

FMOSTHN05P04-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

FMOSTHN05P04-H

**-5.0A -40V P-Channel Trench
Enhancement Mode Power MOSFET****Features**

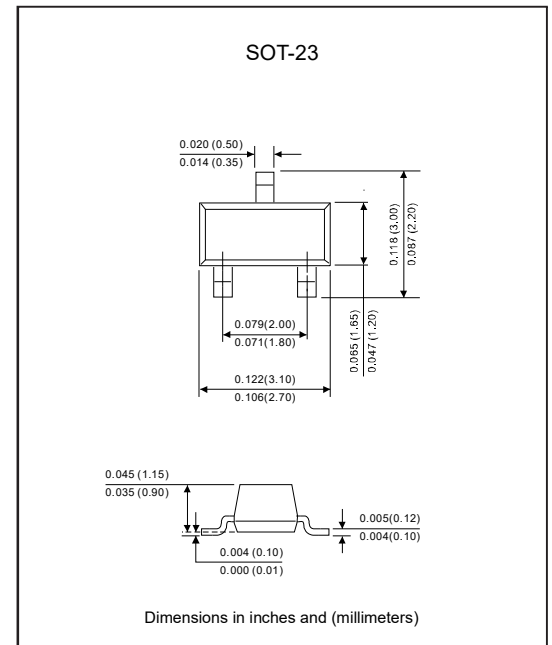
- $V_{DS} = -40V$, $I_D = -5A$.
- $R_{DS(ON)} < 88m\Omega$, $V_{GS} = -10V$, $I_D = -3A$.
- $R_{DS(ON)} < 117m\Omega$, $V_{GS} = -4.5V$, $I_D = -2A$.
- Advanced Trench Technology.
- Moisture Sensitivity Level 1.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21).

Applications

- Power Management.
- Load Switch.
- PWM application.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-23.
- Weight : Approximated 8mg.

Package outline**Maximum Ratings** (At $T_A = 25^\circ C$ Unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain source voltage	$-V_{DS}$	40	V
Gate source voltage	V_{GS}	± 20	V
Drain current continuous	$-I_D$	5	A
Pulsed drain current (Note 1)	$-I_{DM}$	20	A
Power Dissipation (Note 2)	P_D	1.2	W
Thermal resistance, junction to ambient	$R_{\theta JA}$	120	$^\circ C/W$
Operating junction temperature range	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$

FMOSTHN05P04-H

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

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static parameters						
Drain-source breakdown voltage	$-I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	$-BV_{DSS}$	40			V
Drain-source leakage current	$-V_{DS}=40\text{V}$, $V_{GS}=0\text{V}$	$-I_{DSS}$			1	μA
Gate-source leakage current	$V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$	I_{GSS}			± 100	nA
Gate threshold voltage(Note 3)	$V_{DS}=V_{GS}$, $-I_D=250\mu\text{A}$ (Note 3)	$-V_{GS(TH)}$	1	1.6	2.5	V
Static drain-source on-state resistance (Note 3)	$-V_{GS}=10\text{V}$, $-I_D=3\text{A}$	$R_{DS(ON)}$		68	88	m Ω
	$-V_{GS}=4.5\text{V}$, $-I_D=2\text{A}$			85	117	
Forward Transconductance(Note 3)	$V_{DS}=-5$, $-I_D=1\text{A}$ (Note 3)	gfs		4.5		S

Dynamic parameters

Input capacitance	$-V_{GS}=0\text{V}$, $-V_{DS}=20\text{V}$, $f=1.0\text{MHz}$	C_{iss}		515		pF
Out capacitance		C_{oss}		48		
Reverse transfer capacitance		C_{rss}		40		

