

FMOS02N10

List

List.....	1
Package outline.....	2
Features.....	2
Application.....	2
Mechanical data.....	2
Maximum ratings	2
Electrical characteristics.....	3
Rating and characteristic curves.....	4~5
Pinning information.....	6
Marking.....	6
Suggested solder pad layout.....	6
Packing information.....	7
Reel packing.....	8
Suggested thermal profiles for soldering processes.....	8

FMOS02N10

2.2A 100V N-Channel Enhancement Mode Power MOSFET

Features

- $V_{DS}=100V$, $I_D=2.2A$.
- $R_{DS(ON)} < 286m\Omega$ @ $V_{GS}=10V$, $I_D=2V$.
- $R_{DS(ON)} < 312m\Omega$ @ $V_{GS}=4.5V$, $I_D=1V$.
- Advanced trench technology.
- Excellent $R_{DS(ON)}$ and low gate charge.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.FMOS02N10-H.

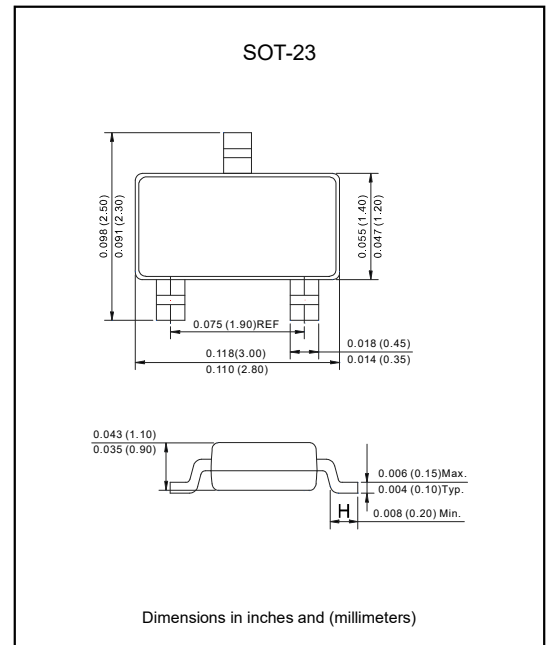
Application

- Load switch.
- PWM Application.
- Power management.

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



Maximum ratings (At $T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	100	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain Current ($T_A=25^\circ C$)	I_D	2.2	A
($T_A=100^\circ C$)		1.4	
Drain current pulse (Note 1)	I_{DM}	8.8	A
Power dissipation	P_D	2.3	W
Operating Junction temperature	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$
Thermal resistance junction to ambient	$R_{\theta JA}$	54	$^\circ C/W$

FMOS02N10

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	100			V
Drain-source leakage current	I_{DSS}	$V_{DS}=100\text{V}$, $V_{GS}=0\text{V}$			1.0	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	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1.0	1.5	2.2	V
Static drain-source on-resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=2\text{A}$		220	286	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=1\text{A}$		223	312	

Dynamic parameters

Input capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		321		pF
Out capacitance	C_{oss}			21		
Reverse transfer capacitance	C_{rss}			15		

Switching parameters

Turn-on delay time	$t_{d(ON)}$	$V_{DS}=30\text{V}$, $V_{GS}=10\text{V}$, $R_G=3\Omega$, $I_D=1\text{A}$		14		ns
Rise time	t_r			54		
Turn-off delay time	$t_{d(OFF)}$			18		
Fall time	t_f			11		
Total gate charge	Q_g	$V_{DS}=30\text{V}$, $I_D=2\text{A}$, $V_{GS}=10\text{V}$		5.3		nC
Gate-source charge	Q_{gs}			1.3		
Gate-drain charge	Q_{gd}			1.7		

Drain-source diode characteristics and maximum ratings

Drain-source diode forward voltage	V_{SD}	$V_{GS}=0\text{V}$, $I_S=2.2\text{A}$			1.2	V
Continuous source current	I_S				2.2	A
Maximum pulsed drain to source diode forward current	I_{SM}				8.8	A

