

FMOST06P8N06-Q1-H

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FMOST06P8N06-Q1-H

7.0A 60V N-Channel
Enhancement Mode Power MOSFET

Features

- $V_{DS}=60V$, $I_D=7A$.
- $R_{DS(ON)} \leq 35m\Omega$, @ $V_{GS}=10V$, $I_D=7A$.
- $R_{DS(ON)} \leq 45m\Omega$, @ $V_{GS}=4.5V$, $I_D=5A$.
- Fast switching.
- Improved dv/dt capability.
- Qualified to AEC-Q101 standards for high reliability.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.FMOST06P8N06-Q1-H.

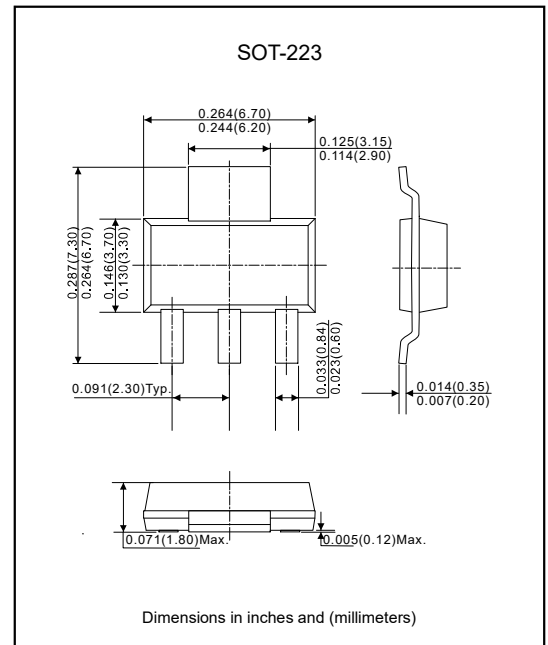
Applications

- Power management switches.
- DC/DC converter.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-223
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Mounting Position : Any.

Package outline

Maximum ratings (At $T_J=25^\circ C$ unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Drain to source voltage	V_{DS}	60	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current ($T_A=25^\circ C$)	I_D	7	A
Pulsed drain current (Note 1)	I_{DM}	28	A
Avalanche energy, single pulse (Note 2)	E_{AS}	24.2	mJ
Power dissipation ($T_A=25^\circ C$)	P_D	2.7	W
Thermal resistance, junction to ambient	$R_{\theta JA}$	46.3	$^\circ C/W$
Junction temperature	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off parameters						
Drain-source breakdown voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	60			V
Drain-source leakage current	I_{DSS}	$V_{DS}=60\text{V}$, $V_{GS}=0\text{V}$			1	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$			± 100	nA

On characteristics

Gate threshold voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1.2		2.5	V
Static drain-source on-state resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=7\text{A}$			35	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=5\text{A}$			45	
Forward transconductance	g_{FS}	$V_{DS}=5\text{V}$, $I_D=7\text{A}$		15.5		S

Dynamic parameters (Note 4)

Gate resistance	R_G	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1.0\text{MHz}$		1.2		Ω
Input capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=30\text{V}$, $f=1.0\text{MHz}$		1325		pF
Out capacitance	C_{oss}			59		
Reverse transfer capacitance	C_{rss}			49		

Switching parameters

Total gate charge	Q_g	$V_{GS}=10\text{V}$, $V_{DS}=30\text{V}$, $I_D=7\text{A}$		22		nC
Gate to source charge	Q_{gs}			4.2		
Gate to drain charge	Q_{gd}			6.9		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=30\text{V}$, $V_{GS}=10\text{V}$, $I_D=7\text{A}$, $R_G=3\Omega$		6.4		nS
Rise time	t_r			15.3		
Turn-off delay time	$t_{d(off)}$			25		
Fall time	t_f			7.6		

Source-drain diode ratings and characteristics

Body Diode Voltage	V_{SD}	$I_S=7\text{A}$, $V_{GS}=0\text{V}$			1.2	V
Continuous source current	I_S	$V_G=V_D=0\text{V}$, forward current			7	A

