FMOSTHN03P04-H

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FMOSTHN03P04-H

-3.0A -40V P-Channel Trench Enhancement Mode Power MOSFET

Features

- V_{DS} = -40V, I_D = -3A.
- $R_{DS(ON)}$ < 80mΩ, V_{GS} = -10V, I_D = -3A.
- $R_{DS(ON)}$ < 110mΩ, V_{GS} = -4.5V, I_D = -2A.
- Trench Power LV MOSFET technology.
- High Speed switching.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21).

Applications

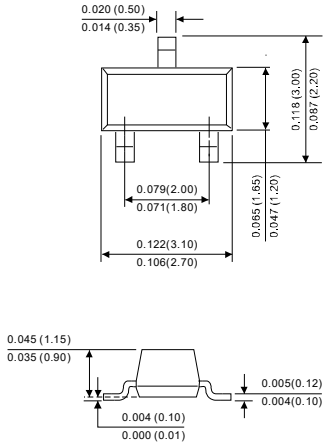
- Power switching application
- Uninterruptible power supply
- PWM application

Mechanical data

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

Package outline

SOT-23



Dimensions in inches and (millimeters)

Maximum Ratings (At T_A=25°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 T_C=25℃	$-I_D$	3	A
Drain current continuous T_C=100℃	$-I_D$	1.9	A
Pulsed drain current (Note 1)	$-I_{DM}$	20	A
Power Dissipation (Note 2) T_C=25°C	P_D	1	W
Power Dissipation (Note 2) T_C=100°C	P_D	0.4	W
Thermal resistance, junction to ambient	$R_{\theta JA}$	120	°C/W
Operating junction temperature range	T_J	+150	°C
Storage temperature range	T_{STG}	-55 to +150	°C

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

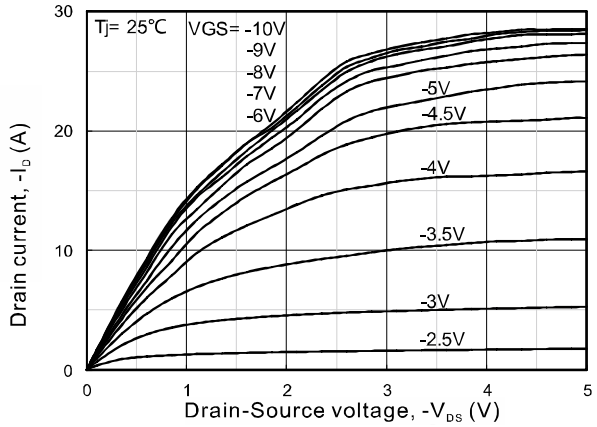
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static parameters						
Drain-source breakdown voltage	$-I_D$=250μA, V_{GS}=0V	$-BV_{DSS}$	40			V
Drain-source leakage current	$-V_{DS}$=40V, V_{GS}=0V	$-I_{DSS}$			1	μA
	$-V_{DS}$=40V, V_{GS}=0V, T_j=150℃				100	
Gate-source leakage current	V_{GS}=±20V, V_{DS}=0V	I_{GSS}			±100	nA
Gate threshold voltage	V_{DS}=V_{GS}, $-I_D$=250μA	$-V_{GS(TH)}$	1	1.5	2.5	V
Static drain-source on-state resistance	$-V_{GS}$=10V, $-I_D$=3A	$R_{DS(ON)}$		61	80	mΩ
	$-V_{GS}$=4.5V, $-I_D$=2A			81	110	
Dynamic parameters						
Input capacitance	V_{GS}=0V, $-V_{DS}$=20V, f=1.0MHz	C_{iss}		400		pF
Out capacitance		C_{oss}		50		
Reverse transfer capacitance		C_{rss}		40		
Switching parameters						
Total gate charge	$-V_{GS}$=10V, $-V_{DS}$=20V, $-I_D$=3A	Q_g		8.5		nC
Gate to source charge		Q_{gs}		1		
Gate to drain charge		Q_{gd}		2		
Turn-on delay time	$-V_{DS}$=20V, $-V_{GS}$=10V, R_G=3Ω, $-I_D$=3A	$t_{d(on)}$		6		ns
Rise time		t_r		6		
Turn-off delay time		$t_{d(off)}$		31		
Fall time		t_f		19		
Source-drain diode ratings and characteristics						
Diode continuous current		$-I_S$			3	A
Pulsed drain-source diode forward current		$-I_{SM}$			10	A
Drain-source diode forward voltage	$-I_{SD}$=3A, V_{GS}=0V, T_J=25°C	$-V_{SD}$		0.85	1.2	V

