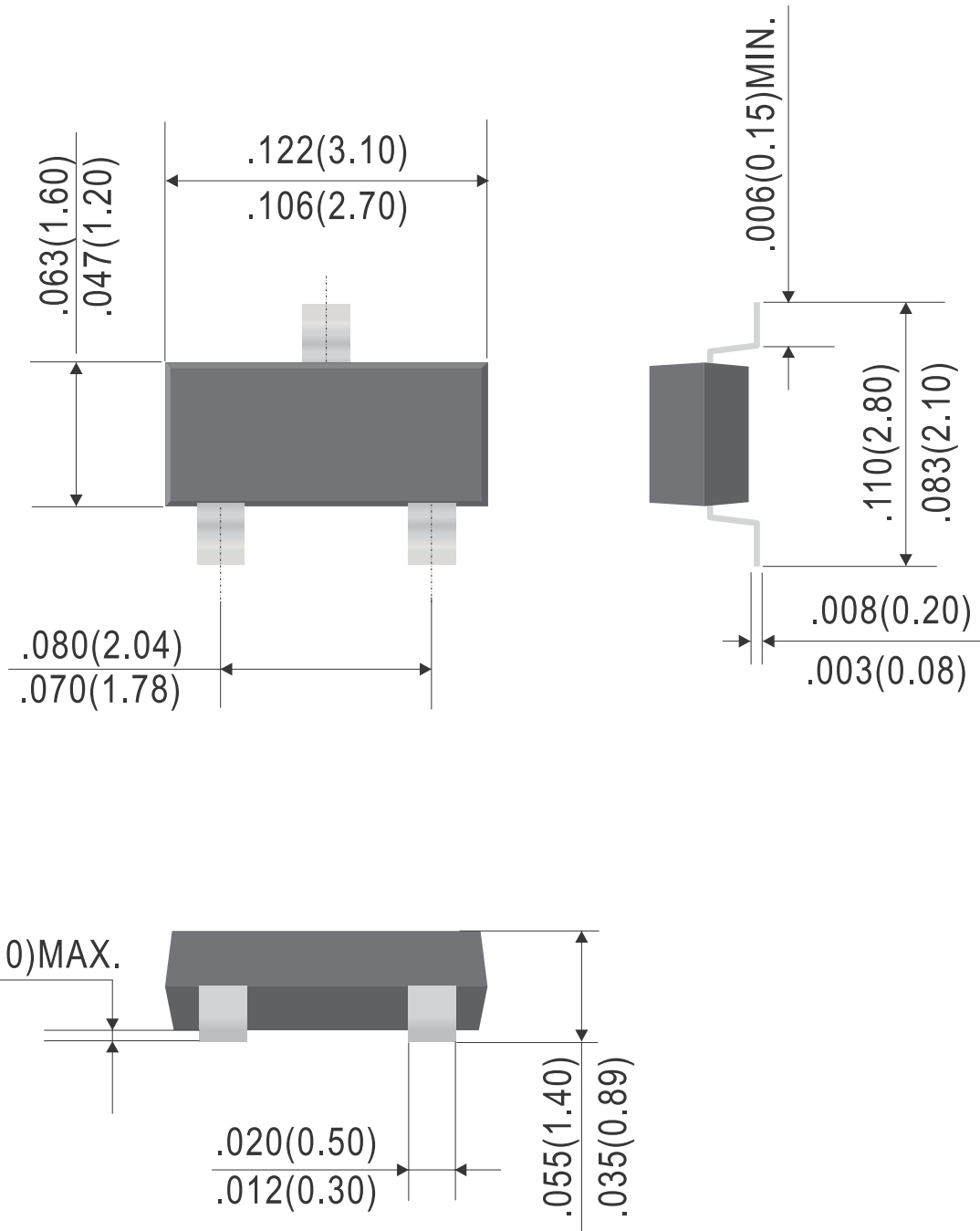
Typical Characteristics





Outline Drawing

SOT-23



Dimensions in inches and (millimeters)

Rev.D

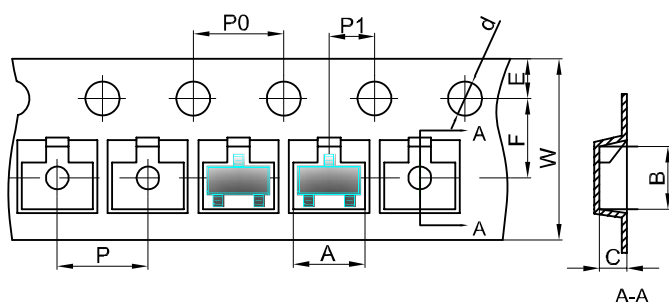


Suggested Soldering Pad Layout	SOT-23
The diagram shows the suggested soldering pad layout for an SOT-23 package. It features three yellow rectangular pads. The top two pads are spaced 0.1063 inches (2.70 mm) apart. The distance from the center of the left pad to the left edge of the package is 0.0435 inches (1.10 mm). The width of each top pad is 0.0435 inches (1.10 mm). The distance from the center of the right pad to the right edge of the package is 0.0355 inches (0.90 mm). The bottom pad is centered between the two top pads, with a distance of 0.0315 inches (0.80 mm) from the center of the right pad to the right edge of the bottom pad. The distance from the center of the bottom pad to the right edge of the package is 0.0374 inches (0.95 mm). The height of the bottom pad is 0.0435 inches (1.10 mm). Dimensions in inches and (millimeters)	
RevB	



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SOT-23 Embossed Carrier Tape



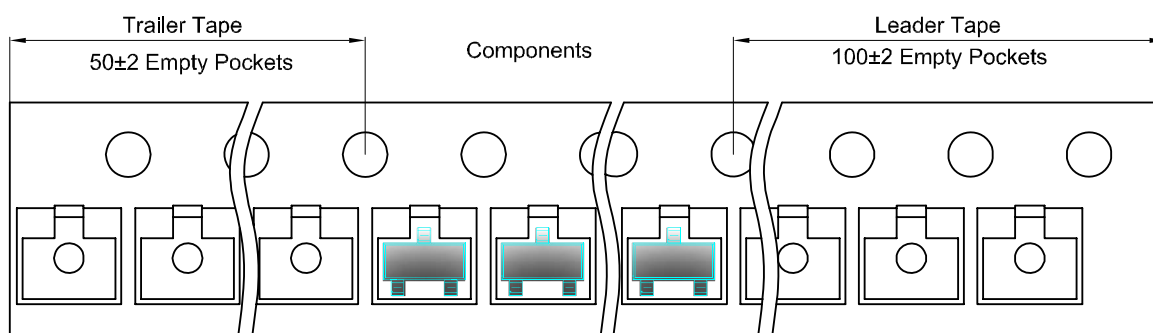
Packaging Description:

SOT-23 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

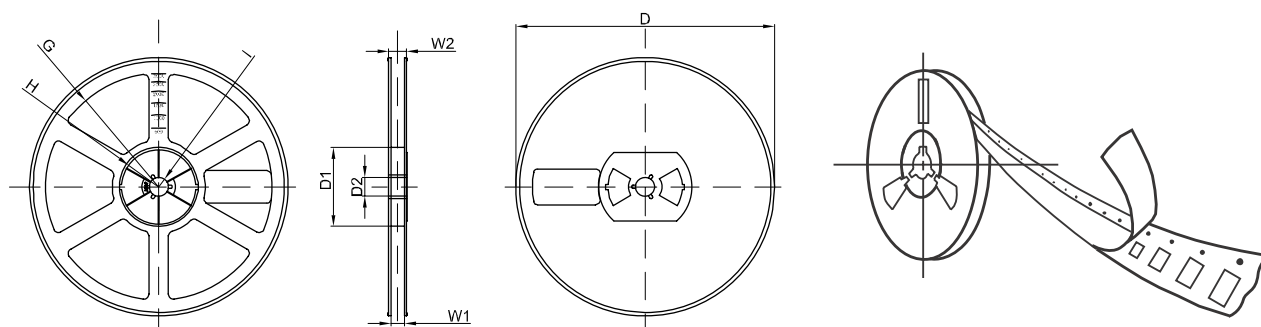
Dimensions are in millimeter

Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

SOT-23 Tape Leader and Trailer



SOT-23 Reel



Dimensions are in millimeter

Reel Option	D	D1	D2	G	H	I	W1	W2
7" Dia	Ø178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50	12.30

Rev.A

Ordering Information:

Device PN	Marking ⁽⁴⁾	Packing
SE2301 - T ⁽¹⁾ H ⁽²⁾ -WS ⁽³⁾	S1/A1sHB/2301/2301A	Tape&Reel: 3 Kpcs/Reel

Note: (1) Packing code, Tape & Reel Packing

(2) Packing code suffix "G" for RoHS product : Packing code Suffix "H" for halogen free product
All materials and products supplied comply with the U.S. Toxic Substances Control Act statement, PBT Chemicals.

(3) Willas brand abbreviation, Label Type does not display.

(4) There may be additional marking, which relates to the lot trace code information (data code and vendor code), the logo or the environmental category on the device.

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