

-20V P-Channel MOSFET
1.Product Summary

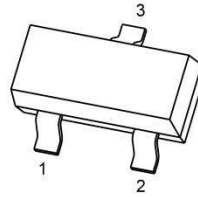
$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
-20V	43mΩ@-4.5V	-3.4A
	55mΩ@-2.5V	

2.Features

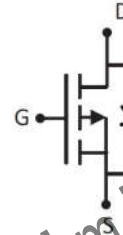
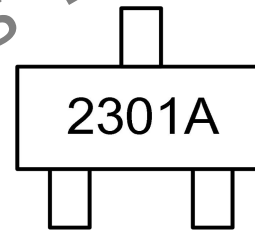
- V_{DS} -20V
- I_D -3.4A
- $R_{DS(ON)}$ (at $V_{GS}=-4.5V$) <55 mohm
- $R_{DS(ON)}$ (at $V_{GS}=-2.5V$) <78 mohm
- TrenchFET Power MOSFET

3.Applications

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch

SOT-23


PIN1:GATE
PIN2:SOURCE
PIN3:DRAIN

Schematic diagram

Marking

4.Absolute Maximum rating ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain - Source Voltage	V_{DS}	-20	V
Gate - Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ^{1,5}	I_D	-3.4	A
Pulsed Drain Current ²	I_{DM}	-14	A
Power Dissipation ^{4,5}	P_D	1.4	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	89	$^\circ\text{C/W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

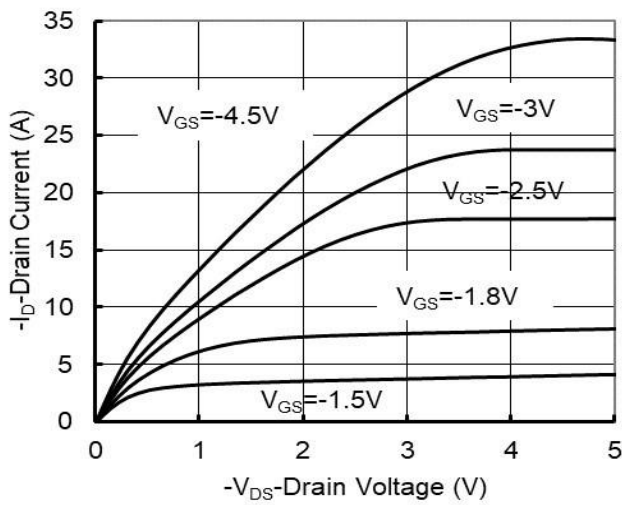
5. Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain - Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}= 0V, I_D= -250\mu A$	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}= -20V, V_{GS}= 0V$			-1	μA
Gate - Body Leakage Current	I_{GSS}	$V_{GS}= \pm 10V, V_{DS}= 0V$			± 100	nA
Gate Threshold Voltage ³	$V_{GS(th)}$	$V_{DS}= V_{GS}, I_D= -250\mu A$	-0.4	-0.7	-1	V
Drain-source On-resistance ³	$R_{DS(on)}$	$V_{GS}= -4.5V, I_D= -3.4A$		43	55	m Ω
		$V_{GS}= -2.5V, I_D= -3.0A$		55	78	
		$V_{GS}= -1.8V, I_D= -2.5A$		70	110	
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}= -10V, V_{GS}= 0V, f= 1MHZ$		438		pF
Output Capacitance	C_{oss}			76		
Reverse Transfer Capacitance	C_{rss}			62		
Switching Characteristics						
Total Gate Charge	Q_g	$V_{GS}= -4.5V, V_{DS}= -10V, I_D= -3.4A$		5.41		nC
Gate-source Charge	Q_{gs}			1.17		
Gate-drain Charge	Q_{gd}			1.24		
Turn-on Delay Time	$t_{d(on)}$	$V_{GS}= -4.5V, V_{DS}= -10V, I_D= -1A, R_{GEN}= 3\Omega$		6.4		ns
Turn-on Rise Time	t_r			21.8		
Turn-off Delay Time	$t_{d(off)}$			37.4		
Turn-off Fall Time	t_f			34		
Source - Drain Diode Characteristics						
Diode Forward Voltage ³	V_{SD}	$V_{GS}= 0V, I_S= -3.4A$			1.2	V