Note : 1. Repetitive rating: pulse width limited by maximum junction temperature.
2. Pd is based on max. junction temperature, using junction-case thermal resistance.

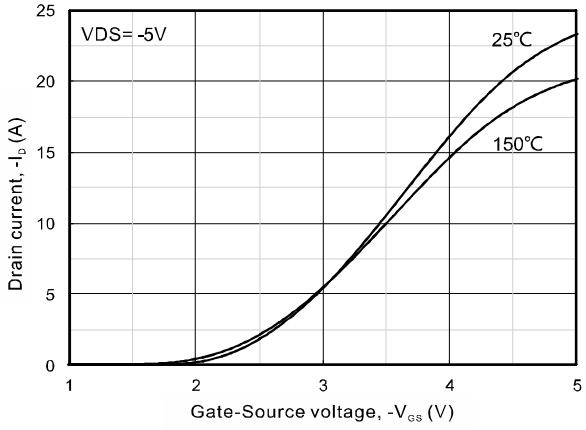
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Rating and characteristic curves

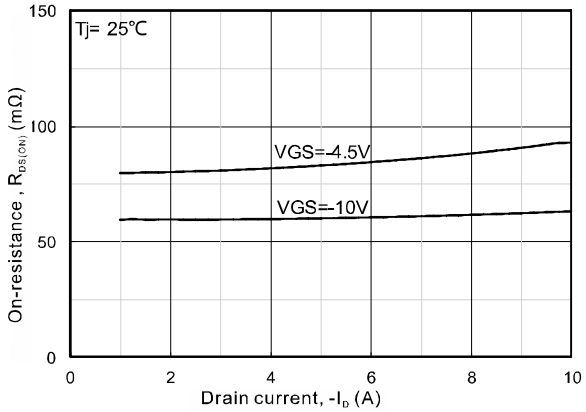
On-region characteristics



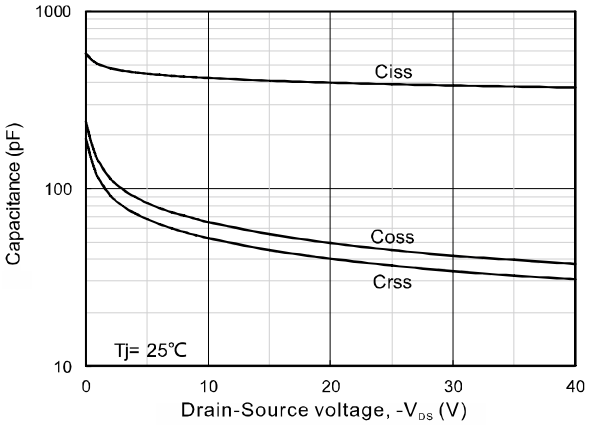
Transfer characteristics



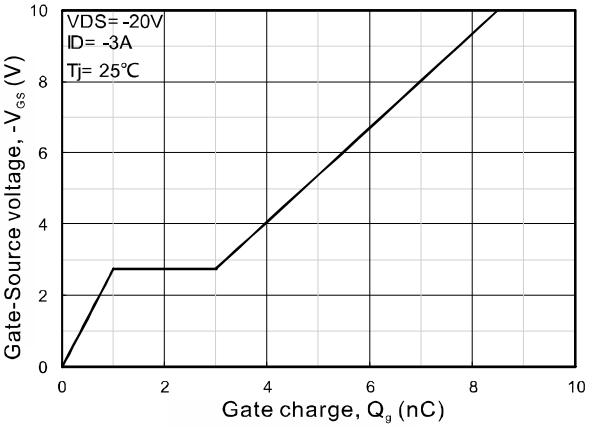
On-resistance variation vs. Drain current and gate voltage



