

FMOSH003N03E

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FMOSH003N03E

300mA 30V N-Channel Enhancement Mode MOSFET ESD Protection

Features

- $V_{DS}=30V, I_D=300mA$.
- $R_{DS(on)} < 1.5\Omega @ V_{GS}=10V, I_D=0.3A$.
- $R_{DS(on)} < 2.3\Omega @ V_{GS}=4.5V, I_D=0.2A$.
- Improved dv/dt capability.
- Fast switching.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex. FMOSH003N03E-H.

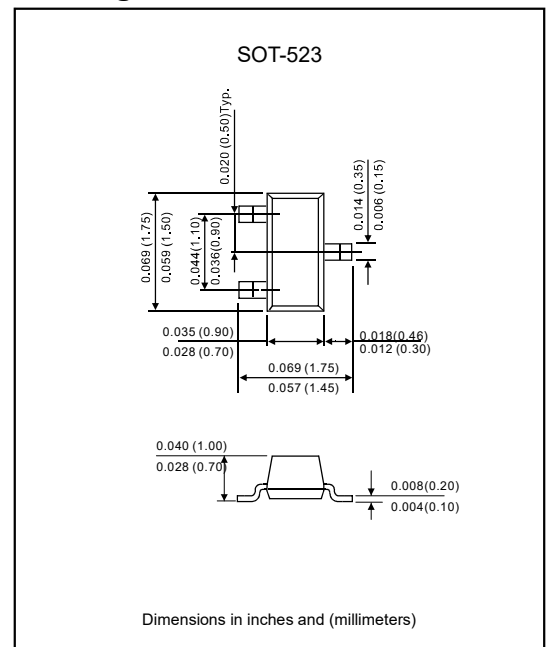
Applications

- Notebook.
- Load switch.
- Battery protection.
- Hand-held instruments.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-523.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Mounting Position : Any.

Package outline



Maximum Ratings (At $T_A=25^\circ\text{C}$ Unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain source voltage	V_{DS}	30	V
Gate source voltage	V_{GS}	± 20	V
Drain current continuous	I_D	300	mA
		240	
Pulsed drain current (Note 1)	I_{DM}	1.2	A
Power dissipation	P_D	313	mW
		2.5	mW/ $^\circ\text{C}$
Thermal resistance, junction to ambient	$R_{\theta JA}$	400	$^\circ\text{C}/\text{W}$
Operating junction temperature	T_J	+150	$^\circ\text{C}$
Storage temperature range	T_{STG}	-55 to +150	$^\circ\text{C}$

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

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static parameters						
Drain-source breakdown voltage	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	BV_{DSS}	30			V
BV_{DSS} temperature coefficient	Reference to 25°C , $I_D=1\text{mA}$	$\Delta BV_{DSS}/\Delta T_J$		0.05		V/ $^{\circ}\text{C}$
Drain-source leakage current	$V_{DS}=30\text{V}$, $V_{GS}=0\text{V}$, $T_J=50^{\circ}\text{C}$	I_{DSS}			400	nA
	$V_{DS}=30\text{V}$, $V_{GS}=0\text{V}$, $T_J=85^{\circ}\text{C}$				600	
Gate-source leakage current	$V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$	I_{GSS}			± 6	μA
Gate threshold voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	$V_{GS(TH)}$	0.8	1.1	1.6	V
$V_{GS(TH)}$ temperature coefficient		$\Delta V_{GS(TH)}$		3		mV/ $^{\circ}\text{C}$
Static drain-source on-state resistance	$V_{GS}=10\text{V}$, $I_D=0.3\text{A}$	$R_{DS(ON)}$		1.2	1.5	Ω
	$V_{GS}=4.5\text{V}$, $I_D=0.2\text{A}$			1.3	2.3	

Dynamic parameters

Input capacitance	$V_{GS}=0\text{V}$, $V_{DS}=30\text{V}$, $f=1.0\text{MHz}$	C_{iss}		23	46	pF
Out capacitance		C_{oss}		16	32	
Reverse transfer capacitance		C_{rss}		10	20	

Source-drain diode ratings and characteristics

Drain-source diode forward voltage	$I_{SD}=0.2\text{A}$, $V_{GS}=0\text{V}$, $T_J=25^{\circ}\text{C}$	V_{SD}			1.3	V
Diode continuous current	$V_G=V_D=0\text{V}$, force current	I_S			300	mA
Pulsed drain-source diode forward current		I_{SM}			600	mA

