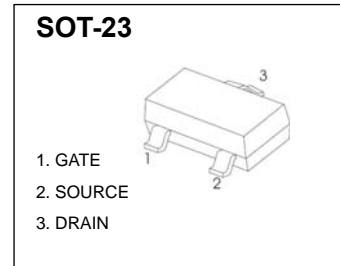


## 2304 N-Channel MOSFET

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
30V	60mΩ@10V	3.3A
	75mΩ@4.5V	



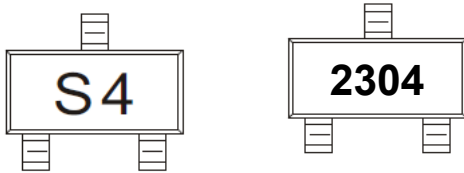
### FEATURE

- TrenchFET Power MOSFET

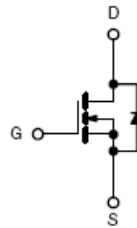
### APPLICATION

- Load Switch for Portable Devices
- DC/DC Converter

### MARKING



### Equivalent Circuit



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	±20	
Continuous Drain Current	$I_D$	3.3	A
Pulsed Drain Current	$I_{DM}$	15	
Continuous Source-Drain Diode Current	$I_S$	0.9	
Maximum Power Dissipation	$P_D$	0.35	W
Thermal Resistance from Junction to Ambient ( $t \leq 5s$ )	$R_{\theta JA}$	357	$^\circ\text{C/W}$
Operation Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 ~ +150	$^\circ\text{C}$

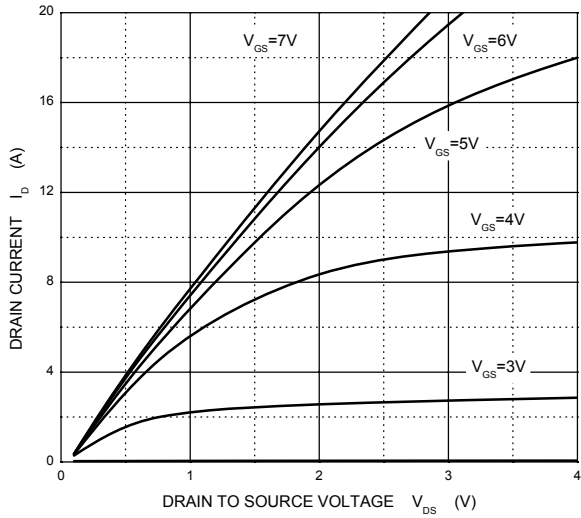
$T_a=25\text{ }^\circ\text{C}$  unless otherwise specified

Parameter	Symbol	Test condition	Min	Typ	Max	Units
<b>Static</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30			V
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.55	2.2	
Gate-body leakage	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 20V$			$\pm 100$	nA
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 30V, V_{GS} = 0V$			1	$\mu A$
Drain-source on-state resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 3.2A$		0.037	0.060	$\Omega$
		$V_{GS} = 4.5V, I_D = 2.8A$		0.057	0.075	
Forward transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 4.5V, I_D = 2.5A$	2.5			S
<b>Dynamic<sup>b</sup></b>						
Total gate charge	$Q_g$	$V_{DS} = 15V, V_{GS} = 10V, I_D = 3.4A$		4.5	6.7	nC
				2.1	3.2	
				0.85		
Gate-source charge	$Q_{gs}$	$V_{DS} = 15V, V_{GS} = 4.5V, I_D = 3.4A$		0.85		nC
Gate-drain charge	$Q_{gd}$			0.65		
Gate resistance	$R_g$	$f = 1.0MHz$	0.8	4.4	8.8	$\Omega$
Input capacitance	$C_{iss}$	$V_{DS} = 15V, V_{GS} = 0V, f = 1MHz$		235		pF
Output capacitance	$C_{oss}$			45		
Reverse transfer capacitance	$C_{rss}$			17		
Turn-on delay Time	$t_{d(on)}$	$V_{DD} = 15V,$ $R_L = 5.6\Omega, I_D \approx 2.7A,$ $V_{GEN} = 4.5V, R_g = 1\Omega$		12	20	ns
Rise time	$t_r$			50	75	
Turn-off delay time	$t_{d(off)}$			12	20	
Fall time	$t_f$			22	35	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 15V,$ $R_L = 5.6\Omega, I_D \approx 2.7A,$ $V_{GEN} = 10V, R_g = 1\Omega$		5	10	
Rise time	$t_r$			12	20	
Turn-off delay time	$t_{d(off)}$			10	15	
Fall time	$t_f$			5	10	
<b>Drain-source body diode characteristics</b>						
Continuous source-drain diode current	$I_S$	$T_C = 25^\circ C$			1.4	A
Pulse diode forward current	$I_{SM}$				15	A
Body diode voltage	$V_{SD}$	$I_S = 2.7A, V_{GS} = 0V$		0.8	1.2	V

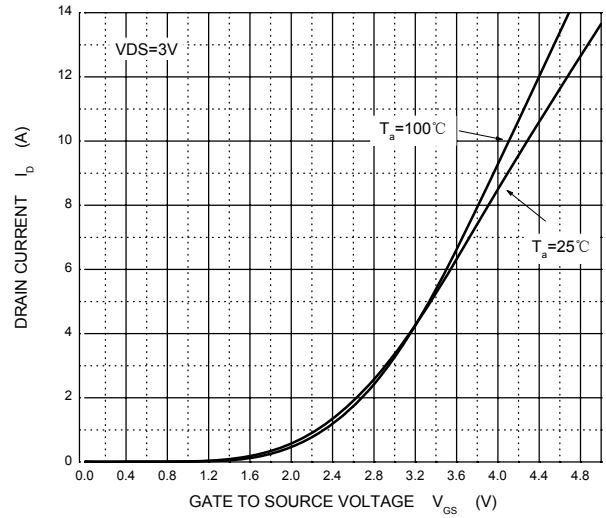
**Notes :**

- a. Pulse Test : Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing.

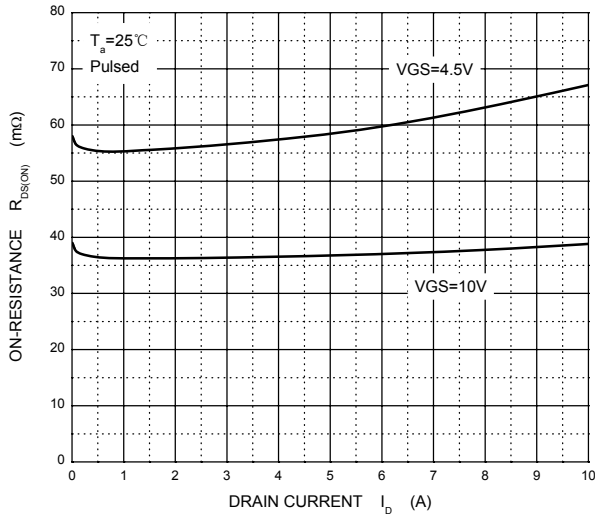
**Output Characteristics**



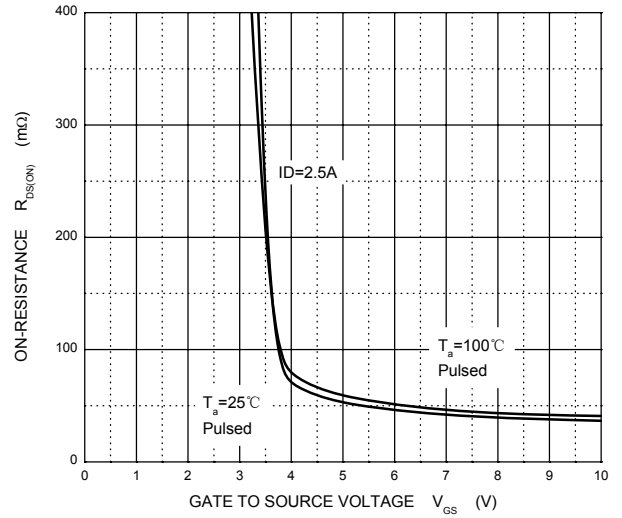
**Transfer Characteristics**



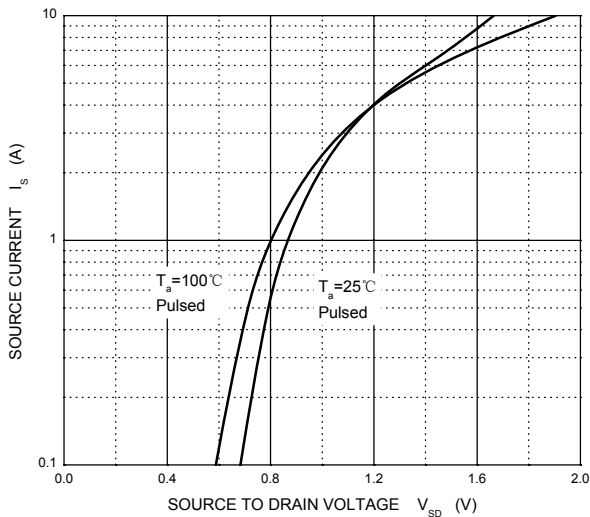
**$R_{DS(ON)}$  —  $I_D$**



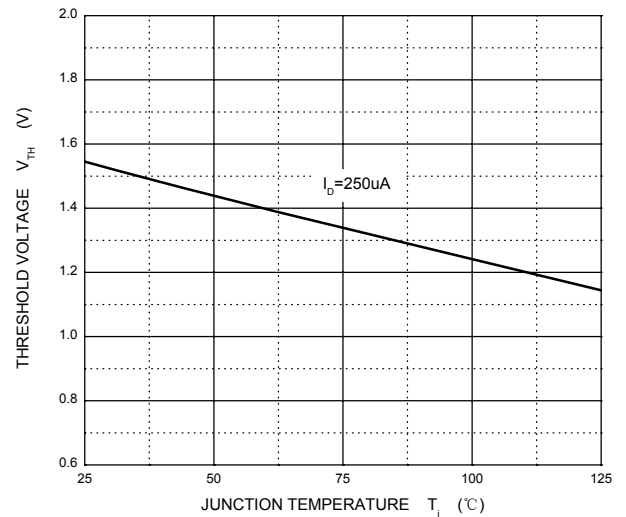
**$R_{DS(ON)}$  —  $V_{GS}$**



**$I_S$  —  $V_{SD}$**



**Threshold Voltage**





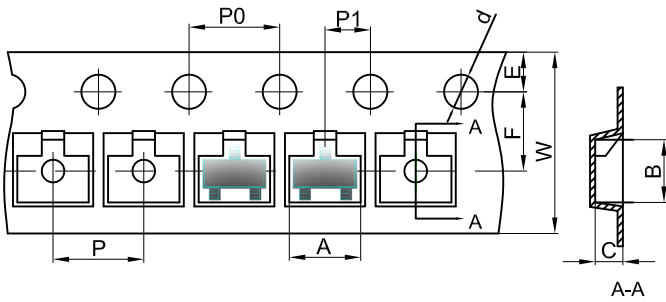