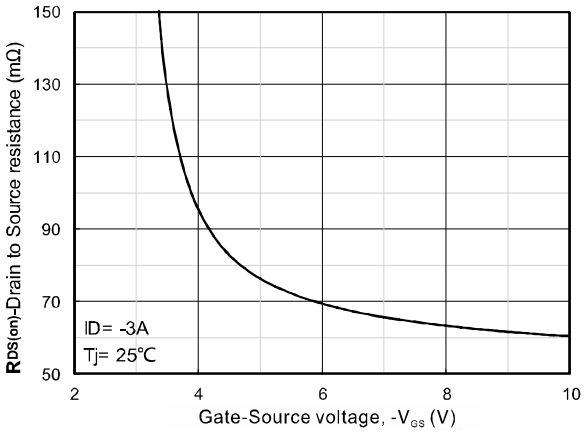
Capacitance characteristics



Gate charge characteristics



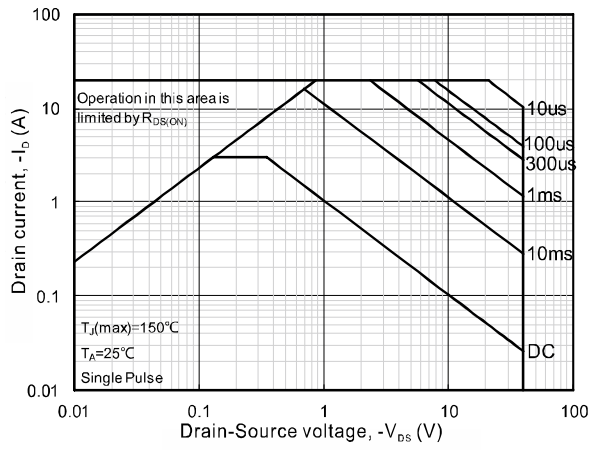
On-resistance vs. Gate voltage



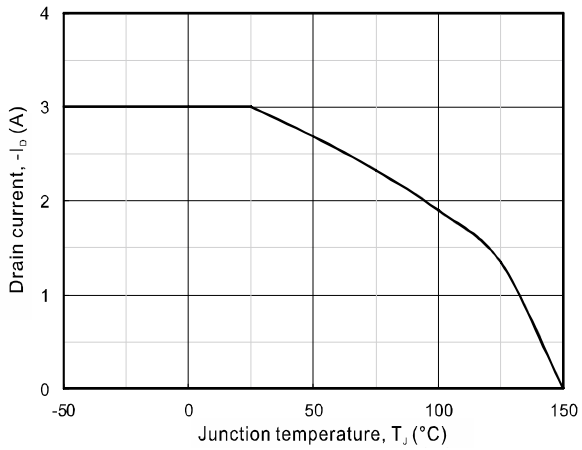
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Rating and characteristic curves

