FMOS047N03

List

FMOS047N03

4.7A, 30V N-Channel Enhancement Mode MOSFET

Features

- Capable of 2.5V gate drive.
- Reliable and rugged.
- Lead -free parts meet RoHS requirments.
- Suffix "-H" dinicates Halogen-free part, ex.FMOS047N03-H.

Application

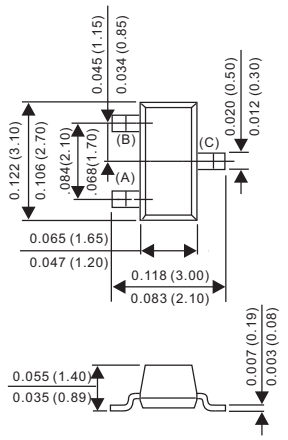
- Load switching.
- DC / DC Converter.

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 (At T_A=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°C)	I_D	4.7	A
Continuous drain Current (T_A=70°C)		3.7	
Drain current pulse (Note 1)	I_{DM}	10	A
Power dissipation (T_A=25°C)	P_D	1.1	W
(T_A=70°C)		0.7	
Avalanche current, Single pulse (Note 2)	I_{AS}	10	A
Avalanche energy, Single pulse (Note 2)	E_{AS}	5	mJ
Operating Junction temperature range	T_j	+150	°C
Storage temperature range	T_{STG}	-55 to +150	°C
Thermal resistance junction to ambient	$R_{\theta JA}$	110	°C/W

FMOS047N03

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

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			±100	nA
On characteristics						
Gate threshold voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	0.6		1.3	V
Forward transconductance	g_{FS}	V_{DS}=3V, I_D=2.5A		15		S
Static drain-source on-resistance (Note 4)	$R_{DS(ON)}$	V_{GS}=10V, I_D=5A		26	32	mΩ
		V_{GS}=4.5V, I_D=5A		28	36	
		V_{GS}=2.5V, I_D=2.6A		32	45	
Dynamic parameters (Note 5)						
Gate resistance	R_G	V_{GS}=0V, V_{DS}=0V, Freq.=1.0MHz		3		Ω
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V, Freq.=1.0MHz		620		pF
Out capacitance	C_{oss}			80		
Reverse transfer capacitance	C_{rss}			55		
Switching parameters						
Turn-on delay time	$t_{d(on)}$	V_{DS}=15V, V_{GS}=10V, R_G=6Ω, I_D=1A		12		ns
Rise time	t_r			20		
Turn-off delay time	$t_{d(off)}$			20		
Fall time	t_f			6		
Total gate charge	Q_g	V_{DS}=15V, I_D=4.5A, V_{GS}=10V		6.5		nC
Gate-source charge	Q_{gs}			0.75		
Gate-drain charge	Q_{gd}			2.3		
Drain-source diode characteristics and maximum ratings						
Drain-source diode forward voltage (Note 4)	V_{SD}	V_{GS}=0V, I_S=1.2A		0.7	1.1	V
Continuous source current	t_{rr}	I_F=5A, V_R=0V, dI_F/dt=100A/μs		14		A
Pulsed source current	Q_{rr}			7		nC

Note:

1. Max. current is limited by bonding wire.
2. UIS tested and pulse width are limited by maximum junction temperature 150℃.
3. Surface mounted on 1in^2 FR-4 board with 1oz.
4. Pulse test (pulse width ≤ 300μs, duty cycle ≤ 2%).
5. Guaranteed by design, not subject to production testing.

