

# FMOS1012KW

## List

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

# FMOS1012KW

## 20V N-Channel Enhancement Mode MOSFET- ESD Protection

### Features

- High-side switching
- Low on-resistance
- Low threshold
- Fast switching speed
- ESD protected up to 2kV
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicates Halogen-free part, ex. FMOS1012KW-H

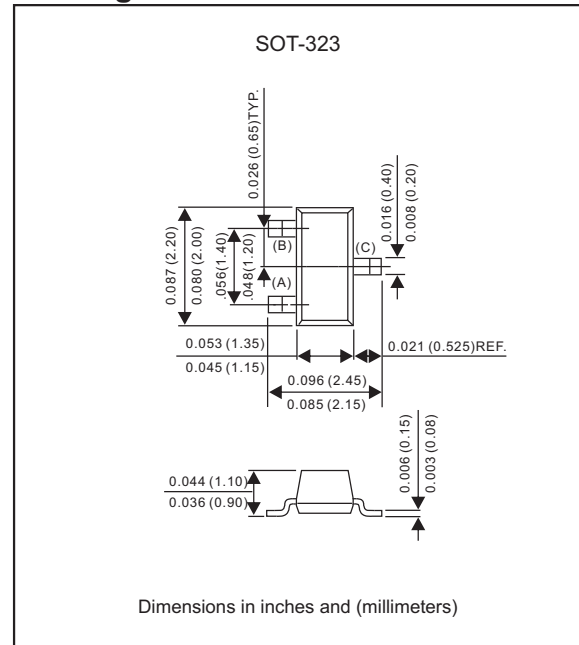
### Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-323
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.006 gram

### Application

- Drivers: Relays, solenoids, lamps, hammers, displays, memories
- Battery operated systems
- Power supply converter circuits
- Load/power switching cell phones, pagers

### Package outline



### Maximum ratings (AT T<sub>A</sub>=25°C unless otherwise noted)

PARAMETER	Symbol	MIN.	TYP.	MAX.	UNIT
Drain-source voltage	V <sub>DSS</sub>			20	V
Drain current-continuous (note 1)	I <sub>D(DC)</sub>			500	mA
Drain current-pulsed(note1)	I <sub>DM(pulse)</sub>			1000	
Gate-source voltage	V <sub>GS</sub>			±12	V
Power dissipation (note 2 , T <sub>a</sub> =25°C)	P <sub>D</sub>			150	mW
Maximum power dissipation (note 3 , T <sub>c</sub> =25°C)				275	
Thermal resistance from junction to ambient	R <sub>θJA</sub>		833		°C/W
Thermal resistance from junction to case	R <sub>θJC</sub>		455		
Operation junction temperature range	T <sub>J</sub>	-55		+150	°C
Storage temperature range	T <sub>STG</sub>	-55		+150	°C

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

2: This test is performed with no heat sink at T<sub>a</sub>=25°C.

3: This test is performed with infinite heat sink at T<sub>c</sub>=25°C.