Switching parameters

Gate Resistance	$-V_{GS}=0\text{V}$, $-V_{DS}=0\text{V}$, $f=1.0\text{MHz}$	R_G		10.8		Ω
Total gate charge	$-V_{GS}=10\text{V}$, $-V_{DS}=20\text{V}$, $-I_D=3\text{A}$	Q_g		10		nC
Gate to source charge		Q_{gs}		2		
Gate to drain charge		Q_{gd}		1.6		
Turn-on delay time	$-V_{DS}=20\text{V}$, $-V_{GS}=10\text{V}$, $R_G=2.4\Omega$, $-I_D=5\text{A}$	$t_{d(on)}$		7		ns
Rise time		t_r		19		
Turn-off delay time		$t_{d(off)}$		16		
Fall time		t_f		24		

Source-drain diode ratings and characteristics

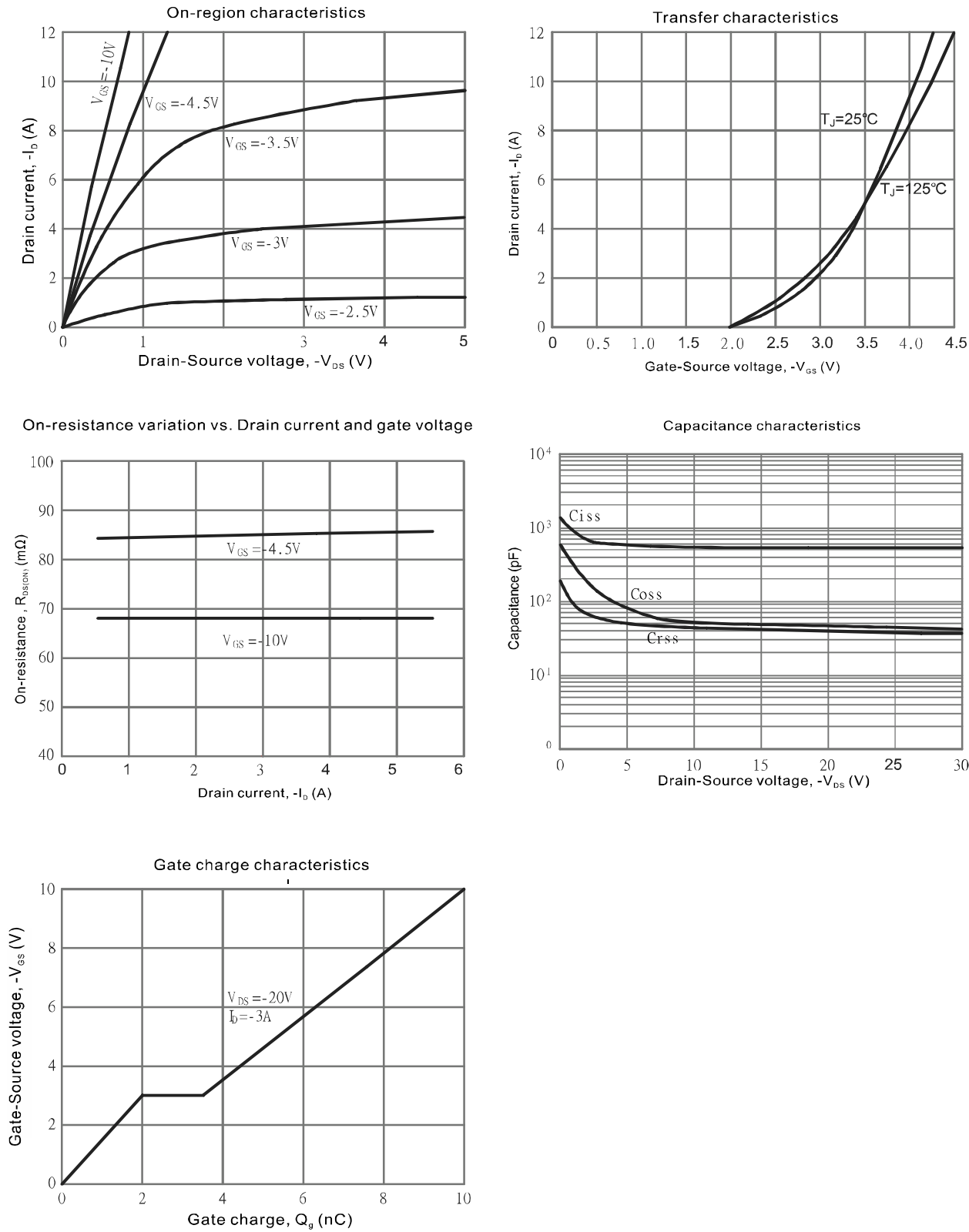
Diode continuous current		$-I_S$			5	A
Pulsed drain-source diode forward current		$-I_{SM}$			10	A
Drain-source diode forward voltage	$-I_{SD}=5\text{A}$, $V_{GS}=0\text{V}$, $T_J=25^{\circ}\text{C}$	$-V_{SD}$			1.2	V