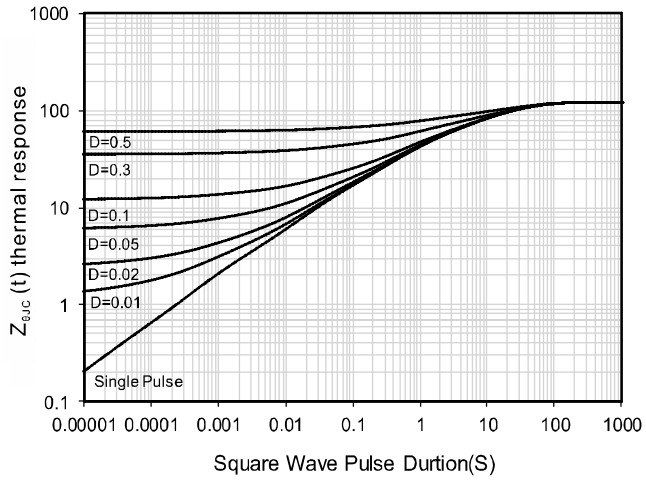
Maximum safe operating area



Maximum continuous drain current vs. temperature

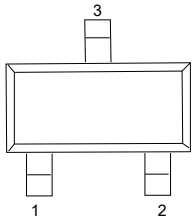
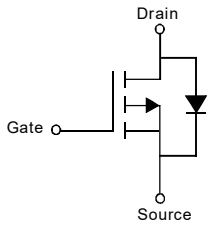


Transient thermal response curve



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Pinning information

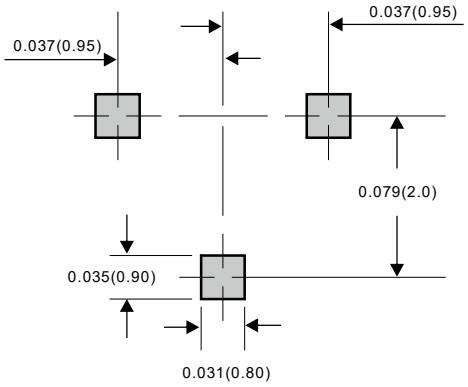
Pin	Simplified outline	Symbol
Pin 1 Gate Pin 2 Source Pin 3 Drain		