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

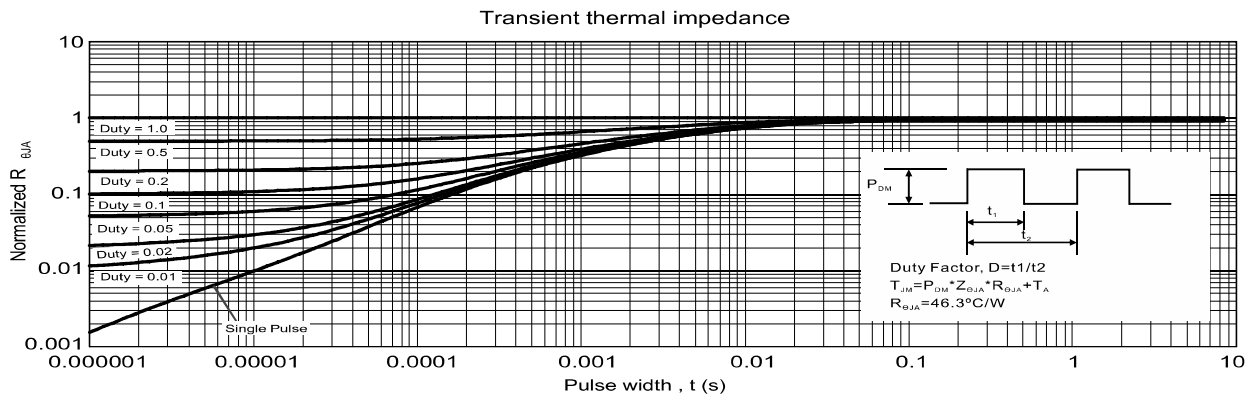
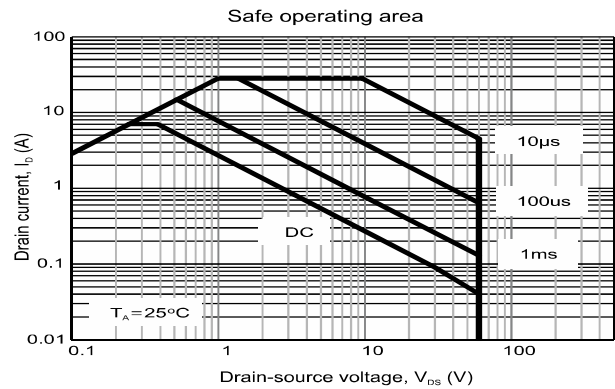
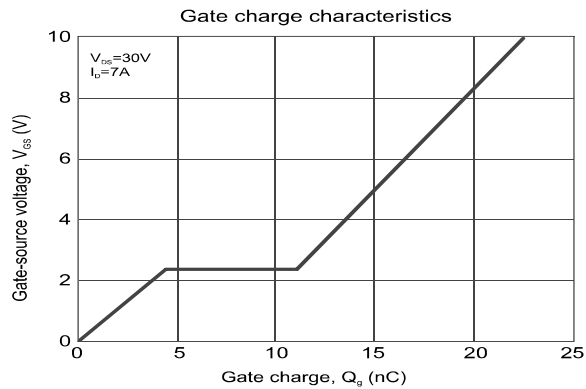
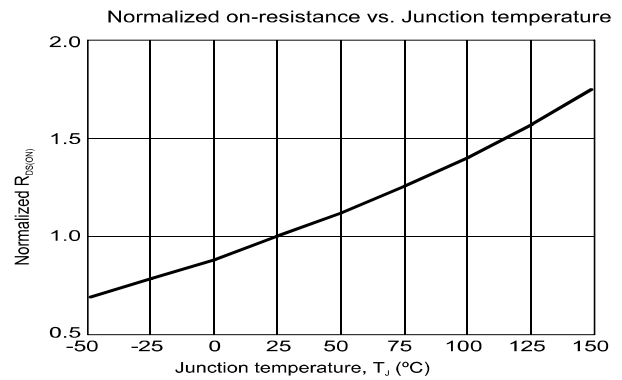
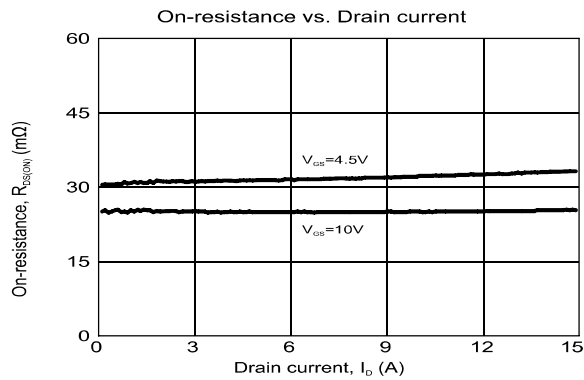
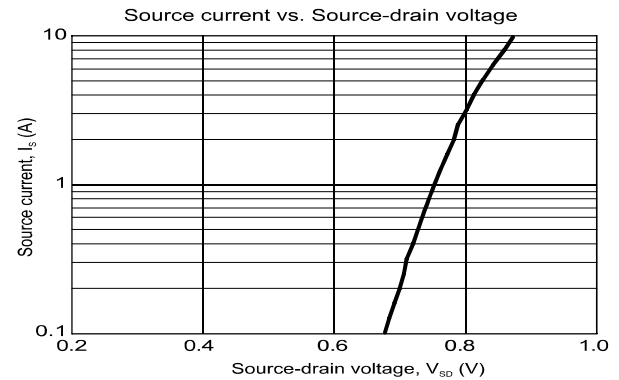
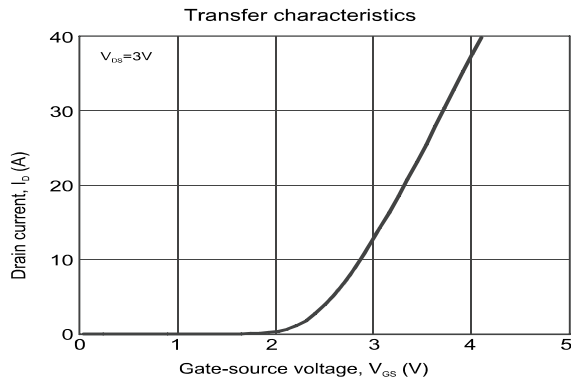
2. The E_{AS} data show maximum rating. The test condition is $V_{DD}=25\text{V}$, $V_{GS}=10\text{V}$, $L=0.4\text{mH}$, $I_{AS}=11\text{A}$.

3. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

4. This value is guaranteed by design hence it is not included in the production test.

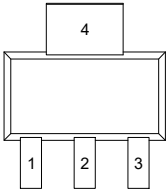
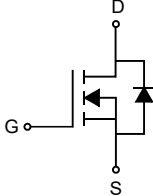
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Rating and characteristic curve



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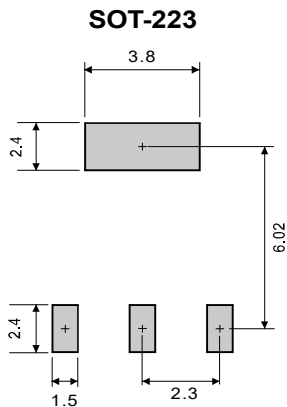
Pinning information

Pin	Simplified outline	Symbol
Pin 1 Gate Pin 2, 4 Drain Pin 3 Source		

Marking

Type number	Marking code
FMOST06P8N06-Q1-H	NG035

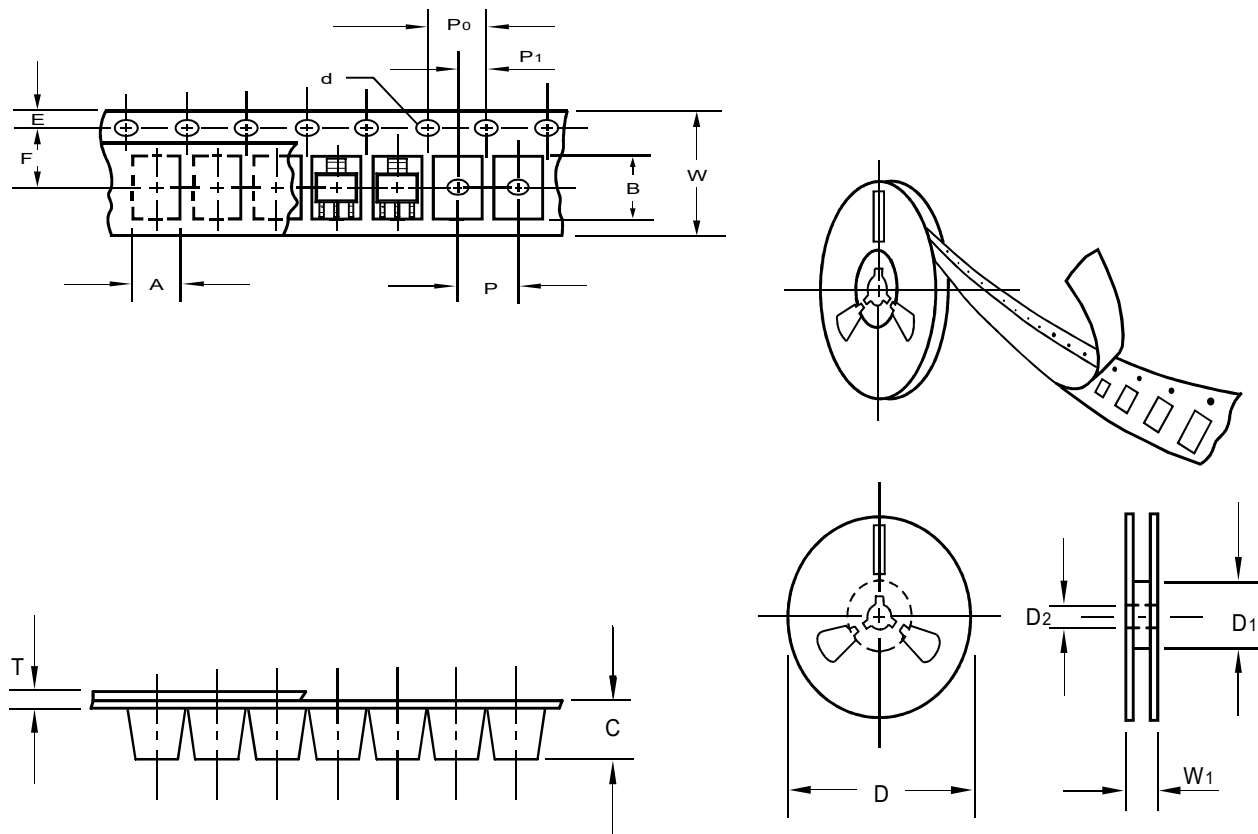
Suggested solder pad layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:±0.050mm.
3.The pad layout is for reference purposes only

