FMSNP3401-Q1-H

List

List.....1

Package outline.....2

Features.....2

Applications.....2

Mechanical data.....2

Maximum ratings 2

Electrical characteristics.....3

Rating and characteristic curves.....4

Pinning information.....5

Marking.....5

Suggested solder pad layout.....5

Packing Information.....6

Reel Packing.....7

Suggested thermal profiles for soldering processes.....7

FMSNP3401-Q1-H

-4.2A -30V P-Channel Trench Enhancement Mode MOSFET

Features

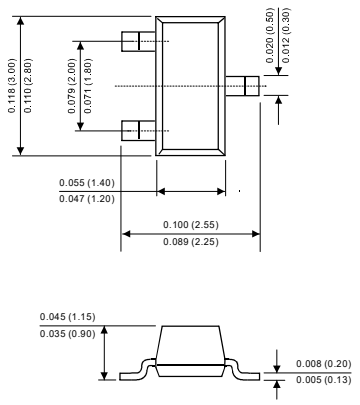
- $-V_{DS}$ = 30V, $-I_D$ = 4.2A.
- $R_{DS(ON)}$ ≤ 65mΩ, @$-V_{GS}$ = 10V, $-I_D$ = 4.2A.
- $R_{DS(ON)}$ ≤ 75mΩ, @$-V_{GS}$ = 4.5V, $-I_D$ = 4.0A.
- $R_{DS(ON)}$ ≤ 90mΩ, @$-V_{GS}$ = 2.5V, $-I_D$ = 1.0A.
- -Q1 for automotive and other applications requiring unique site and control change requirements; AEC-Q101 qualified and PPAP capable.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21).

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.008 gram

Package outline

SOT-23



Dimensions in inches and (millimeters)

Maximum ratings (T_J=25°C unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain-source voltage	$-V_{DS}$	30	V
Gate-source voltage	V_{GS}	±12	V
Continuous drain current (T_A=25℃)	$-I_D$	4.2	A
Continuous drain current (T_A=70℃)		3.5	
Pulsed drain current	$-I_{DM}$	30	A
Power dissipation	P_D	350	mW
Operating Junction temperature range	T_J	+150	℃
Storage temperature range	T_{STG}	-55 to +150	℃
Thermal resistance Junction to ambient	$R_{\theta JA}$	357	℃/W

FMSNP3401-Q1-H

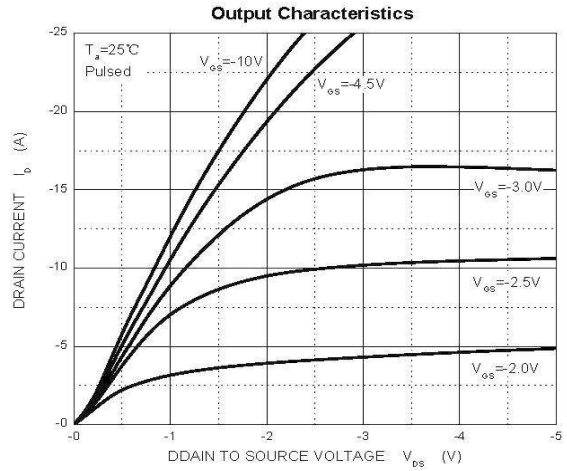
Electrical characteristics (At T_j=25°C unless otherwise specified)