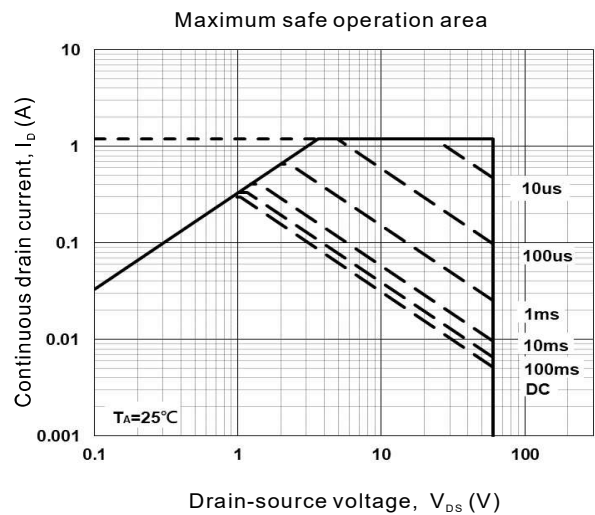
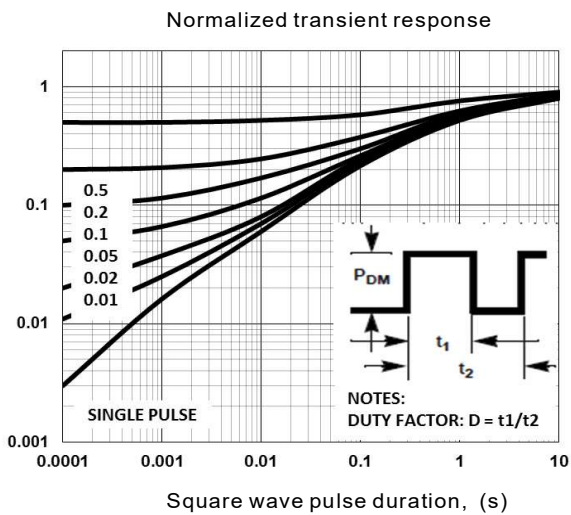
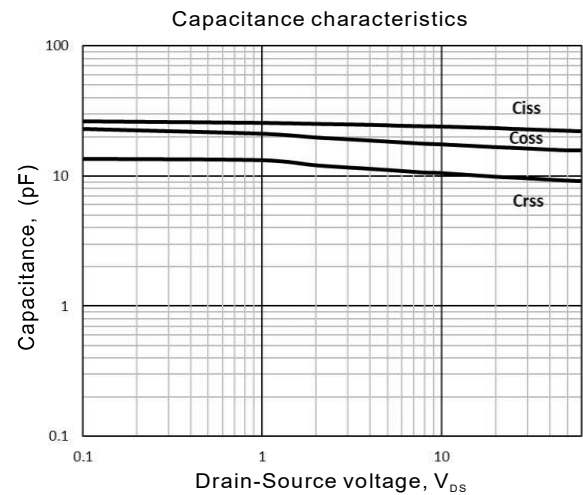
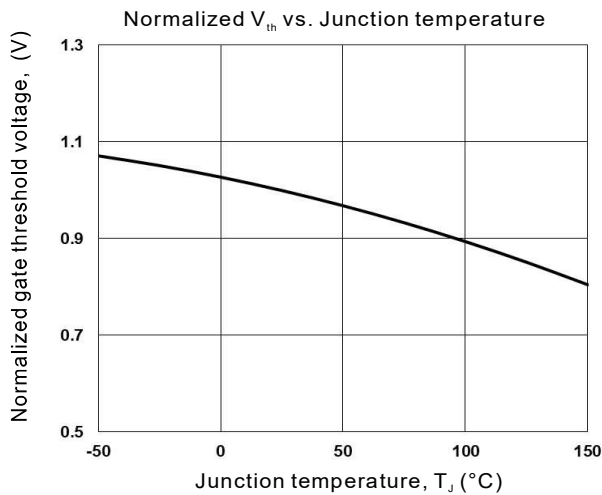
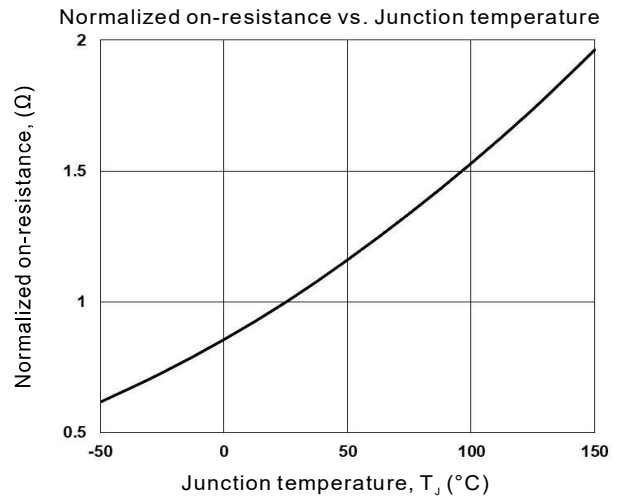
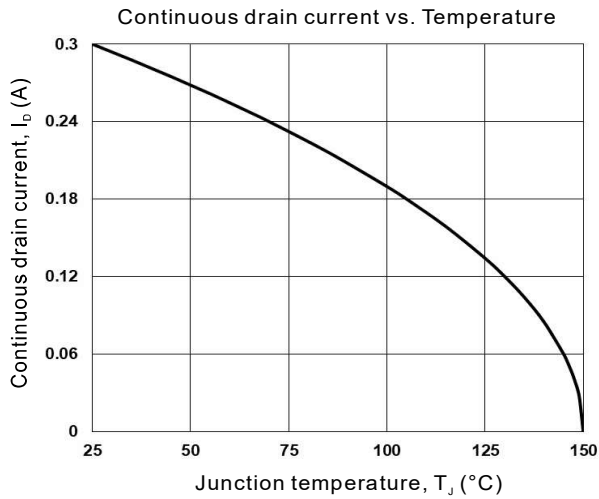
Note: 1. Repetitive rating: pulse width limited by maximum junction temperature.

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

3. Essentially independent of operating temperature.

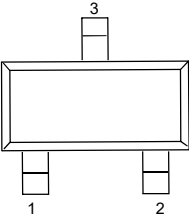
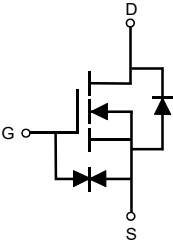
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Rating and characteristic curves



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Pinning information

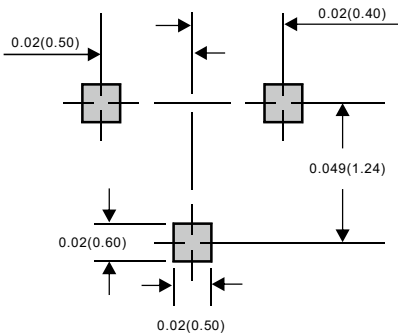
Pin	Simplified outline	Symbol
Pin 1 Gate Pin 2 Source Pin 3 Drain		

Marking

Type number	Marking code
FMOSH003N03E	KN

Suggested solder pad layout

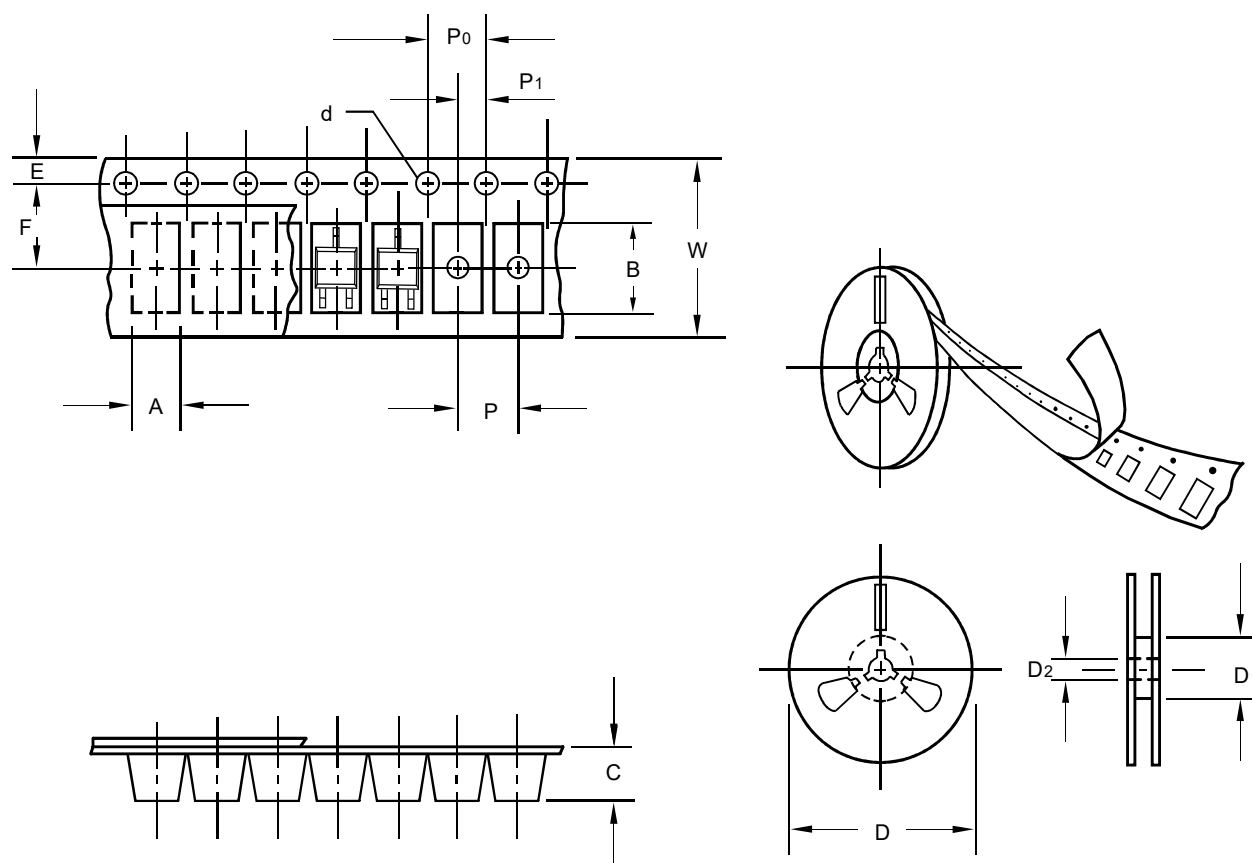
SOT-523



Dimensions in inches and (millimeters)

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Packing information