Rating and characteristic curves（FMOS047N03）

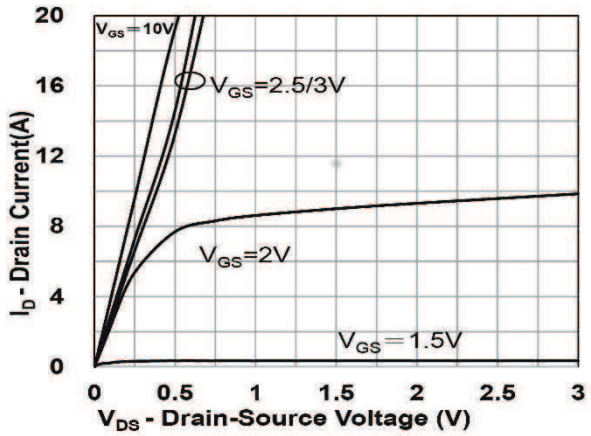


Figure 1. Output Characteristics

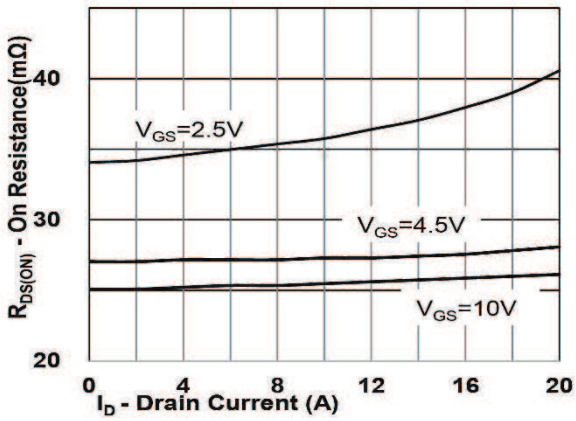


Figure 2. On-Resistance vs. ID

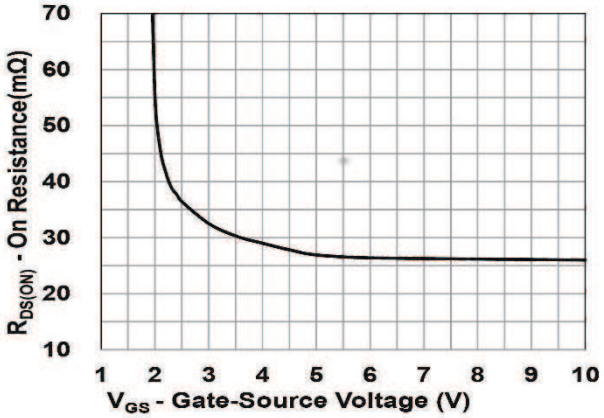


Figure 3. On-Resistance vs. VGS

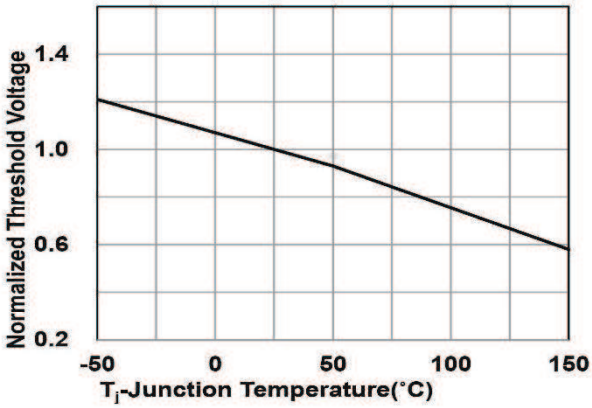


Figure 4. Gate Threshold Voltage

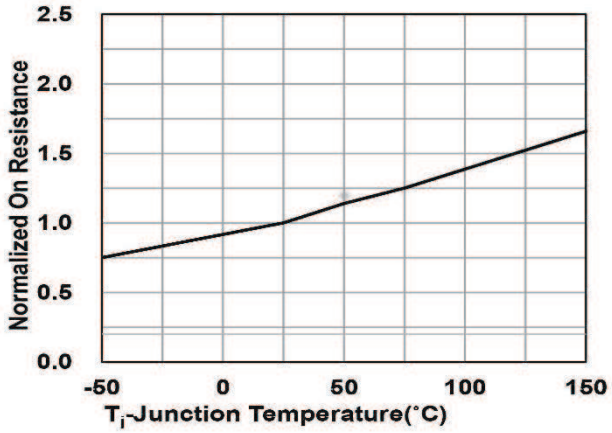


Figure 5. Drain-Source On Resistance

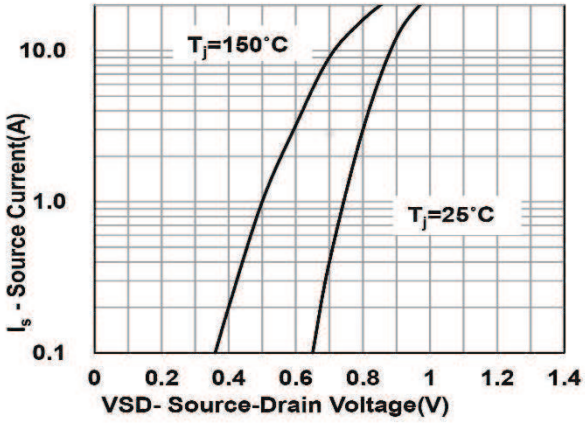


Figure 6. Source-Drain Diode Forward

Rating and characteristic curves（FMOS047N03）