## FMOS1012KW

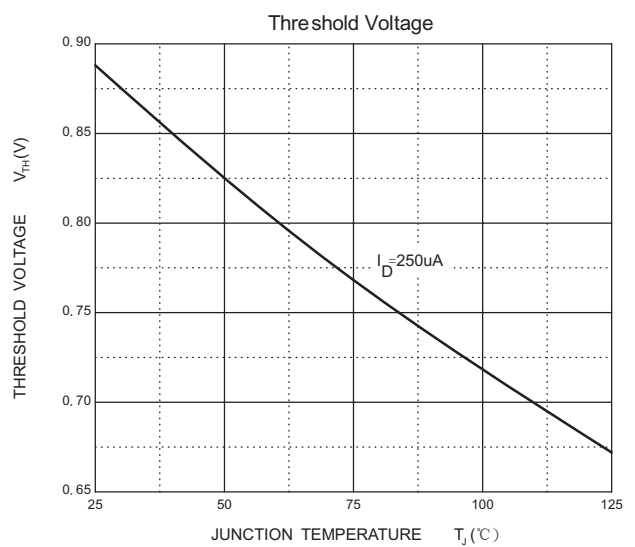
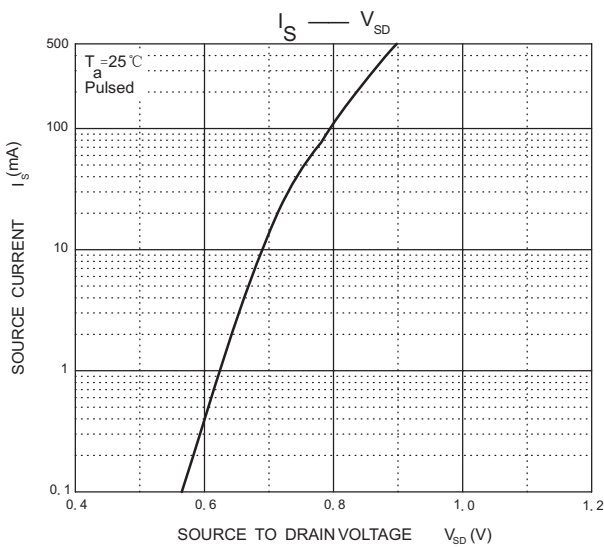
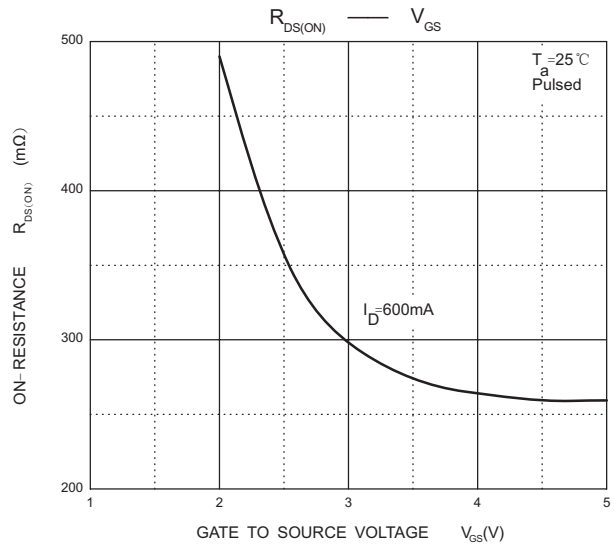
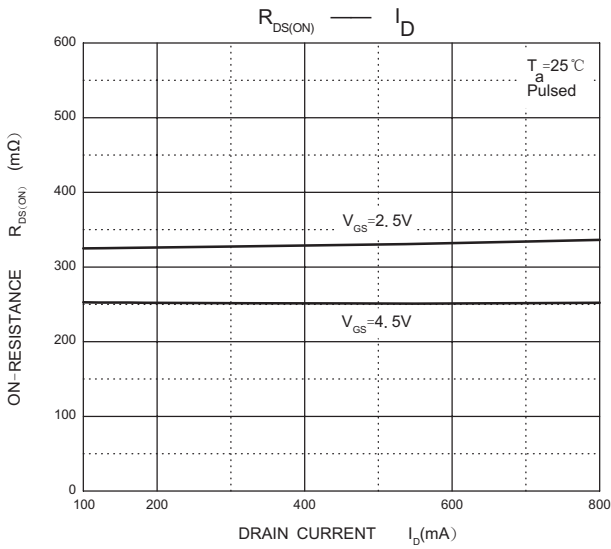
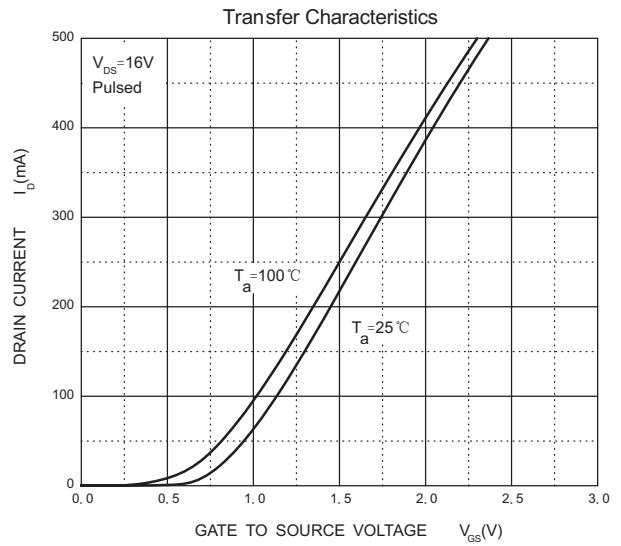
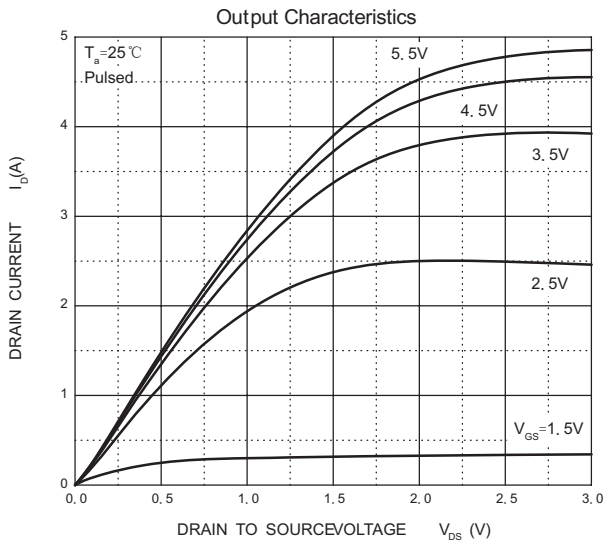
**Electrical characteristics** (At  $T_A=25^\circ\text{C}$  unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
<b>STATIC CHARACTERISTICS</b>						
Drain-source breakdown voltage	$V_{GS} = 0V, I_D = 250\mu A$	$V_{(BR)DSS}$	20			V
Zero gate voltage drain current	$V_{DS} = 16V, V_{GS} = 0V$	$I_{DSS}$			100	nA
Gate-body leakage current	$V_{GS} = \pm 4.5V, V_{DS} = 0V$	$I_{GSS}$			$\pm 1$	$\mu A$
Gate threshold voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(th)}$	0.45		1.2	V
Drain-source on-resistance	$V_{GS} = 4.5V, I_D = 600mA$ $V_{GS} = 2.5V, I_D = 500mA$	$R_{DS(on)}$			700 850	m $\Omega$
