

SuperMOS – SOT-23 -30V BV_{DSS} , 42m Ω $R_{DS(on)}$, P-channel MOSFET

1. Description

The ESPM3401-3/TR is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product ESPM3401-3/TR is Pb-free.

2. Features

- 30V, $R_{DS(on)}$ =42m Ω (TYP.) @ V_{GS} =-10V
 $R_{DS(on)}$ =49m Ω (TYP.) @ V_{GS} =-4.5V
 $R_{DS(on)}$ =72m Ω (TYP.) @ V_{GS} =-2.5V
- Fast Switching
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

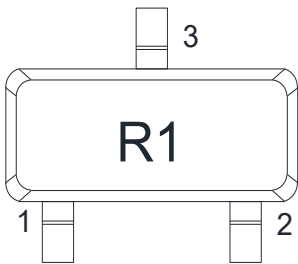
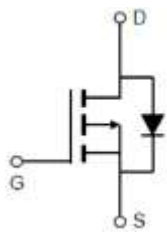
3. Applications

- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
ESPM3401-3/TR	SOT-23	R1	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	7 inches

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
1	Gate		
2	Source		
3	Drain		

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		BV_{DSS}	-30	V
Gate-Source Voltage		V_{GS}	± 12	V
Continuous Drain Current	$T_A=25^{\circ}\text{C}$	I_D	-3.9	A
	$T_A=100^{\circ}\text{C}$		-2.4	
Maximum Power Dissipation	$T_A=25^{\circ}\text{C}$	P_D	1.5	W
Pulsed Drain Current ^a		I_{DM}	-15.6	A
Junction-to-Ambient Thermal Resistance ^b		$R_{\theta JA}$	83	$^{\circ}\text{C/W}$
Operating Junction Temperature		T_J	-55 to +150	$^{\circ}\text{C}$
Storage Temperature Range		T_{stg}	-55 to +150	$^{\circ}\text{C}$

Note:

a: Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

b: $R_{\theta JA}$ is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB.

c: Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.

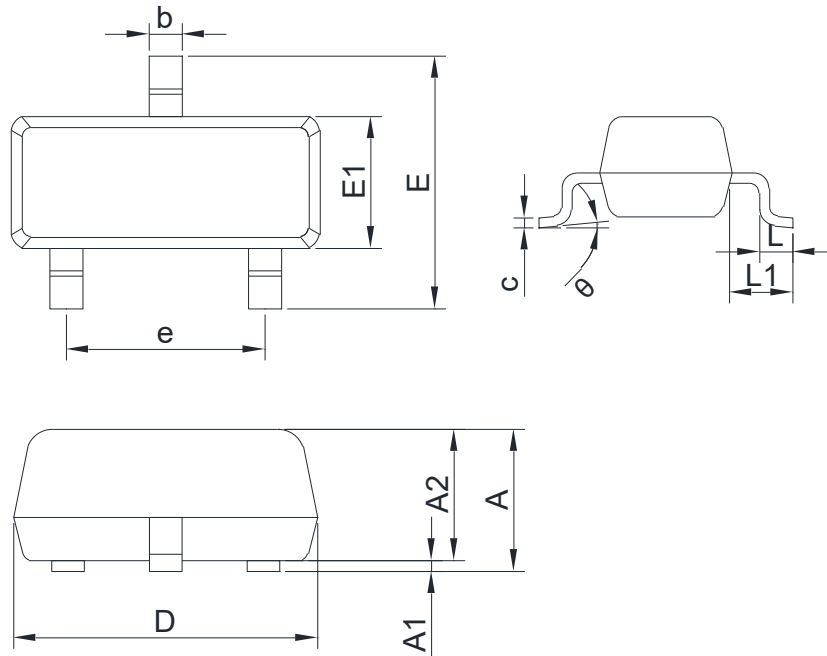
Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250uA	-30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-30V, V _{GS} =0V			-1	uA
Gate-to-source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±12V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =-250uA	-0.5	-0.9	-1.1	V
Drain-to-source On-resistance °	R _{DS(on)}	V _{GS} =-10V, I _D =-3.9A		42	58	mΩ
		V _{GS} =-4.5V, I _D =-3.5A		49	65	
		V _{GS} =-2.5V, I _D =-2.5A		72	90	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =-15V f=1MHz		510		pF
Output Capacitance	C _{OSS}			54		
Reverse Transfer Capacitance	C _{RSS}			47		
Total Gate Charge	Q _{G(TOT)}	V _{GS} =0 to -4.5V V _{DS} =-15V, I _D =-3A		6		nC
Gate-to-Source Charge	Q _{GS}			1.4		
Gate-to-Drain Charge	Q _{GD}			2		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =-4.5V, V _{DS} =-15V I _D =-3A, R _G =3Ω		10		ns
Rise Time	t _r			80		
Turn-Off Delay Time	t _{d(OFF)}			120		
Fall Time	t _f			350		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _S =-2A			-1.2	V