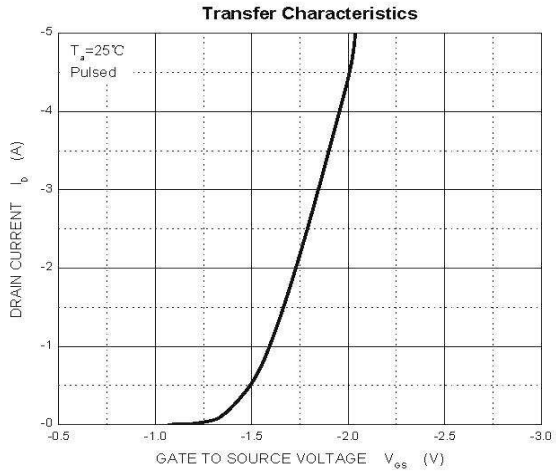
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	$-BV_{DSS}$	$-I_D$ = 250μA, V_{GS} = 0V	30			V
Drain-source leakage current	$-I_{DSS}$	$-V_{DS}$ = 24V, V_{GS} = 0V			1	μA
Gate-source leakage current	I_{GSS}	V_{GS} = ±12V, V_{DS} = 0V			±100	nA
On characteristics						
Gate threshold voltage	$-V_{GS(TH)}$	V_{DS} = V_{GS}, $-I_D$ = 250μA	0.7	0.9	1.3	V
Forward transconductance (Note 1)	g_{FS}	$-V_{DS}$ = 5V, $-I_D$ = 5A	7			S
Static drain-source on-resistance (Note 1)	$R_{DS(ON)}$	$-V_{GS}$=10V, $-I_D$=4.2A		50	65	mΩ
		$-V_{GS}$=4.5V, $-I_D$=4A		60	75	
		$-V_{GS}$=2.5V, $-I_D$=1A		75	90	
Dynamic Parameters						
Input capacitance	C_{iss}	V_{GS}=0V, $-V_{DS}$=15V, f=1.0MHZ		954		pF
Output capacitance	C_{oss}			115		
Reverse transfer capacitance	C_{rss}			77		
Switching parameters						
Turn-on delay time	$t_{D(ON)}$	$-V_{DS}$=15V, $-V_{GS}$=10V, R_G=6Ω, R_L=3.6Ω		6.3		ns
Rise time	t_r			3.2		
Turn-off delay time	$t_{D(OFF)}$			38.2		
Fall time	t_f			12		
Source-drain diode ratings and characteristics (Note2)						
Drain - source diode forward voltage (Note 1)	$-V_{SD}$	$-I_S$=1A, V_{GS}=0V			1.0	V

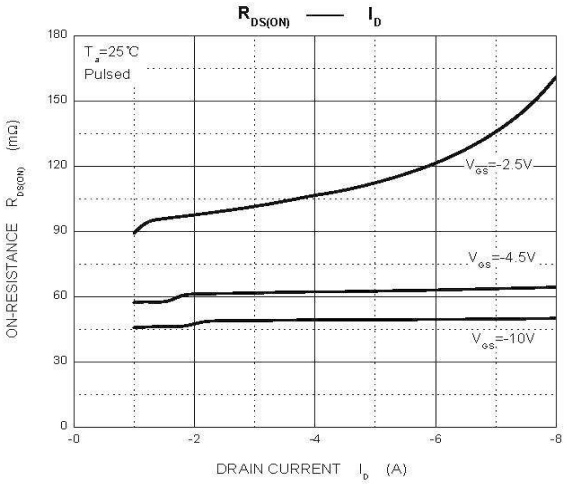
Note :
1 . Pulse test: Pulse width ≤ 300μs, duty cycle ≤ 2%.
2. These parameters have no way to verify.