Forward transconductance	$V_{DS} = 10V, I_D = 400mA$	$g_{FS}$		1		S
Diode forward voltage (note 2)	$I_S = 0.15A, V_{GS} = 0V$	$V_{SD}$			1.2	V
<b>DYNAMIC CHARACTERISTICS</b>						
Input capacitance (note 1)	$V_{DS} = 16V, V_{GS} = 0V, f = 1MHz$	$C_{iss}$		100		pF
Output capacitance (note 1)		$C_{oss}$		16		
Reverse transfer capacitance (note 1)		$C_{rss}$		12		
<b>SWITCHING CHARACTERISTICS</b>						
Total gate charge	$V_{DS} = 10V, V_{GS} = 4.5V, I_D = 250mA$	$Q_g$		750		nC
Gate-source charge		$Q_{gs}$		75		
Gate-drain charge		$Q_{gd}$		225		
Turn-on delay time (note 2)	$V_{DD} = 10V,$ $R_L = 47\Omega, I_D = 200mA,$ $V_{GS} = 4.5V, R_G = 10\Omega$	$t_{d(on)}$		5		ns
Turn-on rise time (note 2)		$t_r$		5		
Turn-off delay time (note 2)		$t_{d(off)}$		25		
Turn-off fall time (note 2)		$t_f$		11		