Note : 1. Repetitive rating: pulse width limited by maximum junction temperature.

2. Surface Mounted on FR4 Board, $t \leq 10$ sec.3. Pulse Test: Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

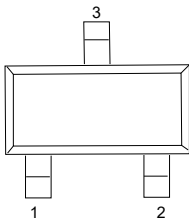
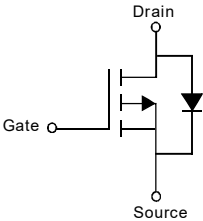
FMOSTHN05P04-H

Rating and characteristic curves



FMOSTHN05P04-H

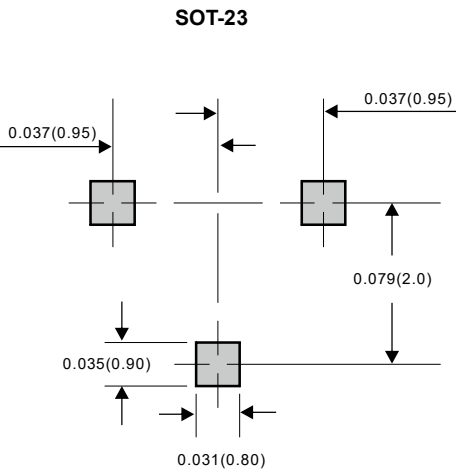
Pinning information

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

Marking

Type number	Marking code
FMOSTHN05P04-H	S45

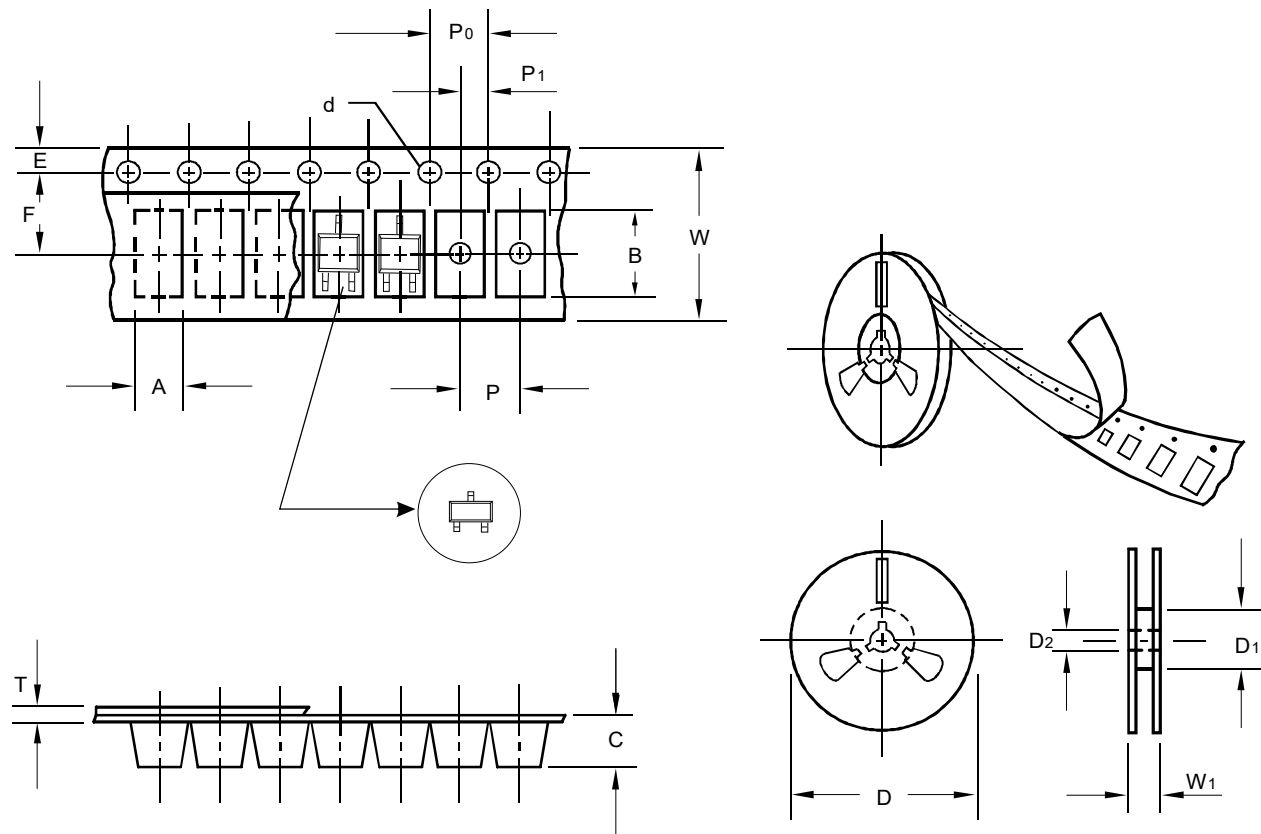
Suggested solder pad layout