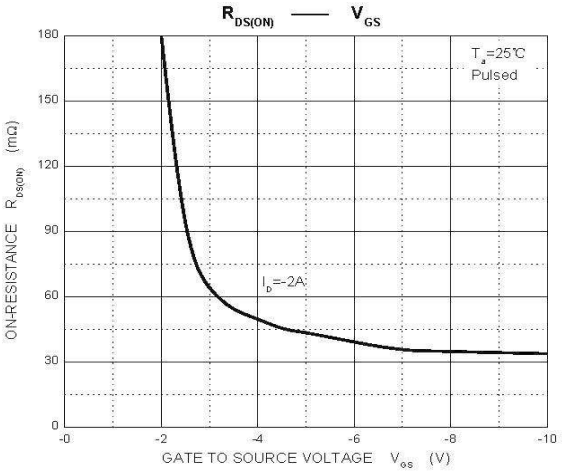
FMSNP3401-Q1-H

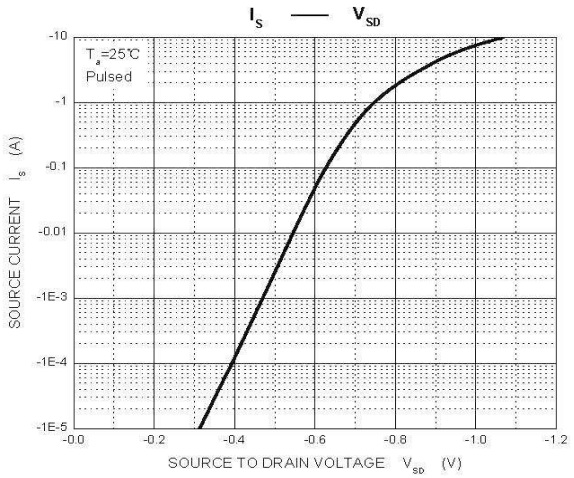
Rating and characteristic curves





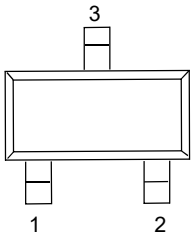
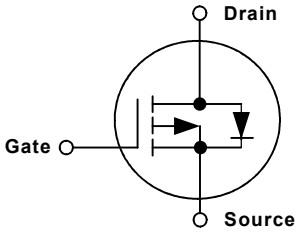






FMSNP3401-Q1-H

Pinning information

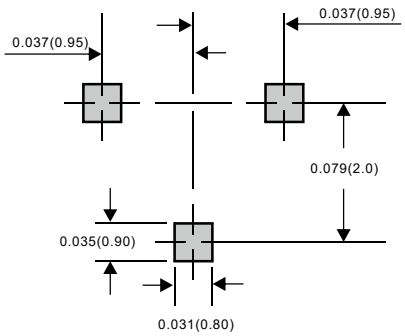
Pin	Simplified outline	Symbol
Pin 1 Gate Pin 2 Source Pin 3 Drain		

