FMOS007N03

List

FMOS007N03

720mA 30V N-Channel Enhancement Mode MOSFET

Features

- V_{DS} = 30V, I_D = 720mA.
- $R_{DS(ON)}$ < 400mΩ @-V_{GS}=4.5V, I_D=0.5A.
- $R_{DS(ON)}$ < 600mΩ @-V_{GS}=2.5V, I_D=0.3A.
- Fast switching speed.
- Excellent $R_{DS(ON)}$ and low gate charge.
- Reliable and rugged.
- RoHS compliant & Halogen - Free.
- Suffix "-H" indicates Halogen-free part, ex.FMOS007N03-H.

Applications

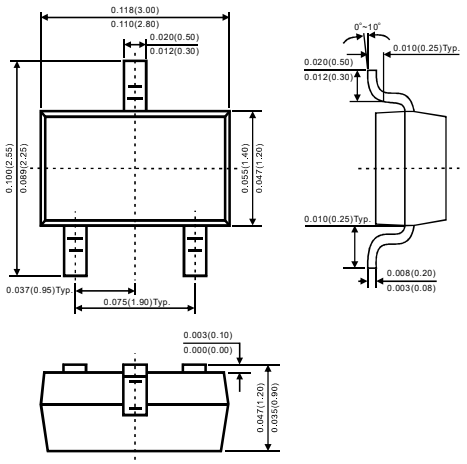
- Portable equipment.
- Battery powered system.

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_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℃)	I_D	720	mA
(T_A=70℃)		570	
Avalanche current, single pulse (Note 2) (L=0.1mH)	I_{AS}	1.8	A
Avalanche energy, single pulse (Note 2) (L=0.1mH)	E_{AS}	0.16	mJ
Power dissipation (T_A=25℃)	P_D	360	mW
Thermal resistance form junction to ambient	$R_{\theta JA}$	350	℃/W
Operating Junction temperature range	T_j	+150	℃
Storage temperature range	T_{STG}	-55 to +150	℃

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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	0.6	0.85	1.1	V
Forward transconductance	g_{FS}	V_{DS}=5V, I_D=250mA		5.7		S
Static drain-source on-resistance (Note 4)	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=500mA		330	400	mΩ
		V_{GS}=2.5V, I_D=300mA		350	600	
		V_{GS}=1.8V, I_D=100mA		600	825	
Dynamic Parameters (Note 5)						
Gate resistance	R_G	V_{GS}=0V, V_{DS}=0V, f=1.0MHz		195		Ω
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V, f=1.0MHz		38.2		pF
Output capacitance	C_{oss}			4.8		
Reverse transfer capacitance	C_{rss}			3.3		
Switching parameters						
Total gate charge	Q_g	V_{GS}=4.5V, V_{DS}=15V, I_D=1A		0.86		nC
Gate to source charge	Q_{gs}			0.29		
Gate to Drain charge	Q_{gd}			0.16		
Turn-on delay time	$t_{d(on)}$	V_{DS}=15V, V_{GS}=4.5V, I_D=1A, R_G=6Ω		5.4		ns
Rise time	t_r			20.2		
Turn-off delay time	$t_{d(off)}$			34.4		
Fall time	t_f			30.3		
Source-drain diode ratings and characteristics						
Reverse recovery time	t_{rr}	I_F=0.25A, V_R=20V, dI_F/dt=100A/μs		24.2		ns
Reverse recovery charge	Q_{rr}			3.2		nC
Drain - source diode forward voltage	V_{SD}	V_{GS}=0V, I_{SD}=250mA		0.9	1.1	V

Note : 1. Max. Current is limited by junction temperature.

2. UIS tested and pulse width are limited by maximum junction temperature 150℃.

3. Surface mounted on 1 in^2 FR4 borad with 1oz.

4. Pulse test (Pulse width ≤ 300μs, duty cycle ≤ 2%).

5. Guaranteed by design, not subject to production testing.

Rating and characteristic curves (FMOS007N03)