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Packing information



unit:mm

Item	Symbol	Tolerance	SOT-223
Carrier width	A	0.1	6.55
Carrier length	B	0.1	7.25
Carrier depth	C	0.1	1.90
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	330.00
13" Reel inner diameter	D1	min	100.00
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	5.50
Punch hole pitch	P	0.1	8.00
Sprocket hole pitch	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.25
Tape width	W	0.3	12.00
Reel width	W1	4.0	17.0

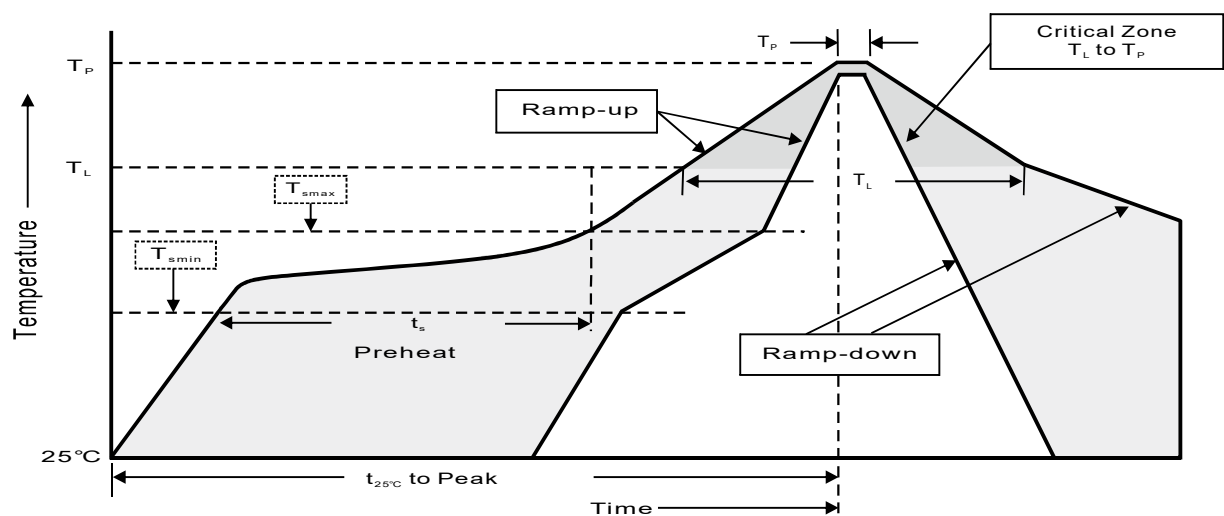
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Reel packing

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-223	13"	2,500	8.0	5,000	335*335*38	330	350*330*360	40,000

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_{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

FMOST06P8N06-Q1-H**High reliability test capabilities**

Item Test	Conditions	Reference
1. MSL Preconditioning	24hr bake@125°C+168hrs@85°C /85%RH+3xIR@260°C+1flux immersion+alcohol+DI H2O rinse	JESD22-A113
2. High Temperature Reverse Bias	$V_{DS}=V_{DS}^*80\%$ ($T_J=T_J \text{ max.}$) Test Duration:1000hrs	JESD22-A108
3. High Temperature Storage Life	$T_a=150^\circ\text{C}$ Test Duration:1000hrs	JESD22 A-103
4. Temperature Cycle	-55°C (15min) to 150°C (15min) Test Cycles:1000cycles	JESD22 A-104
5. Autoclave	$P=2\text{atm}$ $T_a=121^\circ\text{C}$ $\text{RH}=100\%$ Test Duration:96hrs	JESD22 A-102
6. Solderability	$245\pm5^\circ\text{C}$ for 5sec	J-STD-002
7. Moisture Resistance	$T_a=85^\circ\text{C}$ /85% Relative humidity Test Duration:1000hrs	MIL-STD-750E METHOD 1021.2
8. Resistance To Solder Heat	$260\pm5^\circ\text{C}$ for 10sec	JESD22 B-106
9. High Temperature High Humidity Reverse Bias	$T_a=85^\circ\text{C}$, 85%RH, $V_{DS}=80\%$ rated V_{DS} Test Duration: 1000hrs	JESD22-A101