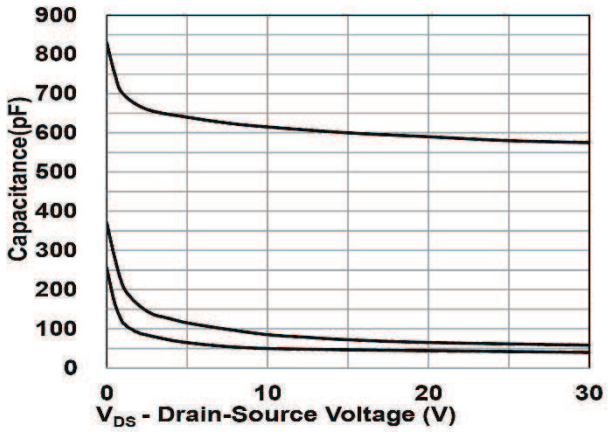


Figure 7. Capacitance

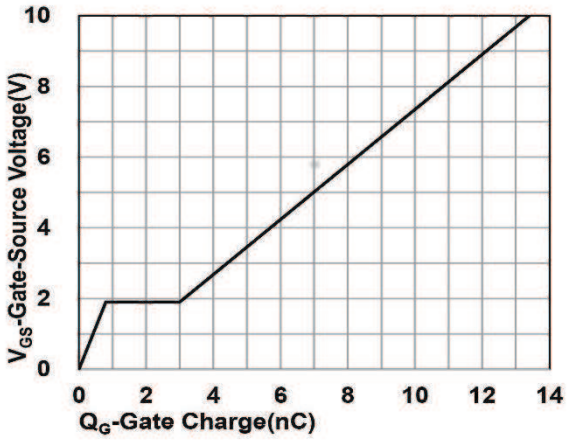


Figure 8. Gate Charge Characteristics

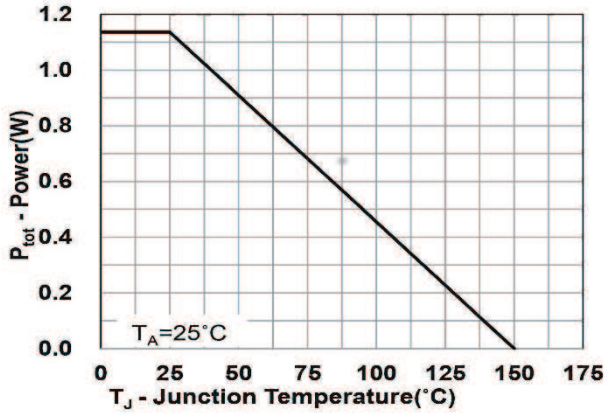


Figure 9. Power Dissipation

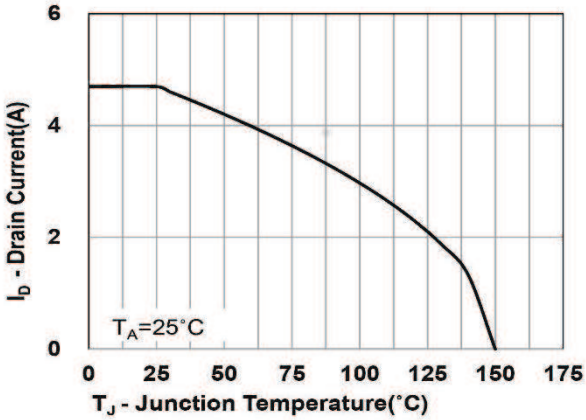


Figure 10. Drain Current

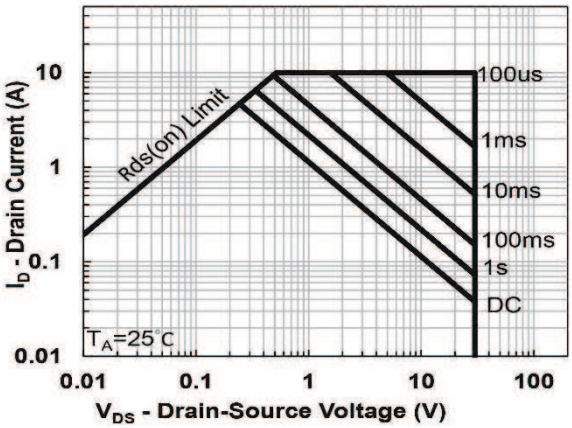


Figure 11. Safe Operating Area

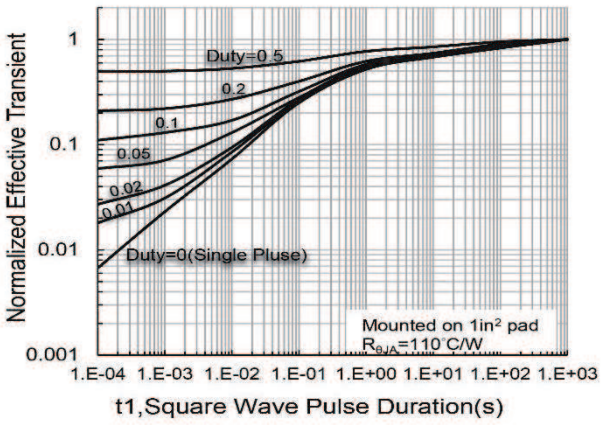
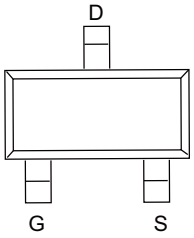
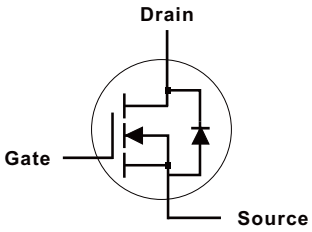


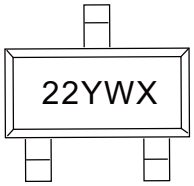
Figure 12. RθJA Transient Thermal Impedance