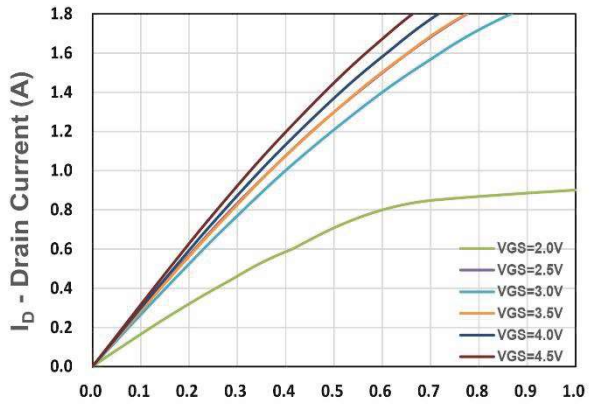


Figure 1. Output Characteristics

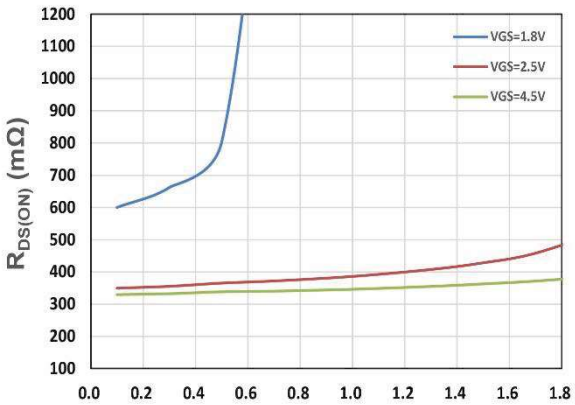


Figure 2. On-Resistance vs. ID

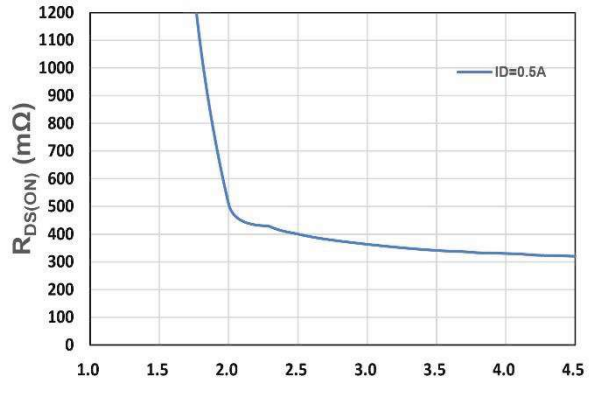


Figure 3. On-Resistance vs. VGS

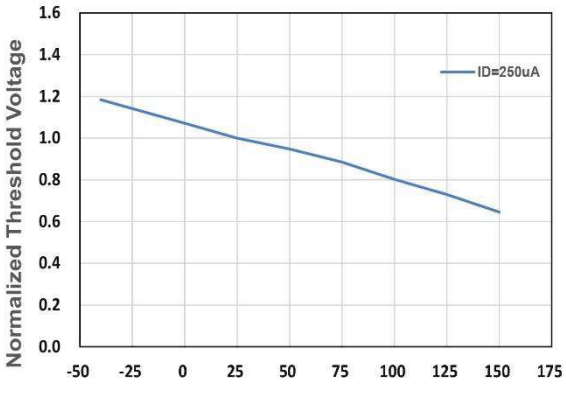


Figure 4. Gate Threshold Voltage

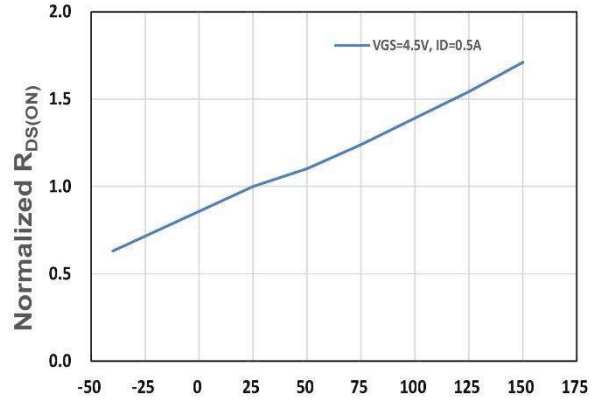


Figure 5. Drain-Source On Resistance

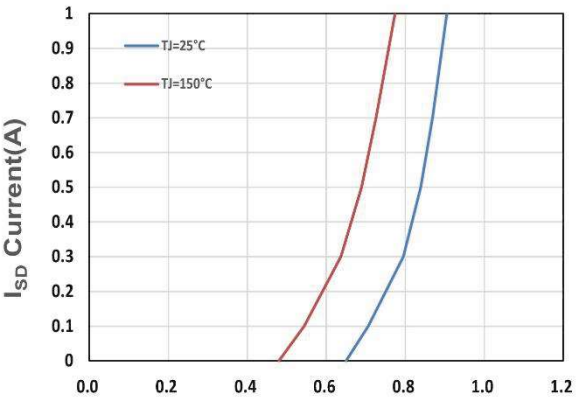