unit:mm

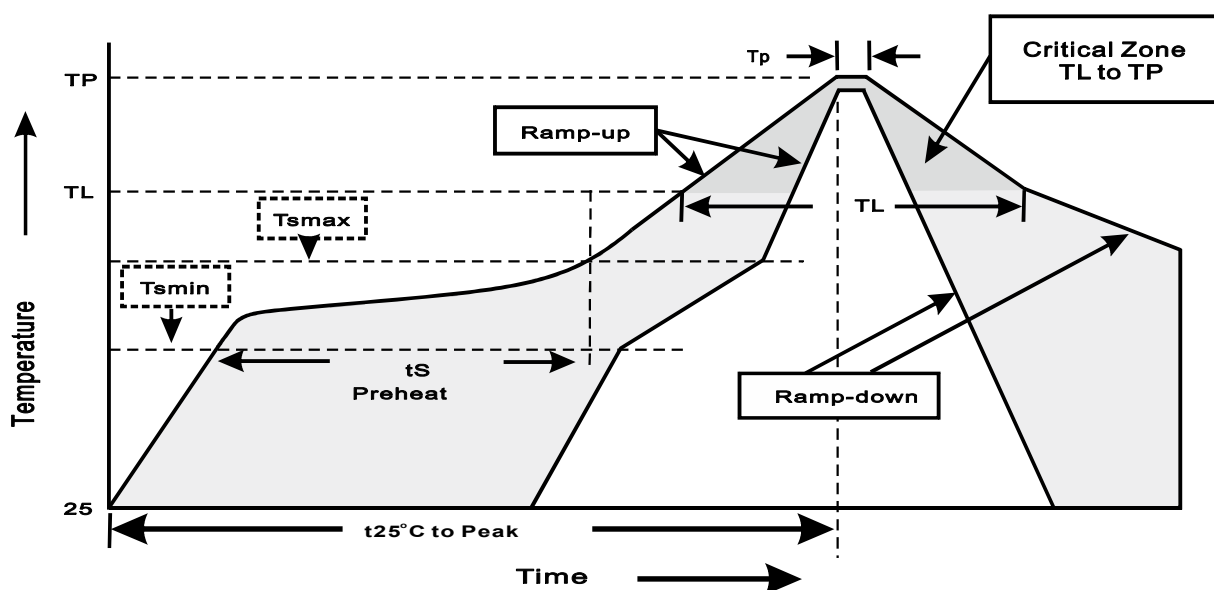
Item	Symbol	Tolerance	SOT-523
Carrier width	A	0.5	1.85
Carrier length	B	0.5	1.85
Carrier depth	C	0.5	0.875
Sprocket hole	d	0.1	1.5
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D1	min	60.00
Feed hole diameter	D2	0.5	13.00
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
Tape width	W	0.3	8.00

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

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-523	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000

1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
2.Reflow soldering of surface-mount devices



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