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

2. Pulse test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 0.5\%$.

FMOS02N10

Rating and characteristic curves

Figure1: Output Characteristics

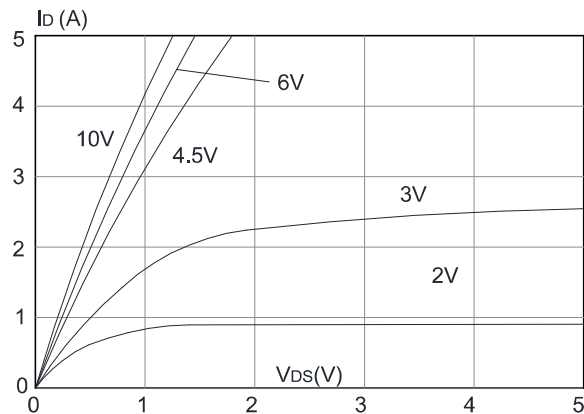


Figure 2: Typical Transfer Characteristics

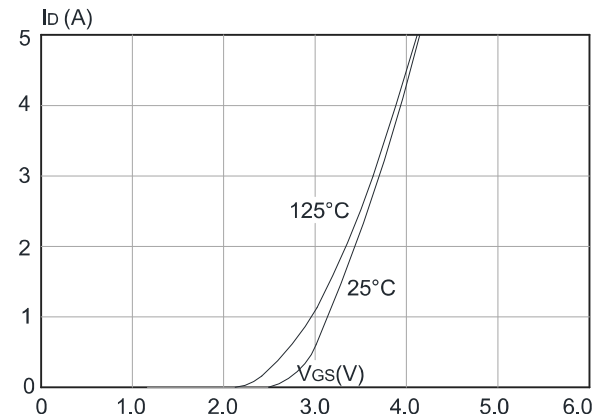


Figure 3: On-resistance vs. Drain Current

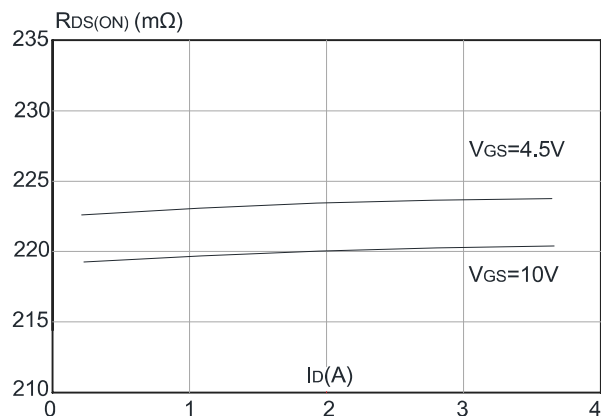