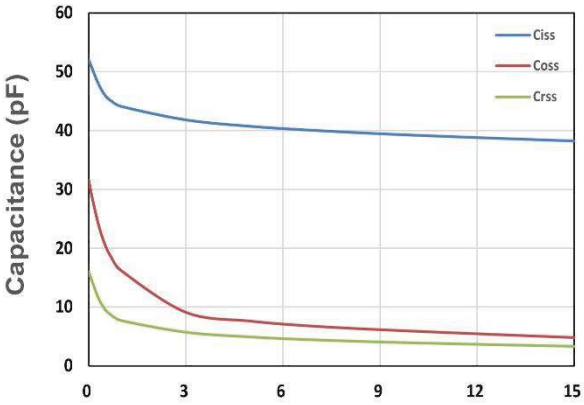


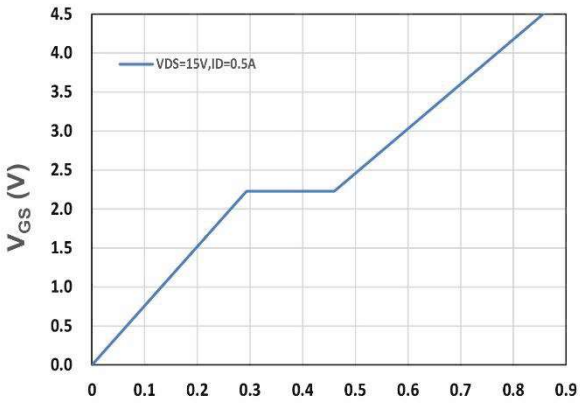
Figure 6. Source-Drain Diode Forward

Rating and characteristic curves (FMOS007N03)



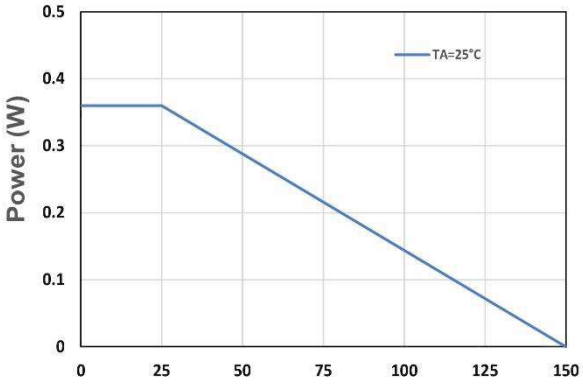
V_{DS} - Drain - Source Voltage (V)

Figure 7. Capacitance



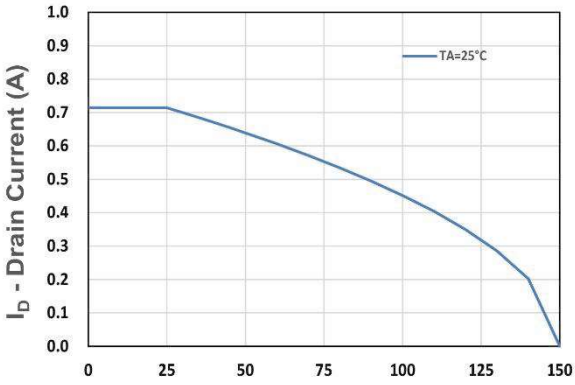
Qg, Total Gate Charge (nC)

Figure 8. Gate Charge Characteristics



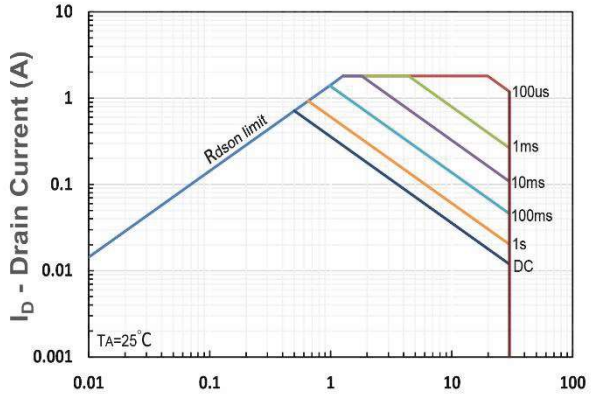
T_A - Junction Temperature (°C)

Figure 9. Power Dissipation



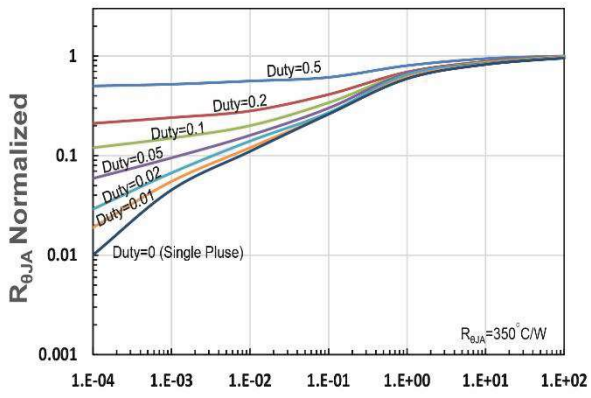
T_A - Junction Temperature (°C)

Figure 10. Drain Current



V_{DS} - Drain-Source Voltage (V)

Figure 11. Safe Operating Area



t_1,Square Wave Pulse Duration(s)

Figure 12. RθJA Transient Thermal Impedance

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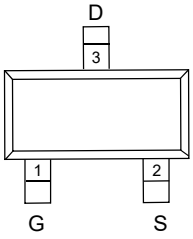
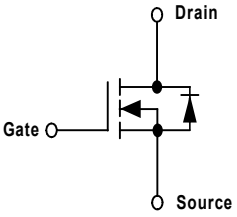
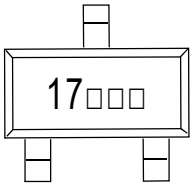
Pinning information

Pin	Simplified outline	Symbol
Pin1 Gate Pin2 Source Pin3 Drain		

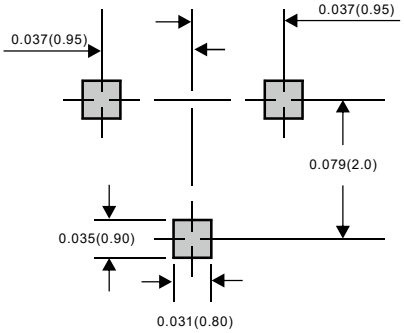
Marking



□□□ : Date Code

Suggested solder pad layout

SOT-23



Dimensions in inches and (millimeters)

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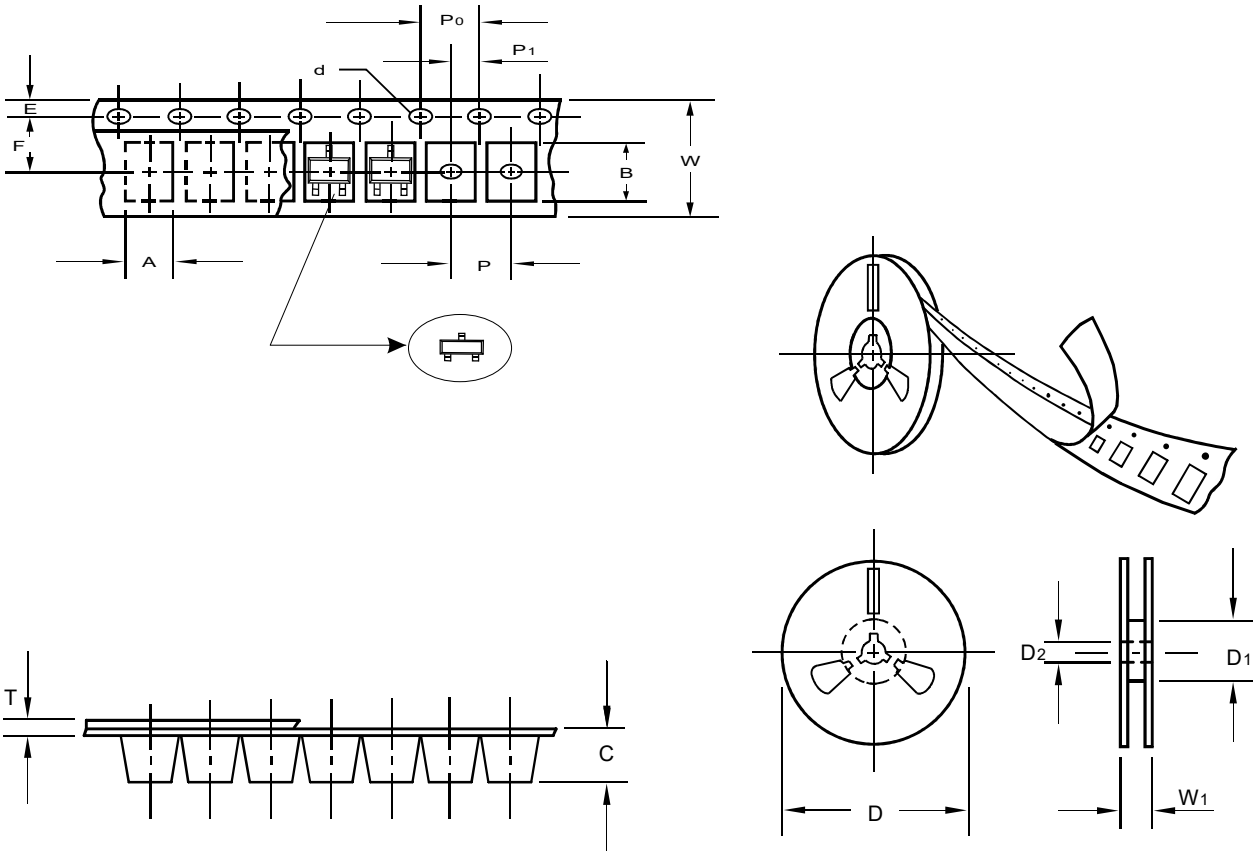
Packing information



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	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.

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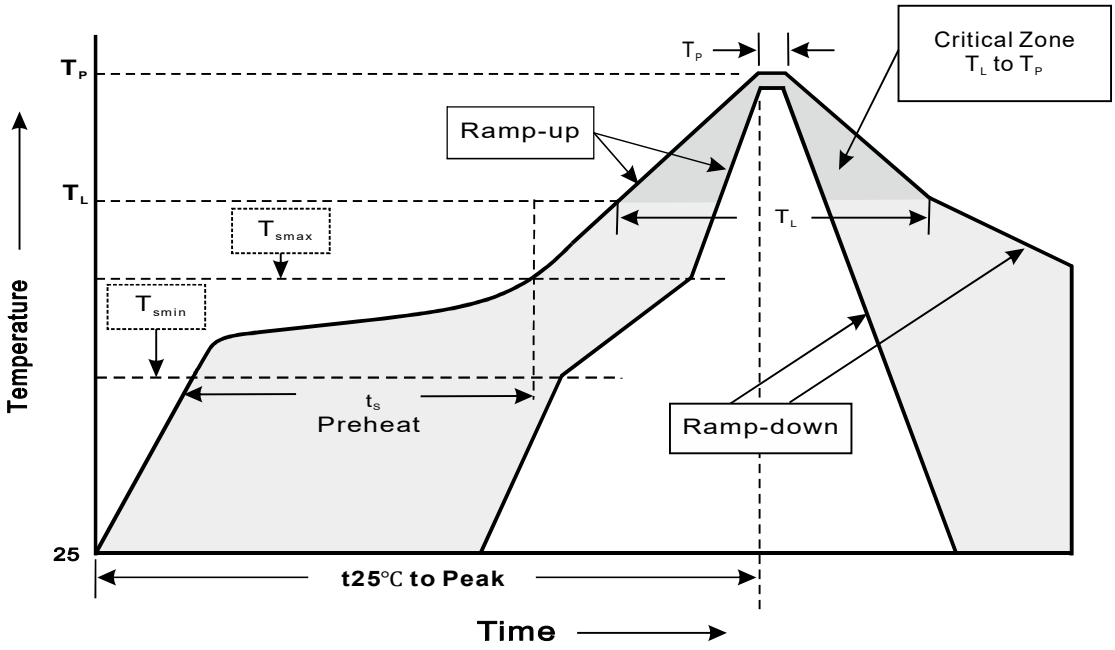
Reel packing

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)	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