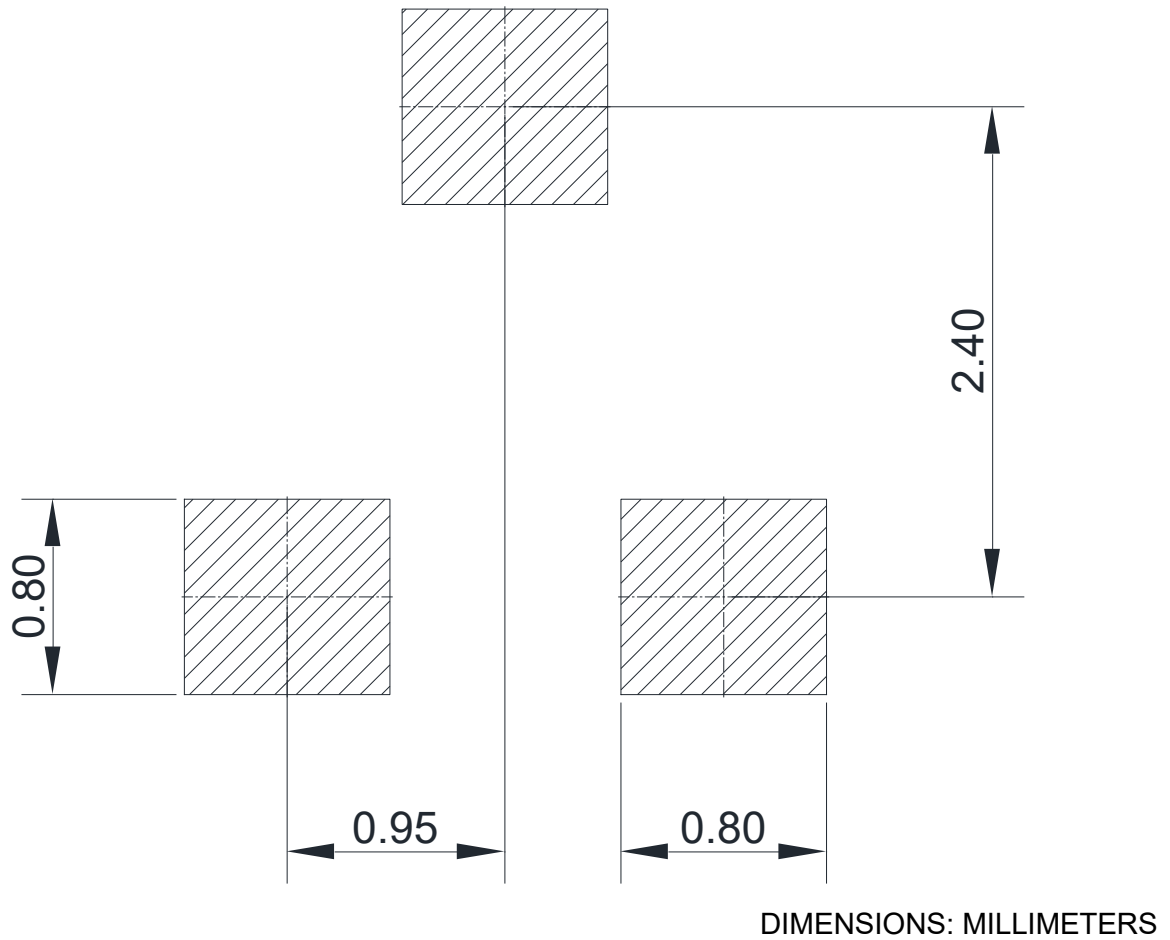
7. Dimension (SOT-23)

POD(Z)



COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER					
SYMBOL	MIN	MAX	SYMBOL	MIN	MAX
A	0.90	1.20	E	2.25	2.55
A1	0.00	0.10	E1	1.20	1.40
A2	0.90	1.10	e	1.80	2.00
b	0.30	0.50	L	0.30	0.50
c	0.07	0.18	L1	0.475	0.625
D	2.80	3.04	θ	0°	8°

8. Recommended Soldering Footprint



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