Figure 4: Body Diode Characteristics

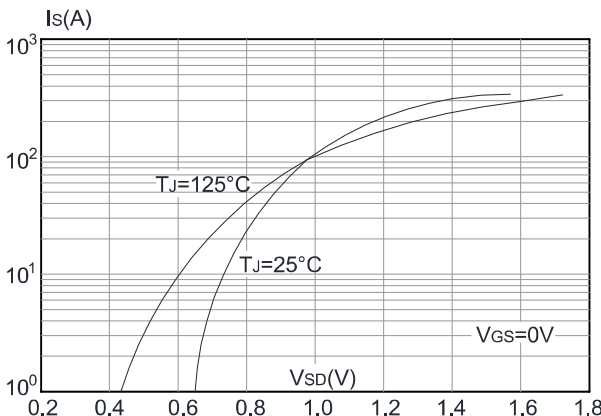


Figure 5: Gate Charge Characteristics

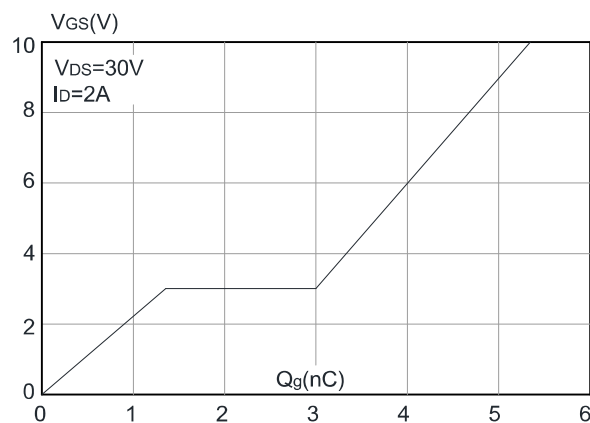
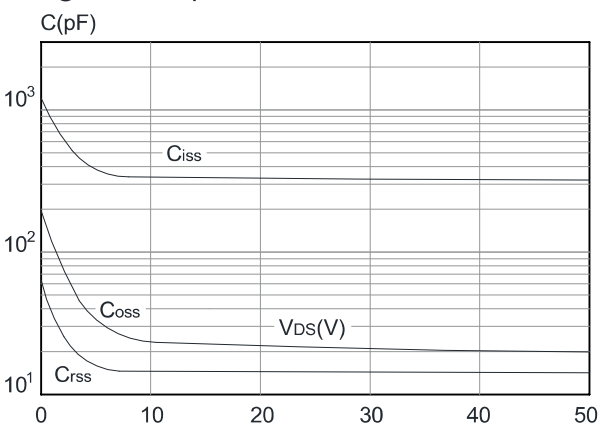
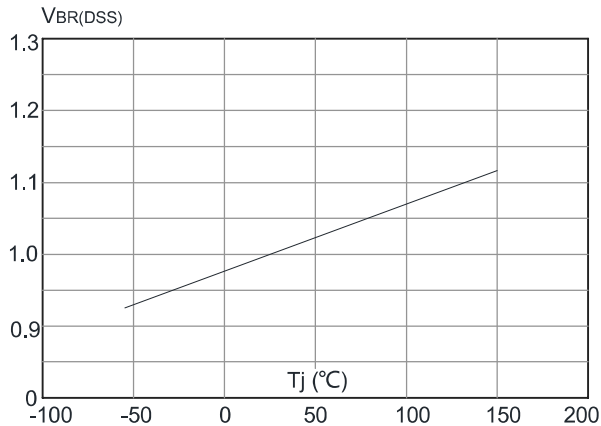
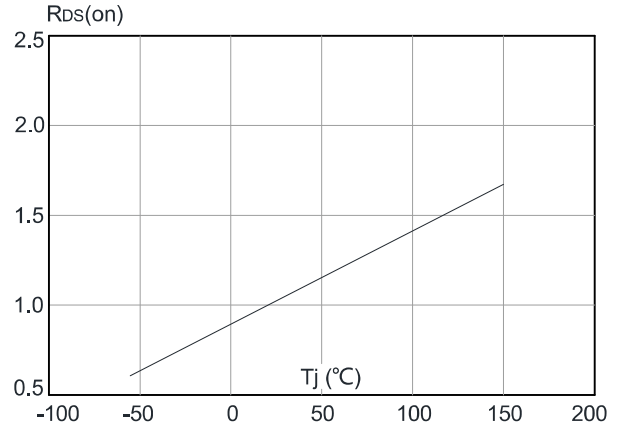
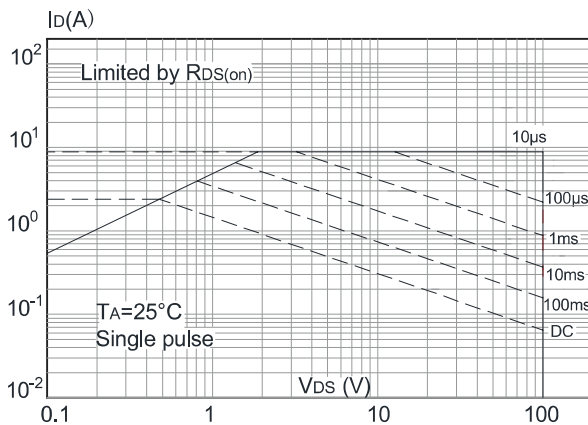
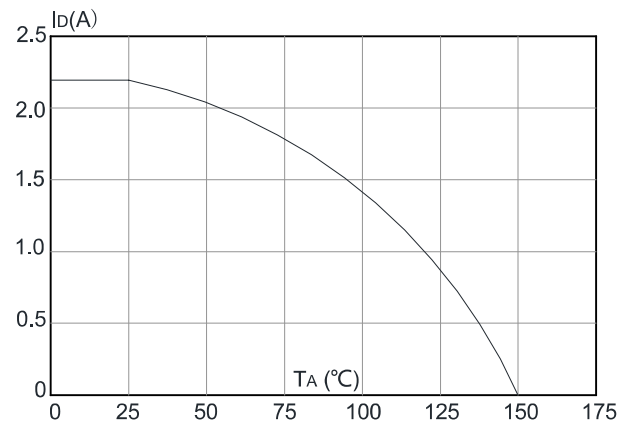
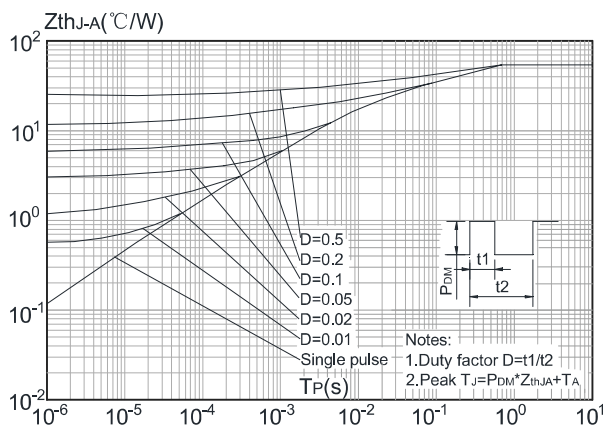


Figure 6: Capacitance Characteristics



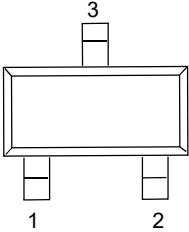
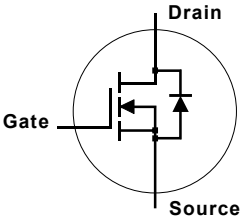
FMOS02N10

Rating and characteristic curves

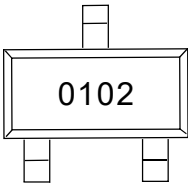
Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**Figure 8:** Normalized on Resistance vs. Junction Temperature**Figure 9:** Maximum Safe Operating Area**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

FMOS02N10

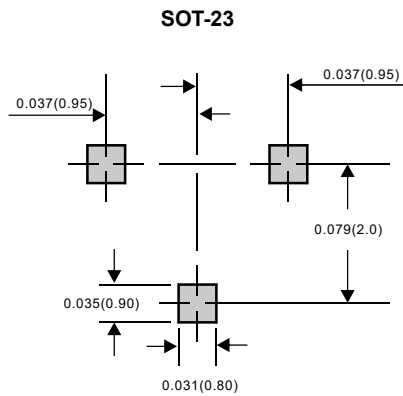
Pinning information

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

Marking

Type number	Marking Code
FMOS02N10	

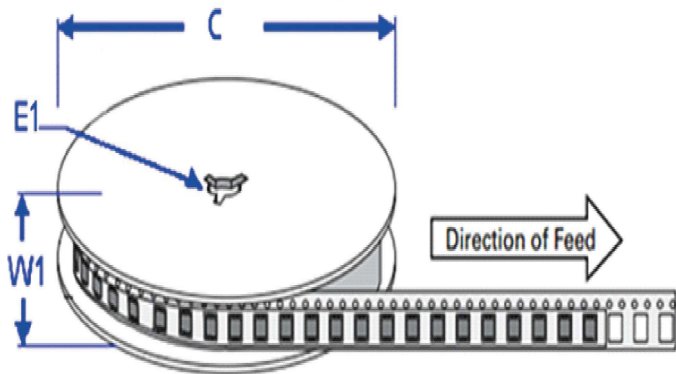
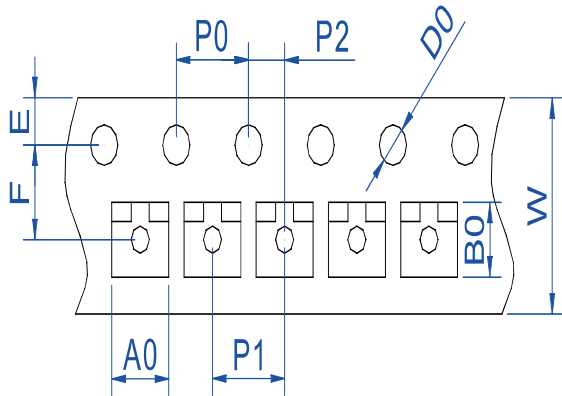
Suggested solder pad layout