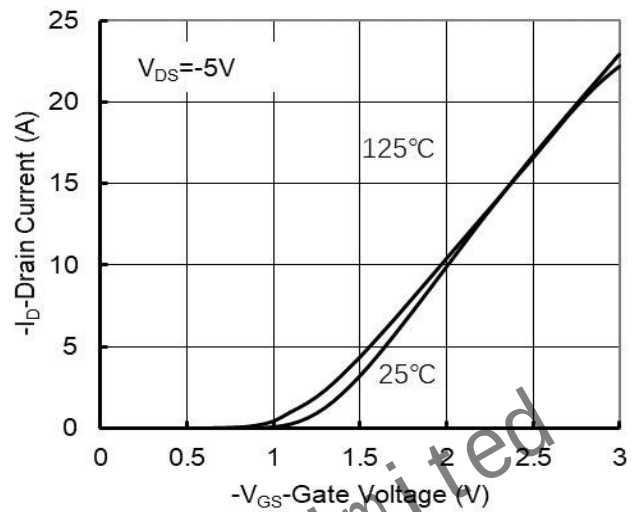
Notes :

1. The maximum current rating is limited by package.
2. Pulse Test : Pulse Width $\leq 10\mu s$, duty cycle $\leq 1\%$.
3. Pulse Test : Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. The power dissipation PD is limited by $T_{J(MAX)} = 150^\circ\text{C}$.
5. Device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$.

