

FMJP3139E-H

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-0.66A -20V P-Channel General Small Signal MOSFET ESD Protection

Features

- $V_{DS} = -20V$, $I_D = -0.66A$.
- $R_{DS(ON)} \leq 510m\Omega$, @ $V_{GS} = -4.5V$, $I_D = -0.5A$.
- $R_{DS(ON)} \leq 775m\Omega$, @ $V_{GS} = -2.5V$, $I_D = -0.5A$.
- Low Threshold Voltage.
- Fast Switching Speed.
- ESD protected: 2.0KV.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21).

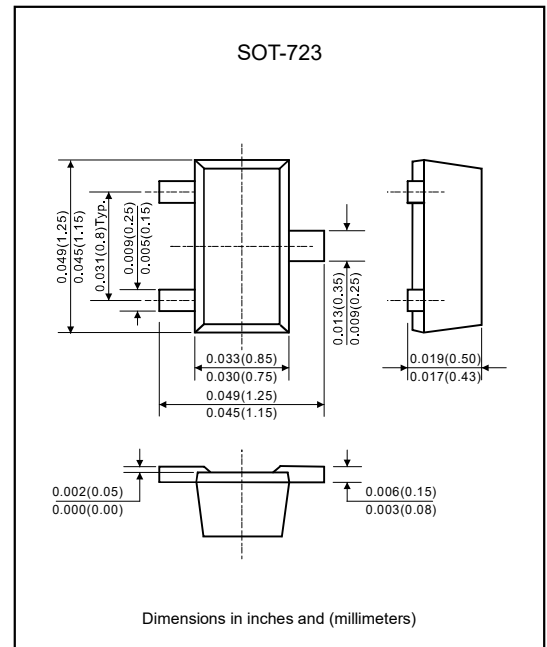
Applications

- Load Switch for Portable Devices.
- Voltage controlled small signal switch.

Mechanical data

- Epoxy : UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-723.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Weight : Approximated 1.5mg.

Package outline



Maximum ratings (At $T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain-source voltage	$-V_{DS}$	20	V
Gate-source voltage	V_{GS}	± 12	V
Continuous drain current	$-I_D$	0.66	A
Pulsed drain current (Note1)	$-I_{DM}$	1.2	A
Total power dissipation (Note2)	P_D	0.15	W
Thermal resistance, junction to ambient (Note2)	$R_{\theta JA}$	833	$^\circ C/W$
Junction temperature	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$