Marking

Type number	Marking code
FMOSTHN03P04-H	03P04

Suggested solder pad layout

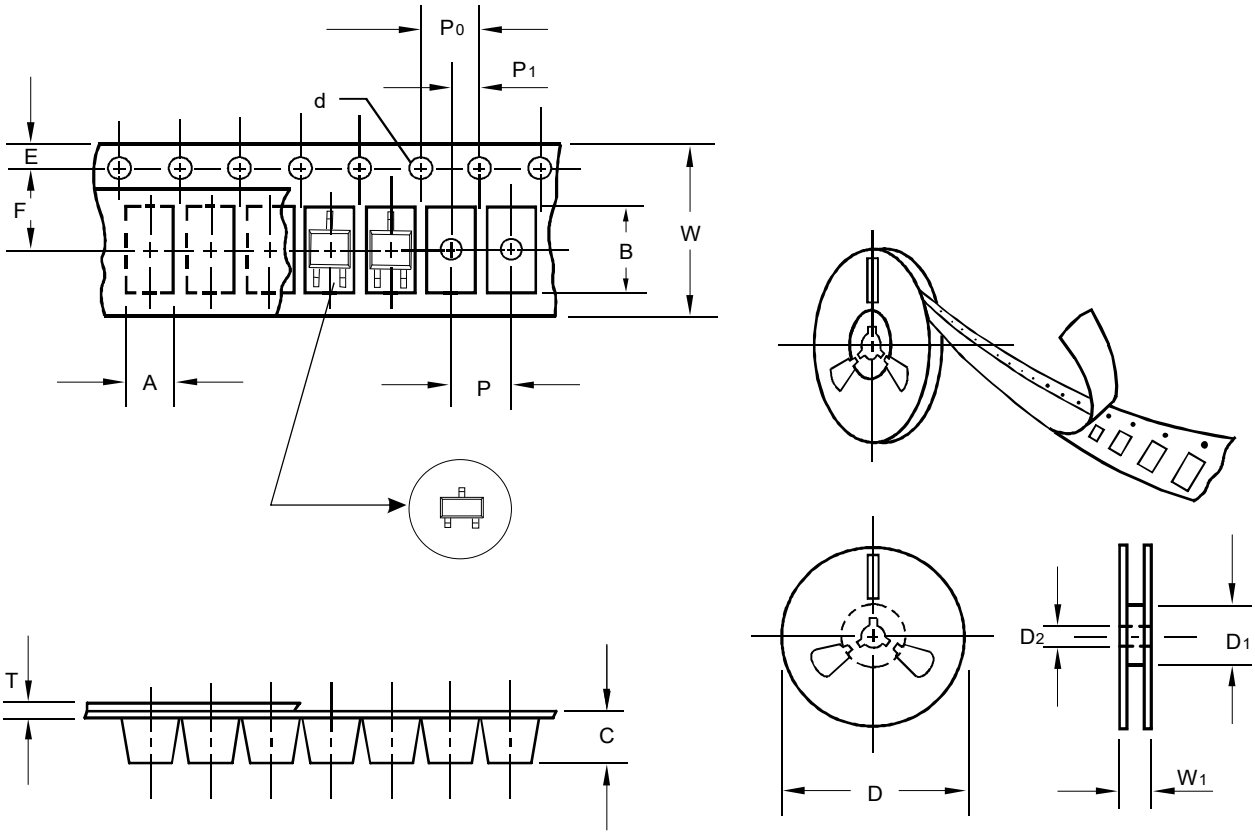
SOT-23



Dimensions in inches and (millimeters)

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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.

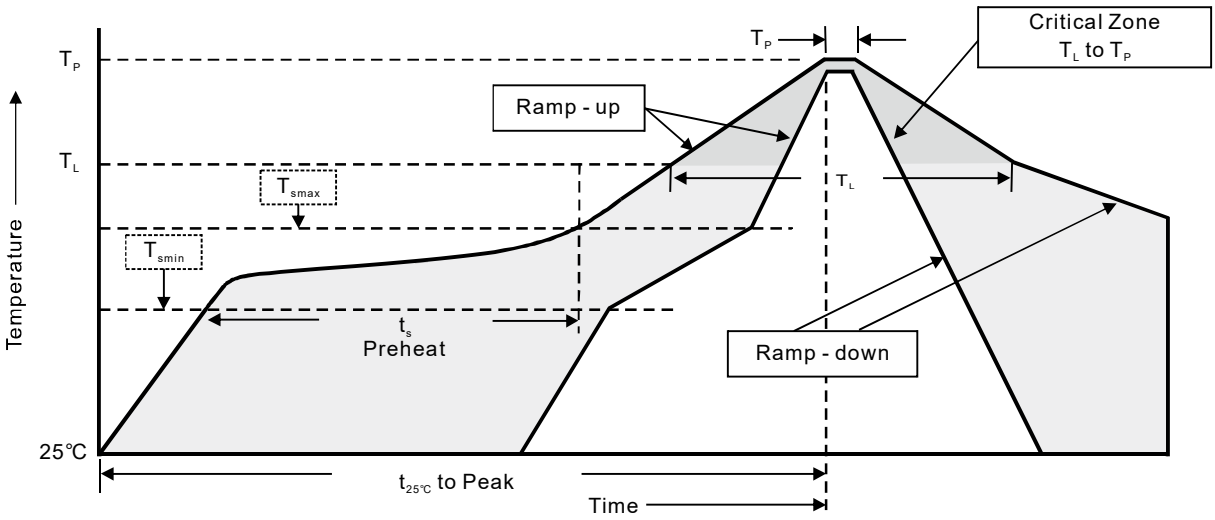
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Reel packing

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℃ ~ 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
Preheat - Temperature Min (T_{smin}) - Temperature Max (T_{smax}) - Time (Min to Max) (t_s)	 150℃ 200℃ 60 ~ 120 sec
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 with 5℃ of actual peak temperature (T_P)	10 ~ 30 sec
Ramp-down rate	< 6℃ / sec
Time 25℃ to peak temperature	< 6 minutes