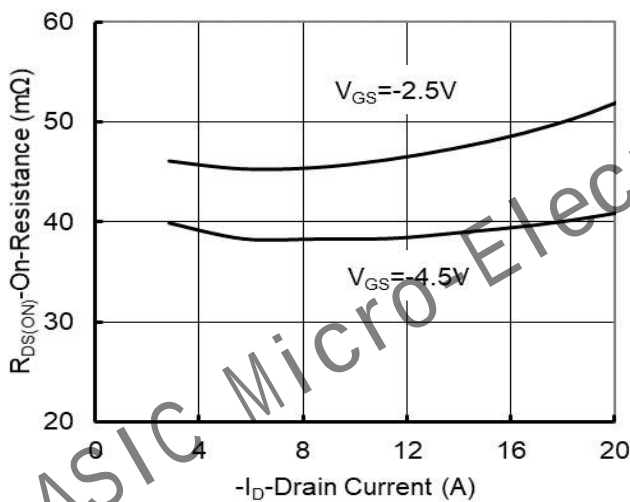
6. Typical Characteristic



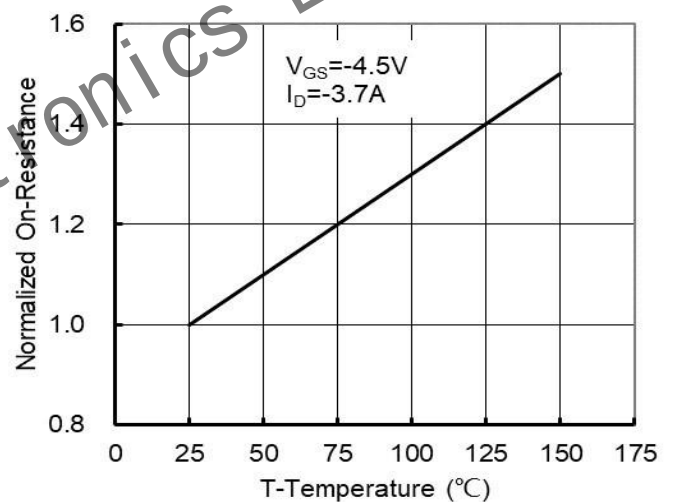
Output Characteristics



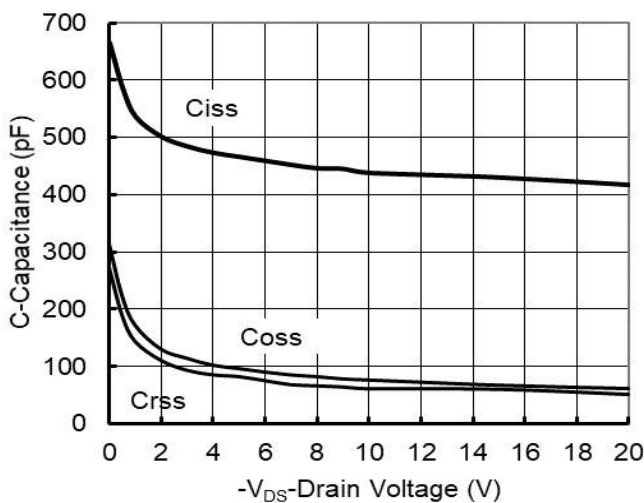
Transfer Characteristics



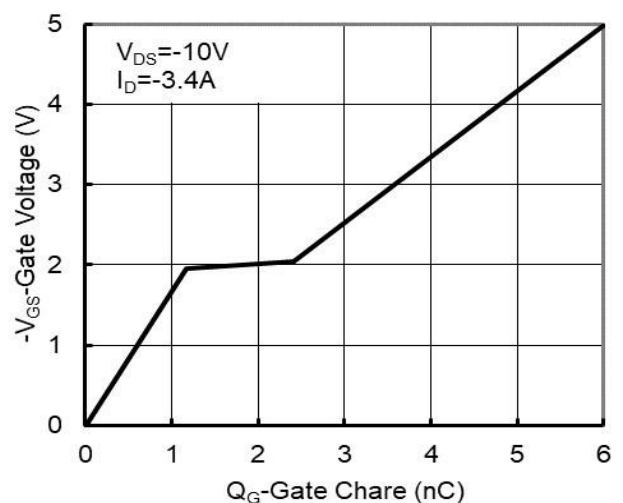
$R_{DS(ON)}$ — I_D



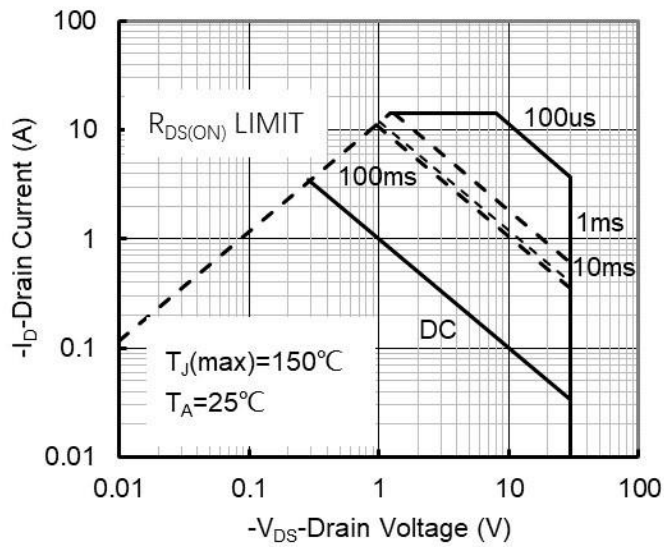
On-Resistance vs. Junction Temperature



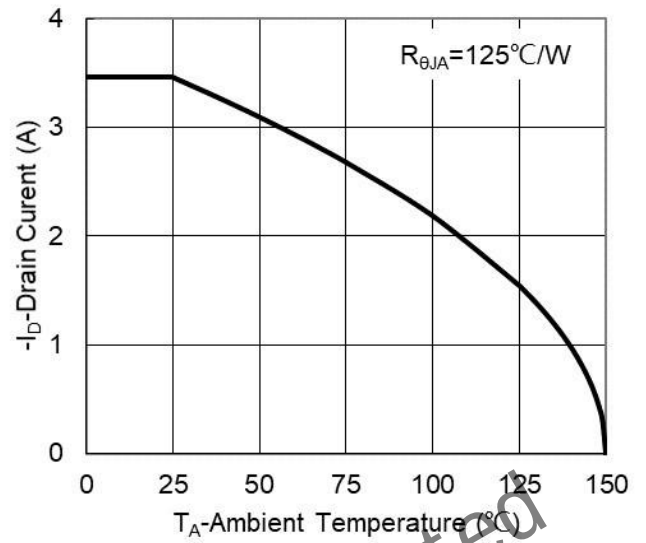
I_S — V_{SD}



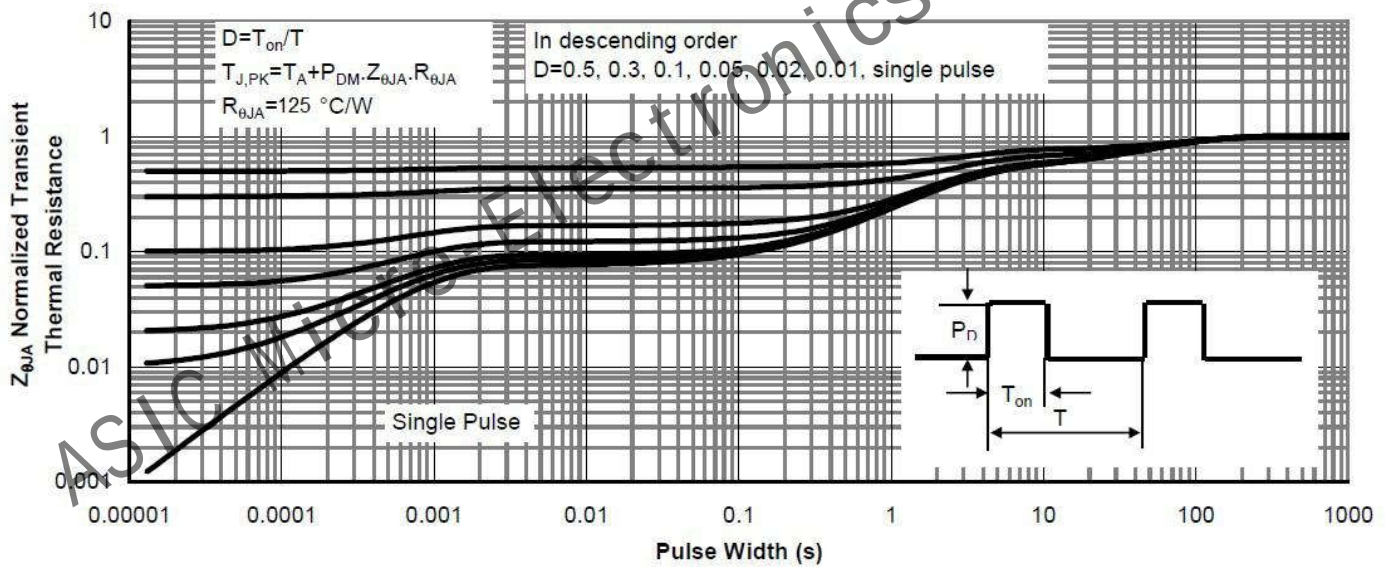