FMOS047N03

Pinning information

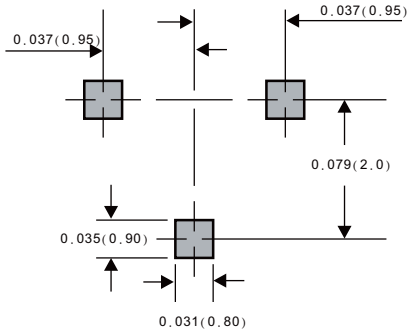
Pin	Simplified outline	Symbol
Pin D Drain Pin G Gate Pin S Source		

Marking

Type number	Marking code
FMOS047N03	 Note: 1. "22" is part number, fixed. 2. "Y" is Yearly code. 3. "W" is weekly code. 4. "X" is internal code.

Suggested solder pad layout

SOT-23



Dimensions in inches and(millimeters)

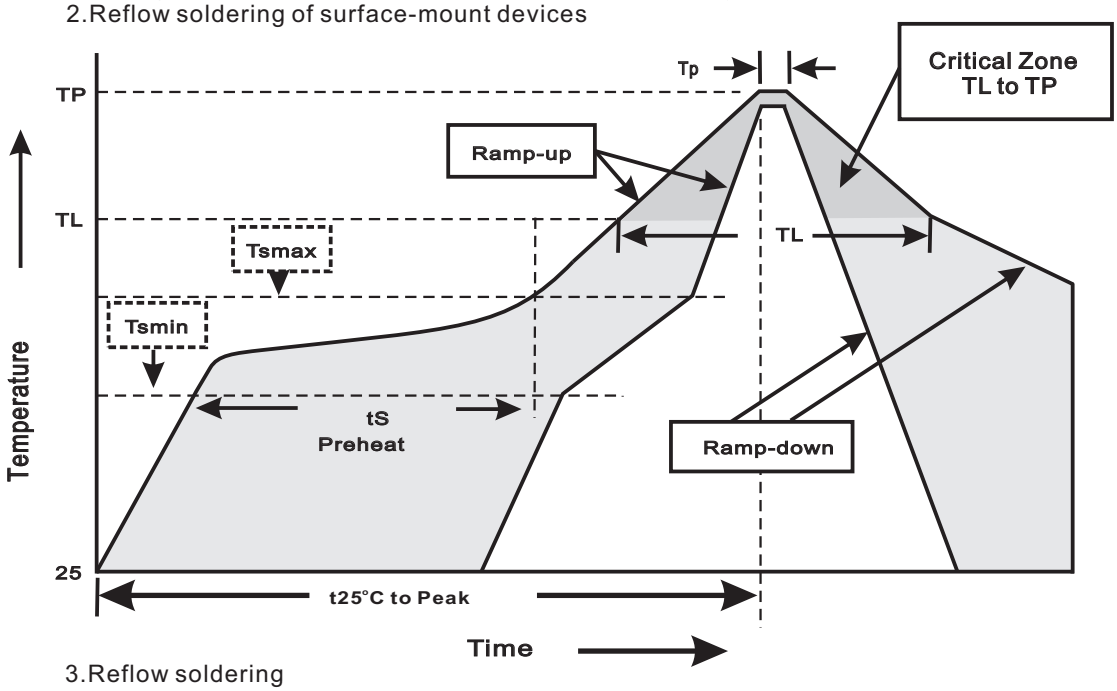
FMOS047N03

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°C~40°C Humidity=55%±25%
2.Reflow soldering of surface-mount devices