Notes 1: These parameters have no way to verify.

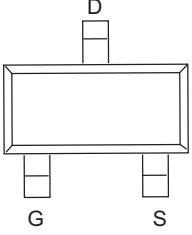
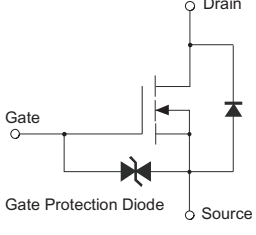
2: Pulse Test : Pulse Width  $\leq 300\mu s$ , duty cycle  $\leq 0.5\%$ .

# Rating and characteristic curves (FMOS1012KW)



# FMOS1012KW

## Pinning information

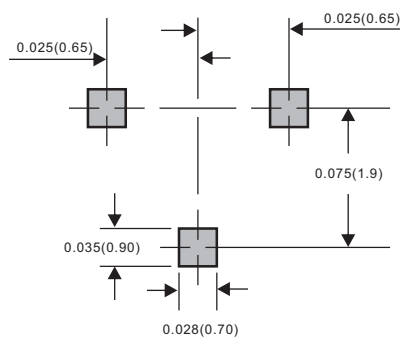
Pin	Simplified outline	Symbol
PinD Drain PinG Gate PinS Source		

## Marking

Type number	Marking code
FMOS1012KW	C

## Suggested solder pad layout

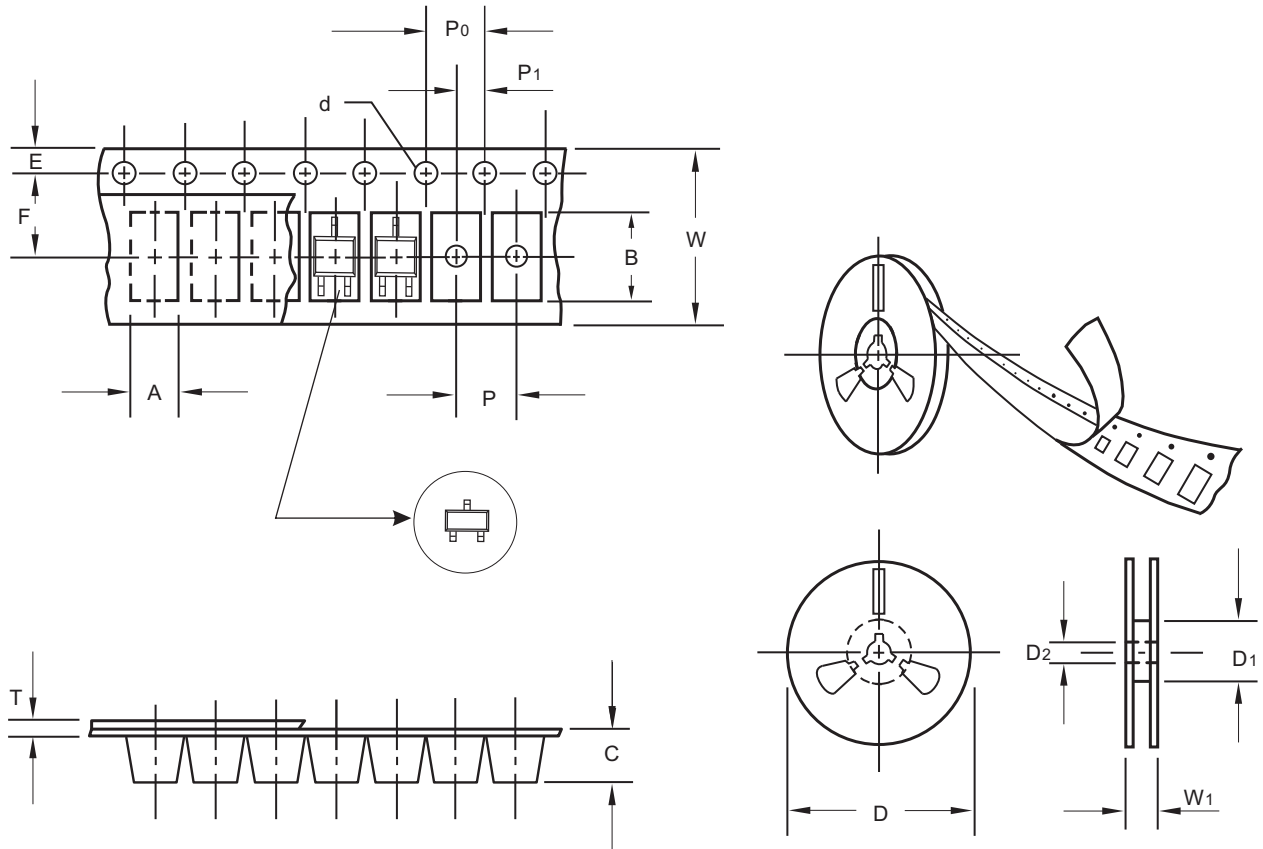
SOT-323



Dimensions in inches and (millimeters)