Threshold Voltage



Safe Operation Area

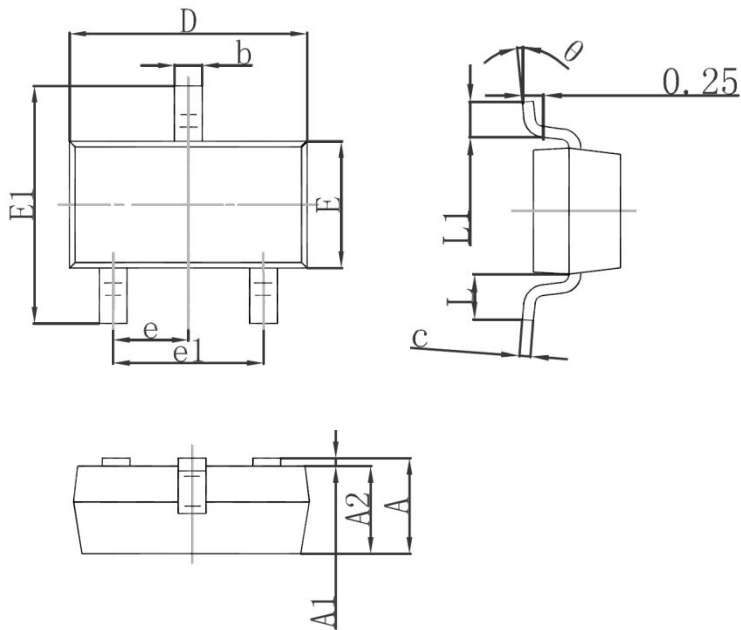


Maximum Continuous Drain Current vs Ambient Temperature



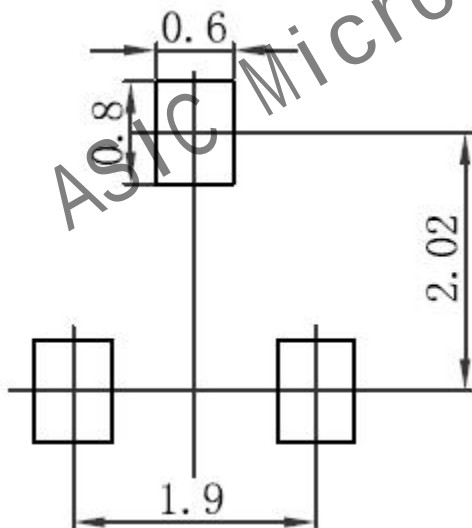
Normalized Maximum Transient Thermal Impedance

7.Dimension



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

8.Recommended Land Pattern

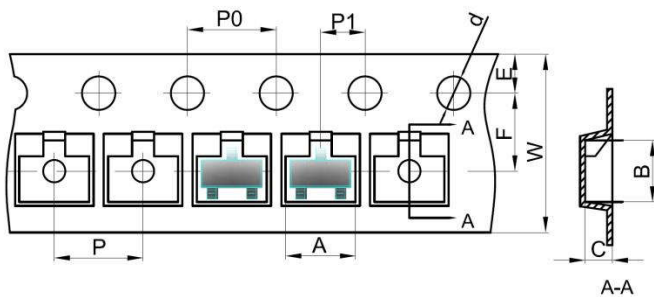


Note:

1. Controlling dimension: in millimeters
2. General tolerance: $\pm 0.05\text{mm}$