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

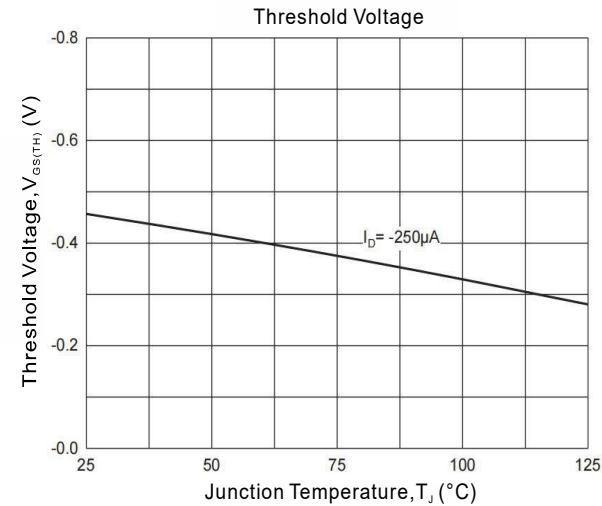
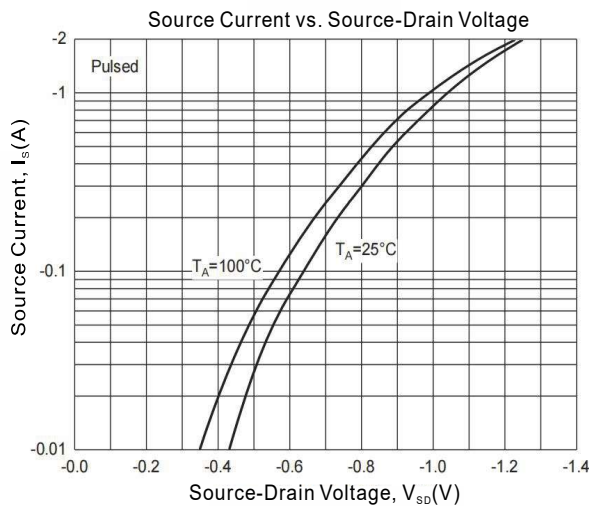
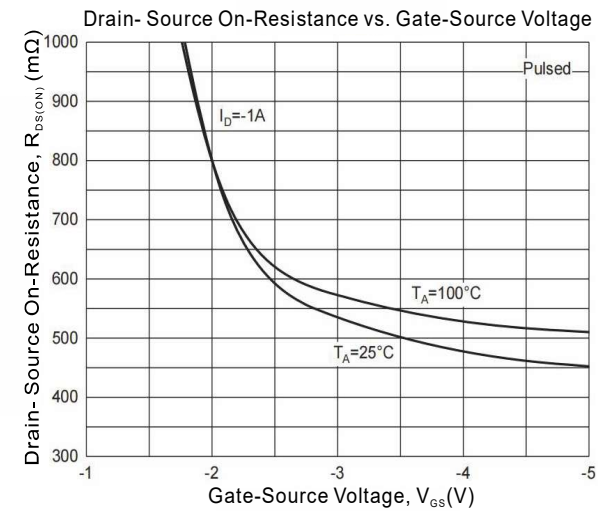
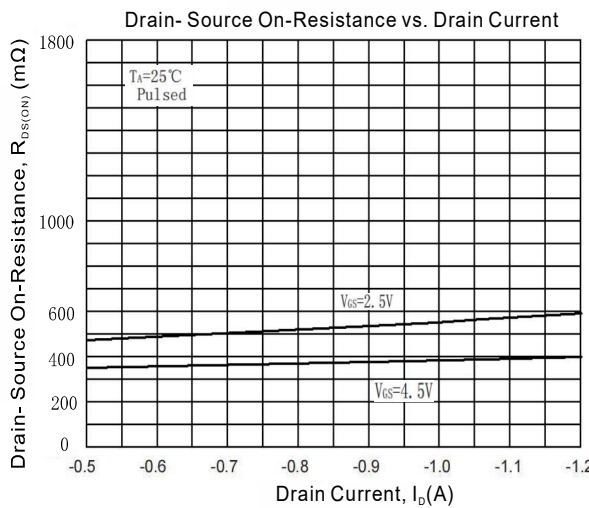
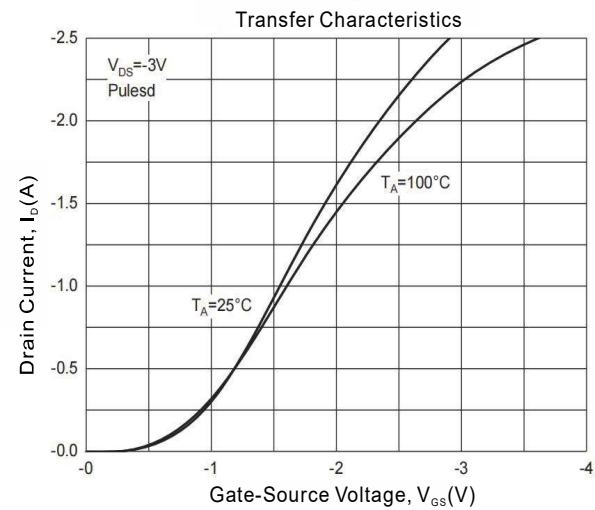
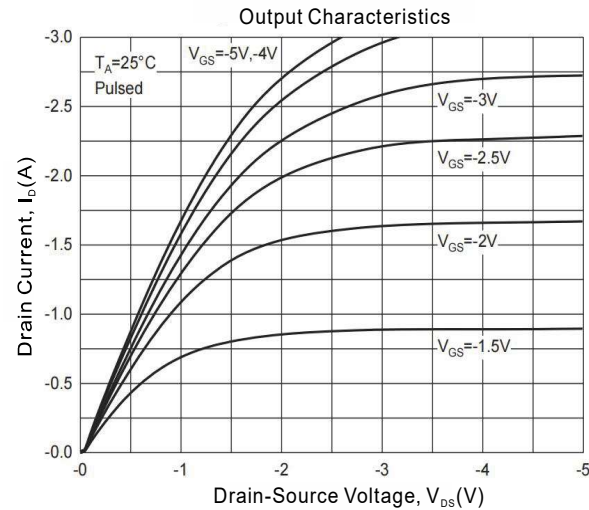
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	$-BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	20			V
Drain-source leakage current	$-I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$			1	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$			± 10	μA
On characteristics						
Gate threshold voltage	$-V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.35		0.8	V
Static drain-source on-resistance	$R_{DS(ON)}$	$-V_{GS}=4.5V, -I_D=0.50A$		350	510	m Ω
		$-V_{GS}=2.5V, -I_D=0.50A$		480	775	
Forward trans conductance	g_{FS}	$-V_{DS}=10V, -I_D=0.54A$		1.2		mS
Dynamic parameters						
Input capacitance	C_{iss}	$-V_{DS}=16V, V_{GS}=0V, f=1.0MHz$		113		pF
Out capacitance	C_{oss}			15		
Reverse transfer capacitance	C_{rss}			9		
Total gate charge	Q_g	$-V_{DS}=10V, -V_{GS}=4.5V, I_D=0.9A$		1.24		nC
Gate-source charge	Q_{gs}			0.37		
Gate-drain charge	Q_{gd}			0.27		
Switching parameters						
Turn-on delay time	$t_{d(on)}$	$-V_{DS}=10V, -V_{GS}=4.5V, R_G=10\Omega, -I_D=200mA$		9.0		ns
Rise time	t_r			5.8		
Turn-off delay time	$t_{d(off)}$			32.7		
Fall time	t_f			20.3		
Source-drain diode ratings and characteristics						
Source-Drain forward voltage drop	$-V_{SD}$	$-I_S=0.5A, V_{GS}=0V$			1.2	V
Body diode Reverse recovery time	t_{rr}	$-I_F=1.25A, dI_F/dt=100A/\mu s$		10.2		ns
Body diode Reverse recovery charge	Q_{rr}			3.5		nC