Marking

Type number	Marking Code
FMSNP3401-Q1-H	$\overline{R}1$

Suggested solder pad layout

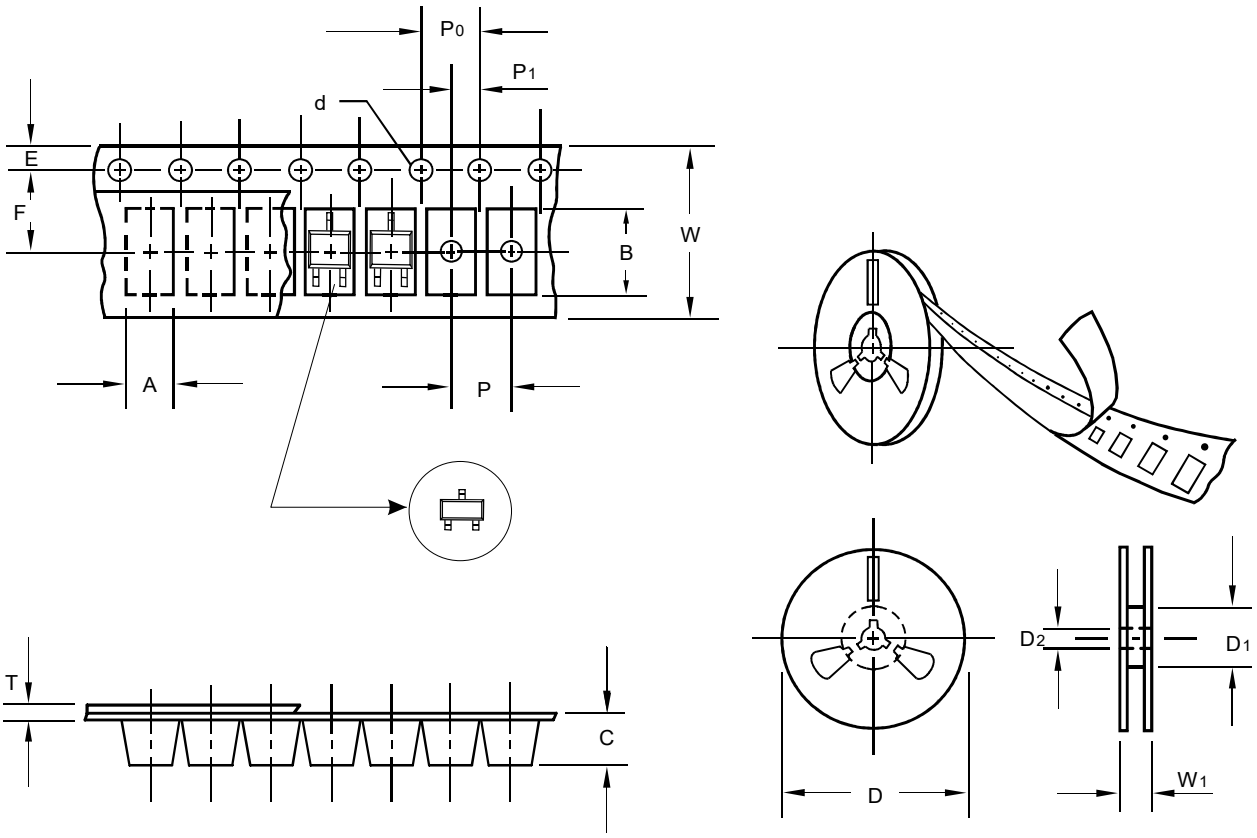
SOT-23



Dimensions in inches and (millimeters)

FMSNP3401-Q1-H

Packing information



unit:mm

Item	Symbol	Tolerance	SOT-23
Carrier width	A	0.1	3.15
Carrier length	B	0.1	2.77
Carrier depth	C	0.1	1.22
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D_1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D_1	min	54.40
Feed hole diameter	D_2	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	4.00
Sprocket hole pitch	P_0	0.1	4.00
Embossment center	P_1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W_1	1.0	11.40

Note:Devices are packed in accor dance with EIA standar RS-481-A and specifications listed above.

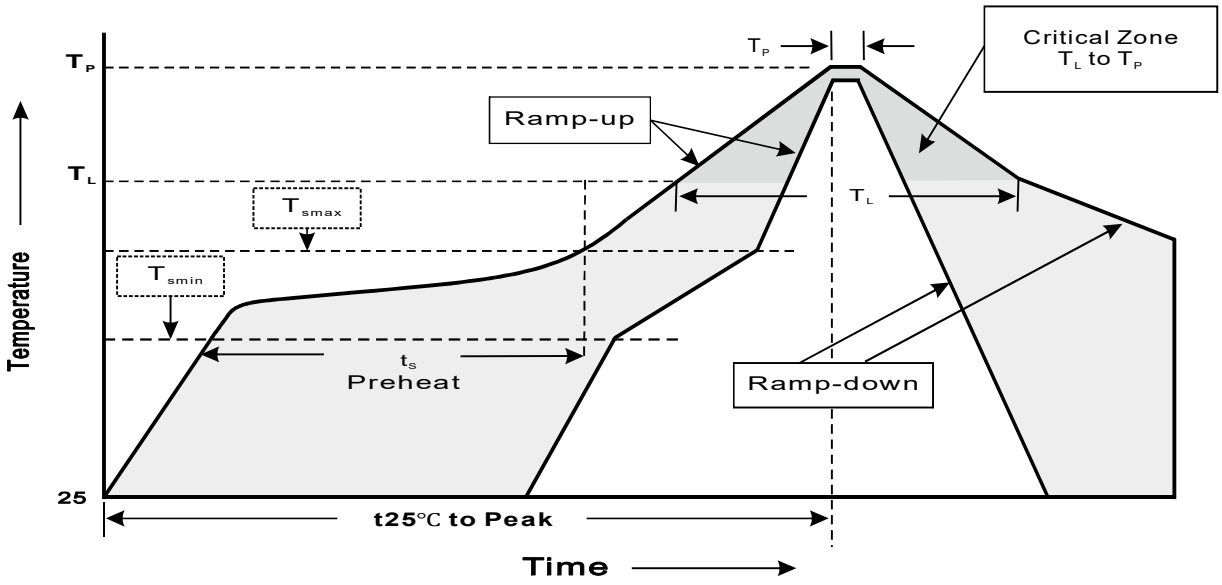
FMSNP3401-Q1-H

Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOT-23	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	11.6

Suggested thermal profiles for soldering processes

1.Storage environment: Temperature=5℃~40℃ 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℃/sec
Prehaeat -Temperature Min (T_{smin}) -Temperature Max (T_{smax}) -Time (min to max) (t_S)	 150℃ 200℃ 60 ~120sec
T_{smax} to T_L -Ramp-up rate	< 3℃/sec
Time maintained above: -Temperature (T_L) -Time(T_L)	 217℃ 60 ~ 260 sec
Peak Temperature(T_P)	255℃ -0/+5℃
Time within 5℃ of actual peak Temperature(T_P)	10 ~ 30sec
Ramp-down rate	< 6℃/sec
Time 25℃ to peak temperature	< 6 minutes