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 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°

## SOT-23 Suggested Pad Layout



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

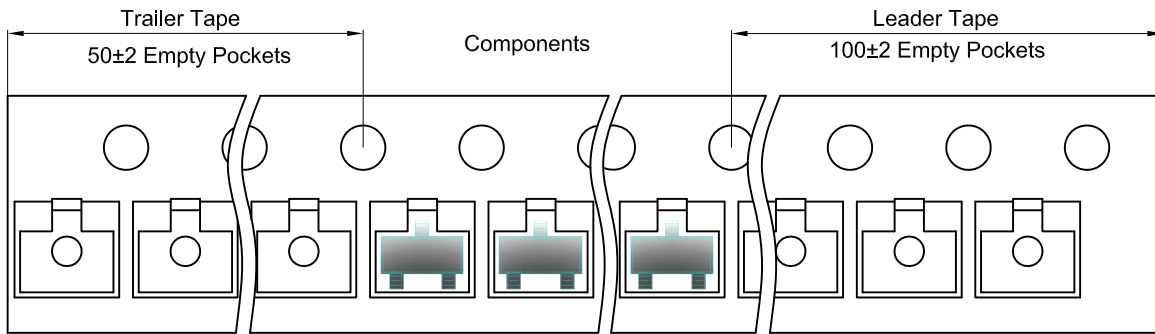
## SOT-23 Embossed Carrier Tape



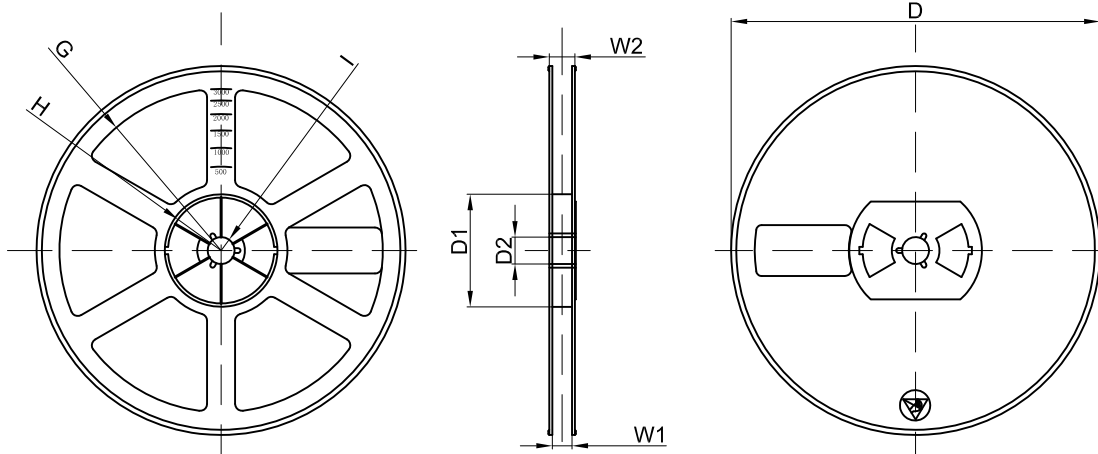
Dimensions are in millimeter

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

REEL	Reel Size	Box
3000 pcs	7 inch	3000 pcs