Dimensions in inches and (millimeters)

FMOS02N10

Packing information



Ref.	Dimensions	
	Millimeters	Inches
A0	3.15 ± 0.3	0.124 ± 0.012
B0	2.77 ± 0.3	0.109 ± 0.012
C	178	7.0
D0	1.50±0.1	0.059 ± 0.004
E	1.75 ± 0.2	0.069 ± 0.008
E1	13.3±0.3	0.524± 0.012
F	3.5 ± 0.2	0.138 ± 0.008
P0	4.00 ± 0.2	0.157 ± 0.008
P1	4.00 ± 0.2	0.157 ± 0.008
P2	2.00 ± 0.2	0.079 ± 0.008
W	8.00 ± 0.2	0.315 ± 0.008
W1	11.5±1.0	0.453 ± 0.039

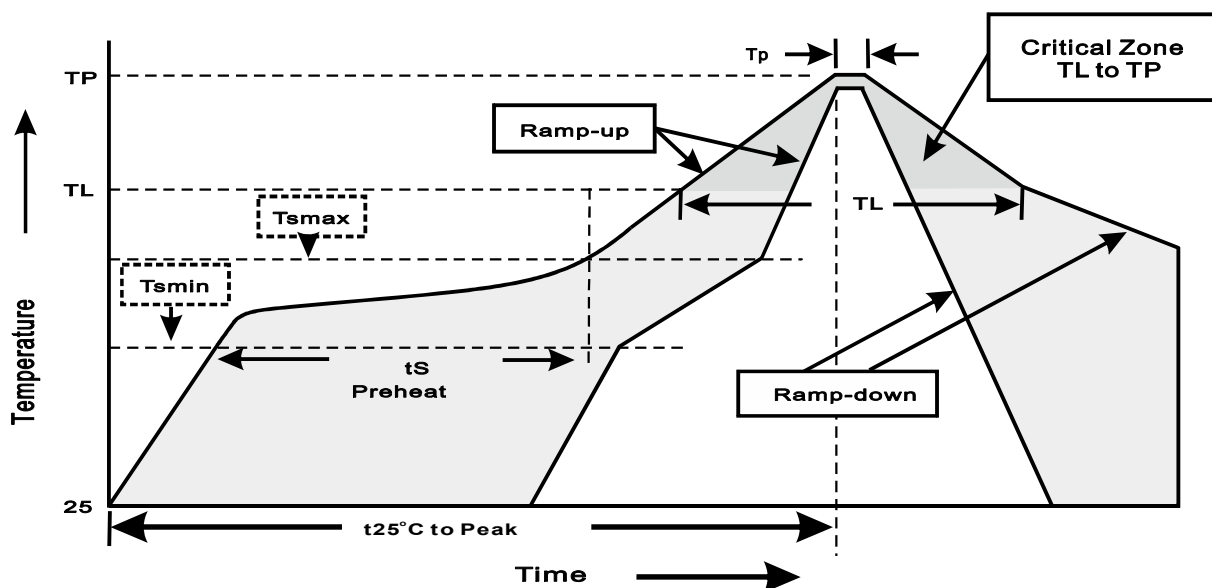
FMOS02N10

Reel packing

Device	Outline	Device Package	Reel Size	Reel (pcs)	Per Carton (pcs)
FMOS02N10	Taping	SOT-23	7 inch	3,000	180,000

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 60~120sec
T _{smax} 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