

### Features

- $V_{DS} = -20V, I_D = -1A$   
 $R_{DS(ON)} < 590m\Omega @ V_{GS} = -4.5V$   
 $R_{DS(ON)} < 900m\Omega @ V_{GS} = -2.5V$
- ESD Protection

### Application

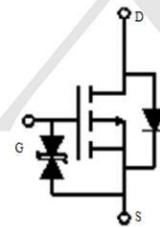
- Load/Power Switching
- Interfacing Switching
- Battery Management for Ultra Small Portable Electronics
- Logic Level Shift

### Package and Pin Configuration



SOT-523

### Circuit diagram



## Making: B

### Absolute Maximum Ratings ( $T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current	$I_D$	-1	A
Pulsed Drain Current ( $t=300\mu s$ ) <sup>(1)</sup>	$I_{DM}$	-1.4	A
Power Dissipation <sup>(2)</sup>	$P_D$	280	mW
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	452	$^\circ C/W$
Junction Temperature	$T_J$	150	$^\circ C$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ C$



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

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
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	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 12V, V_{DS} = 0V$			$\pm 10$	$\mu A$
Gate threshold voltage <sup>(3)</sup>	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.5	-0.75	-1.1	V
Drain-source on-resistance <sup>(3)</sup>	$R_{DS(on)}$	$V_{GS} = -4.5V, I_{DS} = -550mA$			590	m $\Omega$
		$V_{GS} = -2.5V, I_{DS} = -450mA$			900	
Forward transconductance	$g_{FS}$	$V_{DS} = -5V, I_D = 500mA$		1		S
<b>Dynamic characteristics<sup>(4)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V, V_{DS} = -10V, \text{Freq.} = 1MHz$			60	pF
Output Capacitance	$C_{oss}$				6	
Reverse Transfer Capacitance	$C_{rss}$				5	
<b>Switching Characteristics<sup>(4)</sup></b>						
Turn-on delay time	$t_{d(on)}$	$V_{GS} = -4.5V, V_{DS} = -10V, I_D = -1A, R_{GEN} = 3\Omega$		0.45		us
Turn-on rise time	$t_r$			0.04		
Turn-off delay time	$t_{d(off)}$			0.035		
Turn-off fall time	$t_f$			1.1		
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(3)</sup>	$V_{DS}$	$I_S = 0.15A, V_{GS} = 0V$			-1.2	V



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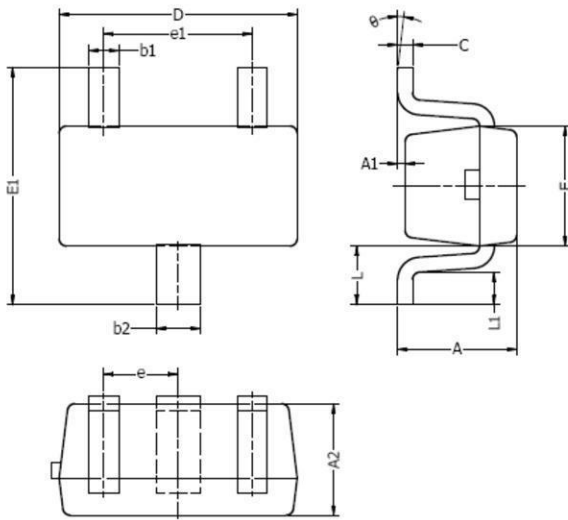
台丹电子

TPM1013ER3-1

P-Channel Enhancement Mode MOSFET

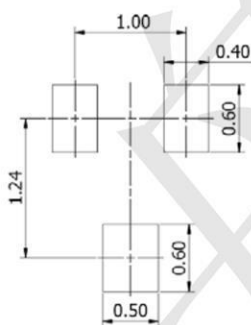
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SOT523 Package Outline Drawing



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.70	0.90	0.028	0.035
A1	0.00	0.10	0.000	0.004
A2	0.70	0.80	0.028	0.031
b1	0.15	0.25	0.006	0.010
b2	0.25	0.35	0.010	0.014
c	0.10	0.20	0.004	0.008
D	1.50	1.70	0.059	0.067
E	0.70	0.90	0.028	0.035
E1	1.45	1.75	0.057	0.069
e	0.50 TYP.		0.020 TYP.	
e1	0.90	1.10	0.035	0.043
L	0.40 REF.		0.016 REF.	
L1	0.10	0.30	0.004	0.012
$\theta$	0°	8°	0°	8°

Suggested Land Pattern



NOTES:

1. Above package outline conforms to JEITA EAIJ ED-7500A SC-75A.
2. Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.