Note:1.Pulse width $\leq 100\mu\text{s}$, duty cycle $\leq 1\%$, limited by T_{jmax} .

2.Device mounted on FR-4 substrate PC board, 2ozcopper, with 1-inch square copper plate in still air.

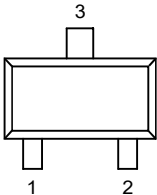
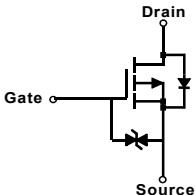
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Rating and characteristic curves



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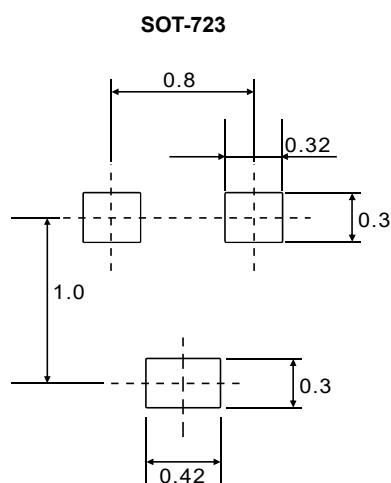
Pinning information

Pin	Simplified outline	Symbol
Pin 1 Gate Pin 2 Source Pin 3 Drain		

Marking

Type number	Marking code
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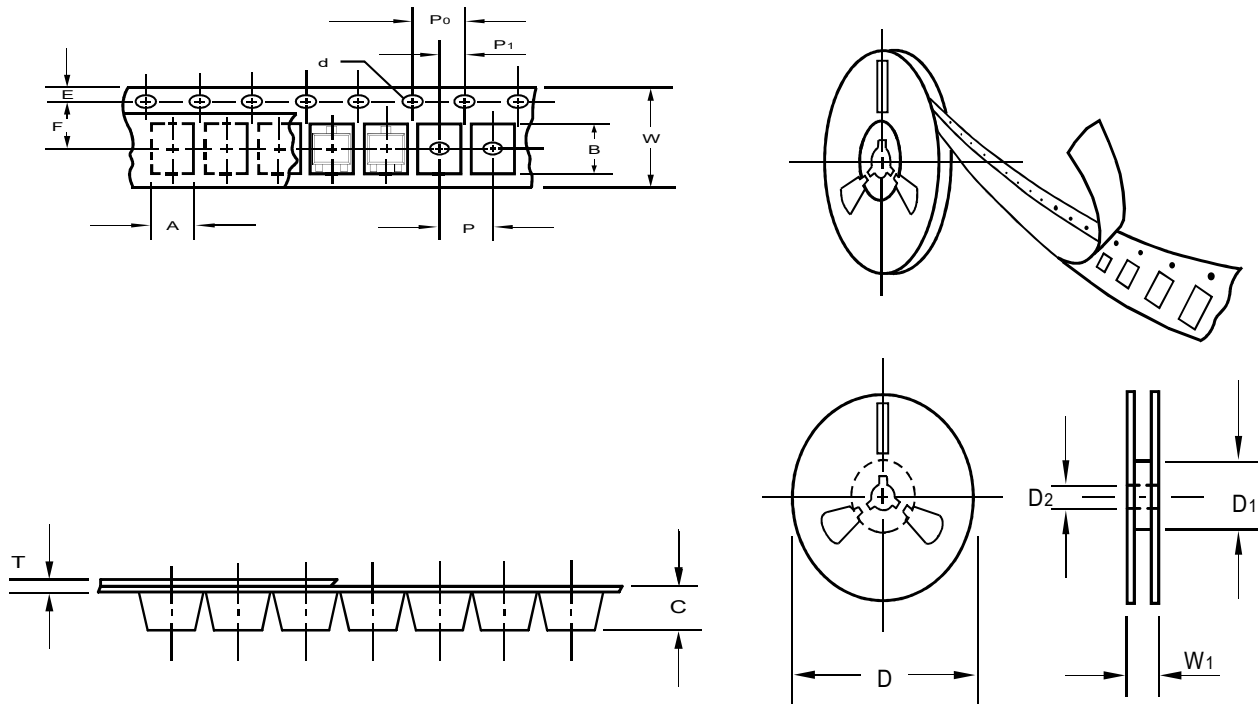
Suggested solder pad layout