3. The pad layout is for reference only
4. Unit: mm

9.Tape and Reel

SOT-23 Embossed Carrier Tape

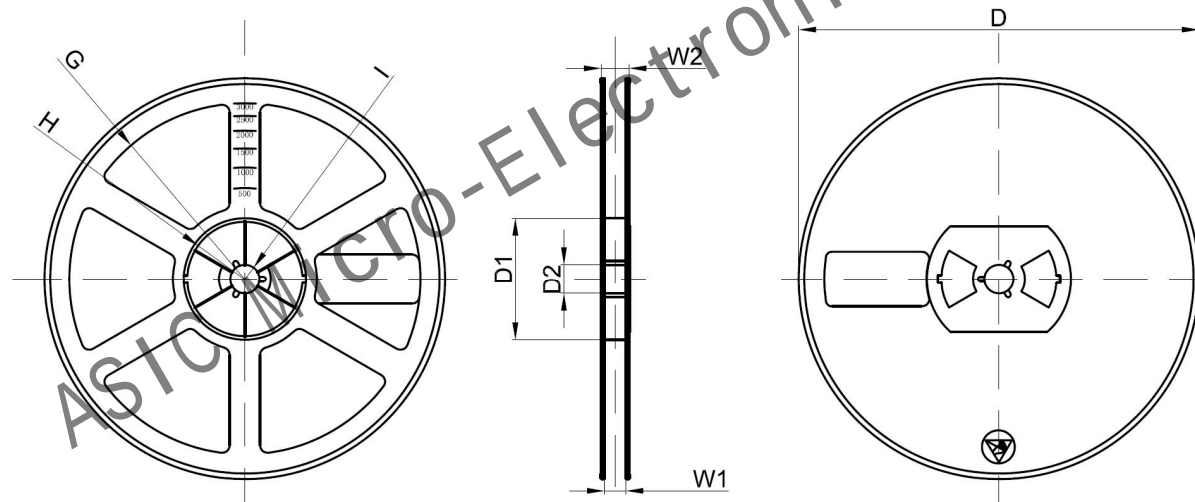


Packaging Description:

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 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

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
3000 pcs	7 inch	45,000 pcs	203×203×195	180,000 pcs	438×438×220	

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