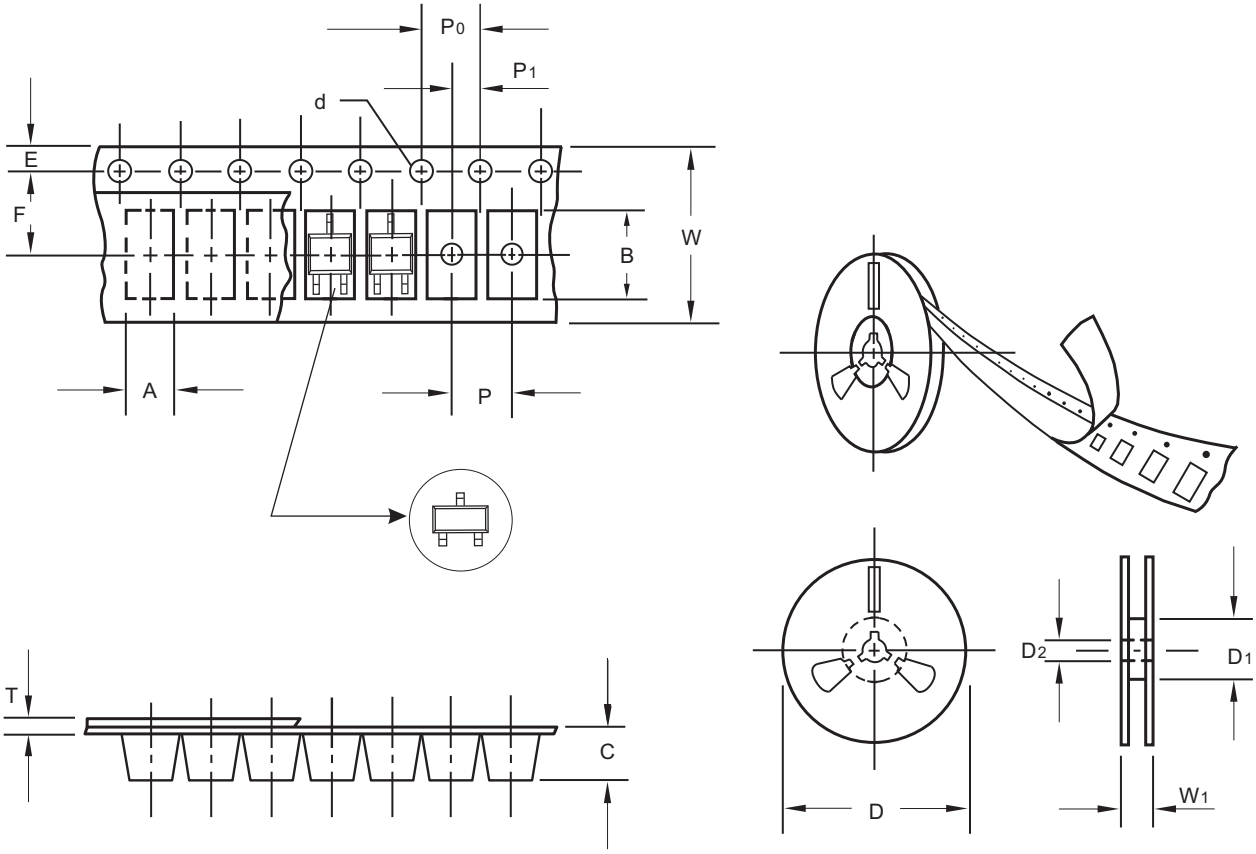


3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T_L to T_P)	<3°C/sec
Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(t_s)	 150°C 200°C 60~120sec
Tsmax to T_L -Ramp-upRate	 <3°C/sec
Time maintained above: -Temperature(T_L) -Time(t_L)	 217°C 60~260sec
Peak Temperature(T_P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t_P)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes

FMOS047N03

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 accor dance with EIA standar RS-481-A and specifications listed above.