DIMENSIONS: MILLIMETERS

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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-723
Carrier width	A	0.1	1.33
Carrier length	B	0.1	1.45
Carrier depth	C	0.1	0.61
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	54.40
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	2.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W1	1.0	9.50

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

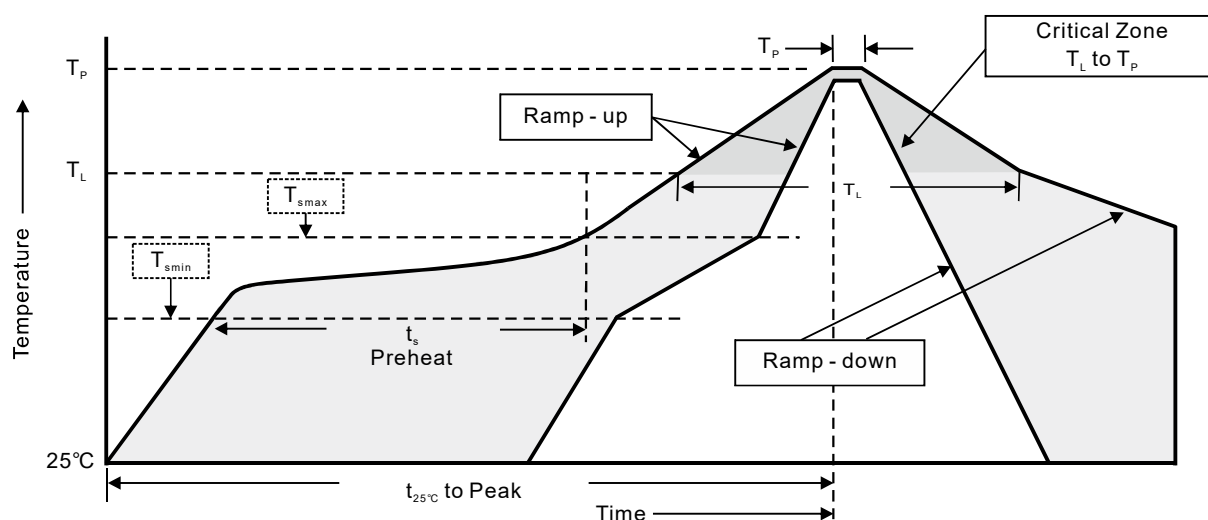
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Reel packing

Package	Units (pcs)			Dimension (Unit : mm ³)		
	Reel	Inner Box	Outer Box	Reel DIA,	Inner Box	Outer Box
SOT-723	8,000	80,000	64,000	178 (7")	183 x 183 x 123	382 x 262 x 387

Suggested thermal profiles for soldering processes

1. Storage environment : Temperature = 5°C ~ 40°C, Humidity = 55%, ±25%.
2. Reflow soldering of surface - Mount devices.



3. Reflow soldering

Profile feature	Soldering condition
Average ramp-up rate (T_L to T_P)	< 3 °C/sec
Preheat - Temperature Min (T_{smin}) - Temperature Max (T_{smax}) - Time (Min to Max) (t_s)	150°C 200°C 60 ~ 120 sec
T_{smax} to T_L - Ramp-up rate	< 3 °C / sec
Time maintained above : - Temperature (T_L) - Time (T_L)	217°C 60 ~ 260 sec
Peak temperature (T_P)	255 °C -0 / +5°C
Time with 5°C of actual peak temperature (T_P)	10 ~ 30 sec
Ramp-down rate	< 6°C / sec
Time 25°C to peak temperature	< 6 minutes