Dimensions in inches and (millimeters)

FMOSTHN05P04-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	55.00
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	12.0

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

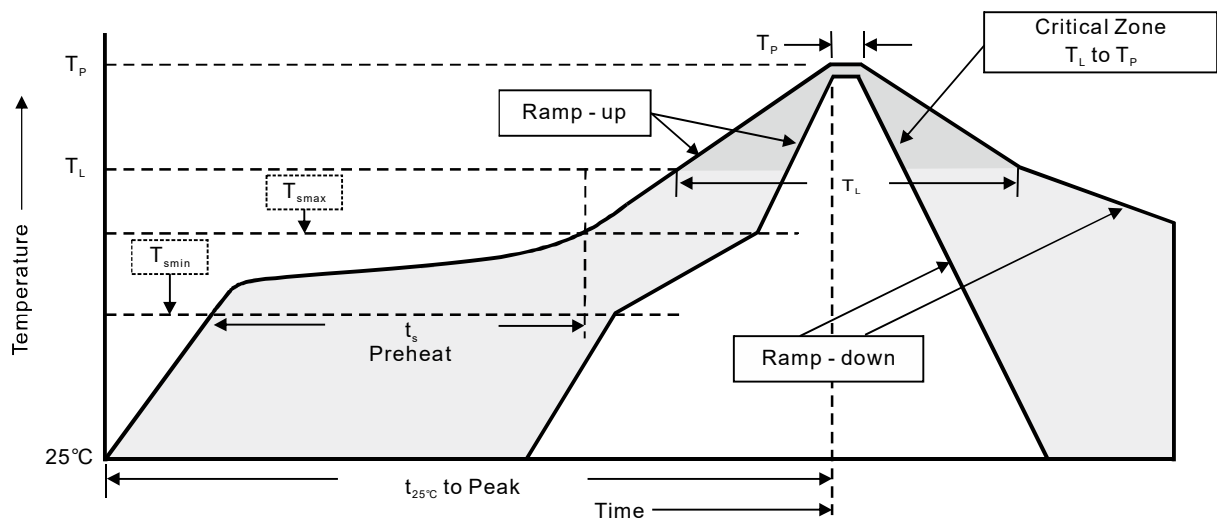
FMOSTHN05P04-H

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)
SOT-23	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000

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_{min}) - Temperature Max (T_{max}) - Time (Min to Max) (t_s)	150°C 200°C 60 ~ 120 sec
T_{max} 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