# FMOS1012KW

## Packing information



unit:mm

Item	Symbol	Tolerance	SOT-323
Carrier width	A	0.1	2.25
Carrier length	B	0.1	2.55
Carrier depth	C	0.1	1.19
Sprocket hole	d	0.1	1.55
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	54.40
Feed hole diameter	D2	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	P0	0.1	4.00
Embossment center	P1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W1	1.0	11.40

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

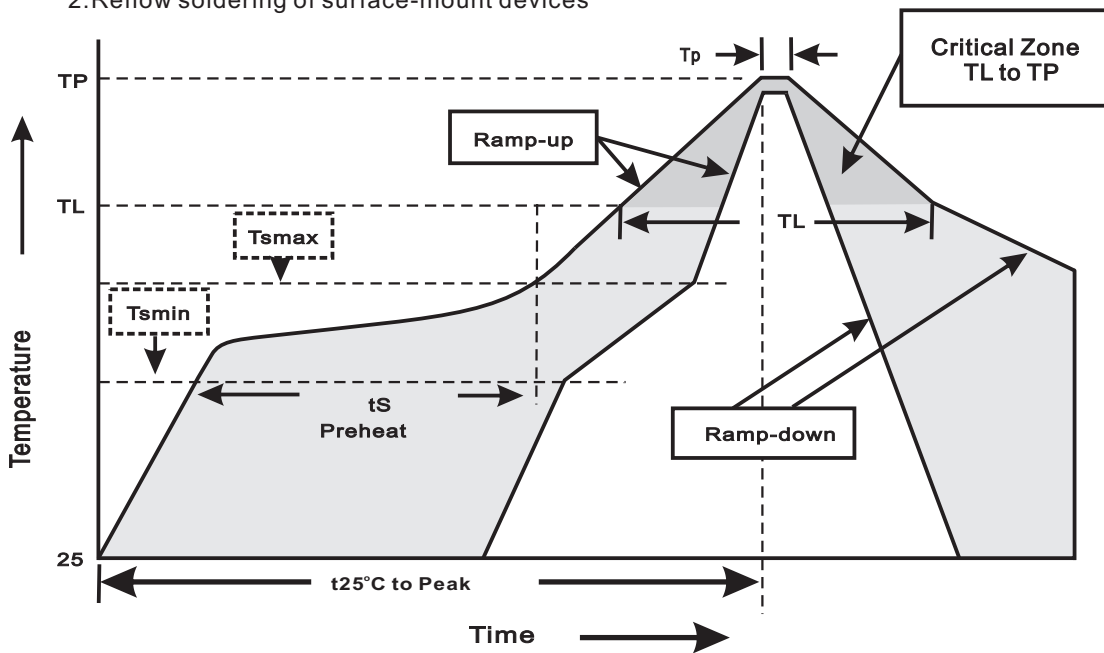
# FMOS1012KW

## 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-323	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	9.5

## 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 <sub>L</sub> to T <sub>P</sub> )	<3°C/sec
Preheat -Temperature Min(T <sub> Amin</sub> ) -Temperature Max(T <sub> smax</sub> ) -Time(min to max)(t <sub> s</sub> )	150°C 200°C 60~120sec
T <sub> smax</sub> to T <sub> L</sub> -Ramp-upRate	<3°C/sec
Time maintained above: -Temperature(T <sub> L</sub> ) -Time(t <sub> L</sub> )	217°C 60~260sec
Peak Temperature(T <sub> P</sub> )	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t <sub> P</sub> )	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes