

FMOSTHF0P3DN03E-H

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0.3A 30V Dual N-Channel Trench Enhancement Mode MOSFET ESD Protection

Features

- $V_{DS}=30V$, $I_D=0.3A$.
- $R_{DS(on)} \leq 1.5\Omega$ @ $V_{GS}=10V$, $I_D=0.3A$.
- $R_{DS(on)} \leq 2.2\Omega$ @ $V_{GS}=4.5V$, $I_D=0.2A$.
- Improved dv/dt capability.
- Fast switching.
- ESD protected: 2KV.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21).

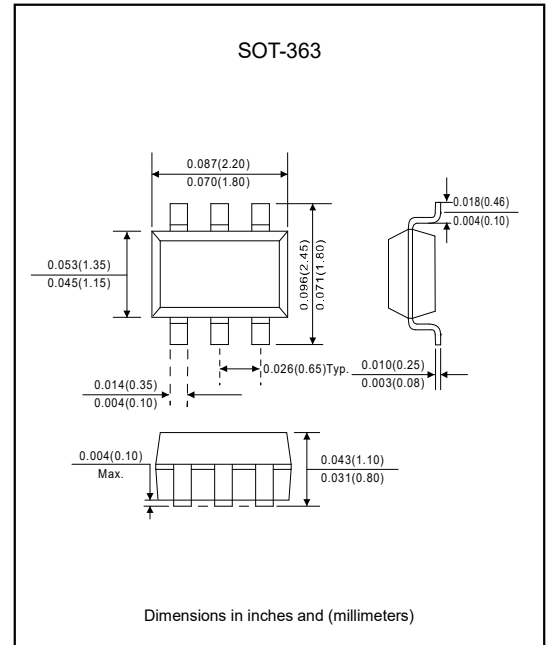
Applications

- Motor drive.
- Power tools.
- LED lighting.

Mechanical data

- Epoxy : UL94-V0 rated flame retardant.
- Case : Molded plastic, SOT-363.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Weight : Approximated 7.5mg.

Package outline



Maximum ratings ($T_c=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain-source voltage	V_{DS}	30	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current ($T_A=25^\circ\text{C}$) ($T_A=70^\circ\text{C}$)	I_D	0.3	A
		0.2	
Pulse drain current (Note1)	I_{DM}	0.9	A
Power dissipation ($T_A=25^\circ\text{C}$) (Derate above 25°C)	P_D	0.28	mW
		0.002	W/ $^\circ\text{C}$
Thermal resistance, junction to ambient	$R_{\theta JA}$	450	$^\circ\text{C/W}$
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 $T_J=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	30			V
BV_{DSS} temperature coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=1\text{mA}$		0.04		$\text{V}/^{\circ}\text{C}$
Drain-source leakage current	I_{DSS}	$V_{DS}=30\text{V}$, $V_{GS}=0\text{V}$, $T_J=25^{\circ}\text{C}$			1	μA
Gate-source leakage current	I_{GSS}	$V_{GS}=\pm 20\text{V}$, $V_{DS}=0\text{V}$			± 10	μA

On characteristics

Gate threshold voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	0.8	1.1	1.5	V
$V_{GS(TH)}$ temperature coefficient	$\Delta V_{GS(TH)}$			-4		$\text{mV}/^{\circ}\text{C}$
Static drain-source on-resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=0.3\text{A}$		1.1	1.5	Ω
		$V_{GS}=4.5\text{V}$, $I_D=0.2\text{A}$		1.3	2.2	
Forward transconductance	g_{FS}	$V_{DS}=10\text{V}$, $I_D=0.1\text{A}$		0.24		S

Dynamic Parameters

Input capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=10\text{V}$, $f=1.0\text{MHz}$		30.6		pF
Output capacitance	C_{oss}			5.5		
Reverse transfer capacitance	C_{rss}			4		

Switching parameters

Total gate charge (Note 2, 3)	Q_g	$V_{GS}=10\text{V}$, $V_{DS}=30\text{V}$, $I_D=0.2\text{A}$		1.1		nC
Gate-source charge (Note 2, 3)	Q_{gs}			0.1		
Gate-drain charge (Note 2, 3)	Q_{gd}			0.23		
Turn-on delay time (Note 2, 3)	$t_{d(on)}$	$V_{DD}=30\text{V}$, $V_{GS}=10\text{V}$, $I_D=0.2\text{A}$, $R_G=6\Omega$		3		ns
Rise time (Note 2, 3)	t_r			5		
Turn-off delay time (Note 2, 3)	$t_{d(off)}$			14		
Fall time (Note 2, 3)	t_f			9		

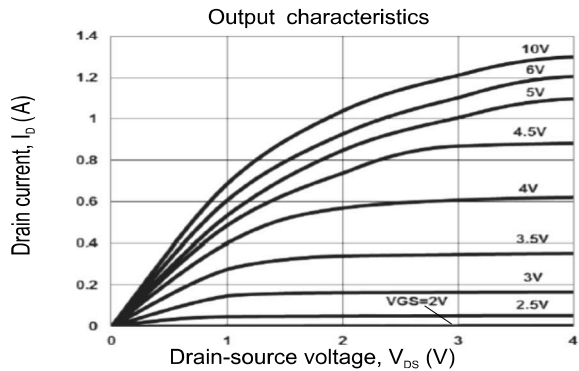
Source-drain diode ratings and characteristics

Drain - source diode forward voltage	V_{SD}	$I_S=1\text{A}$, $V_{GS}=0\text{V}$, $T_J=25^{\circ}\text{C}$			1.4	V
Maximum continuous drain-source forward current	I_S	$V_G=V_D=0\text{V}$, force current			0.3	A
Maximum pulsed drain-source forward current	I_{SM}				0.6	A

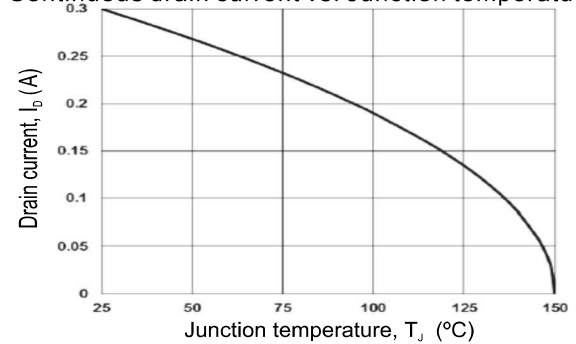
Note : 1. Repetitive rating: pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.

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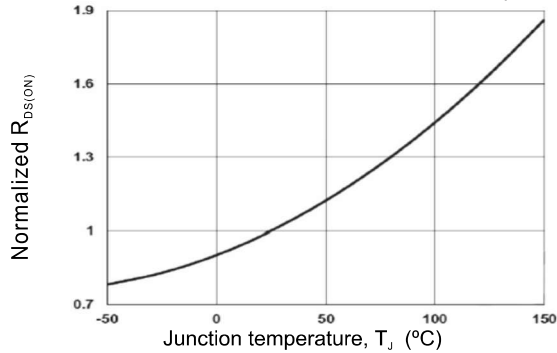
Rating and characteristic curves



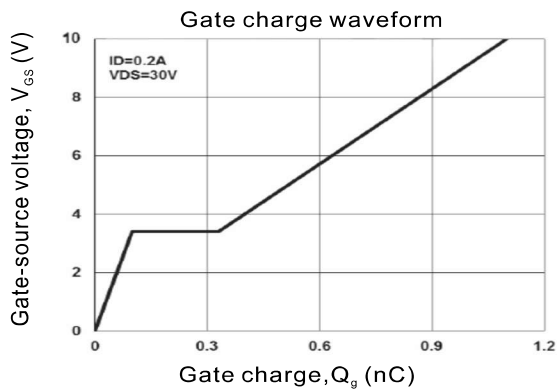
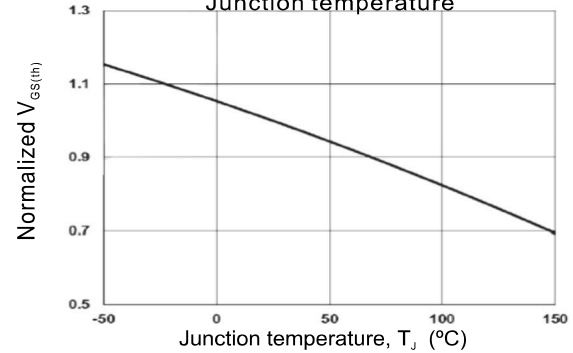
Continuous drain current vs. Junction temperature



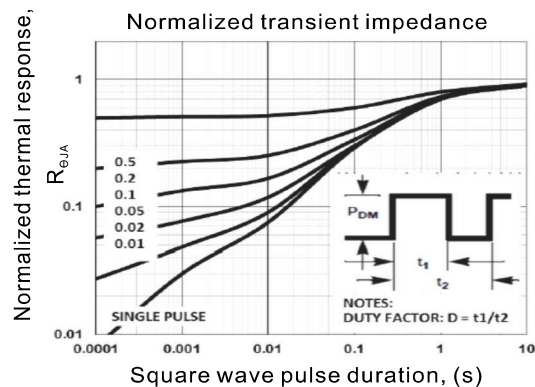
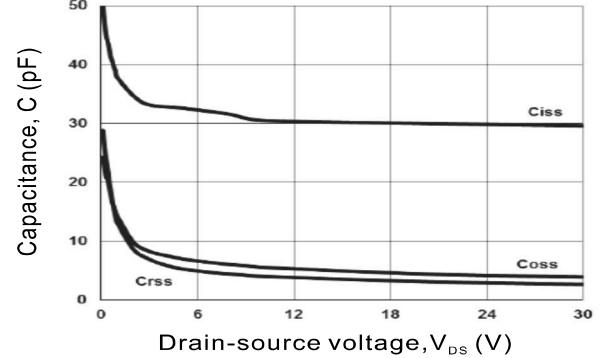
Normalized on-resistance vs. Junction temperature



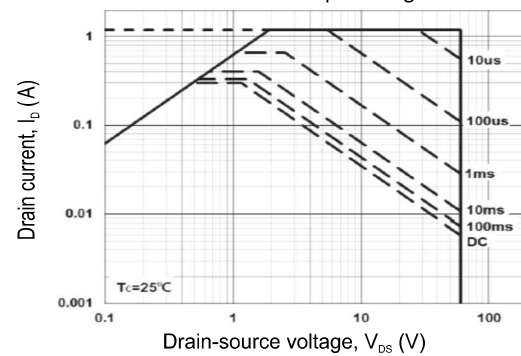
Normalized gate threshold voltage vs. Junction temperature



Capacitance characteristics

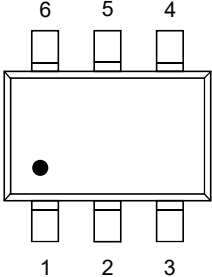
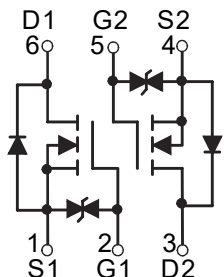


Maximum safe operating area



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Pinning information

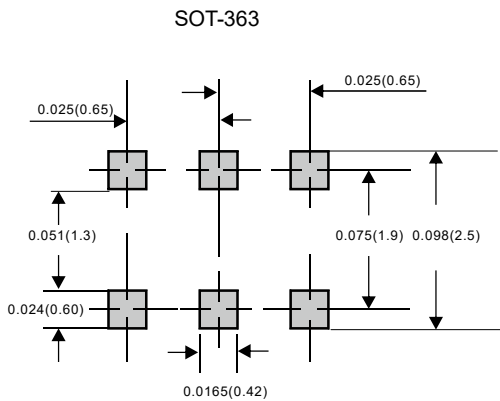
Pin	Simplified outline	Symbol
Pin1 Source 1 Pin2 Gate 1 Pin3 Drain 2 Pin4 Source 2 Pin5 Gate 2 Pin6 Drain 1		

Marking

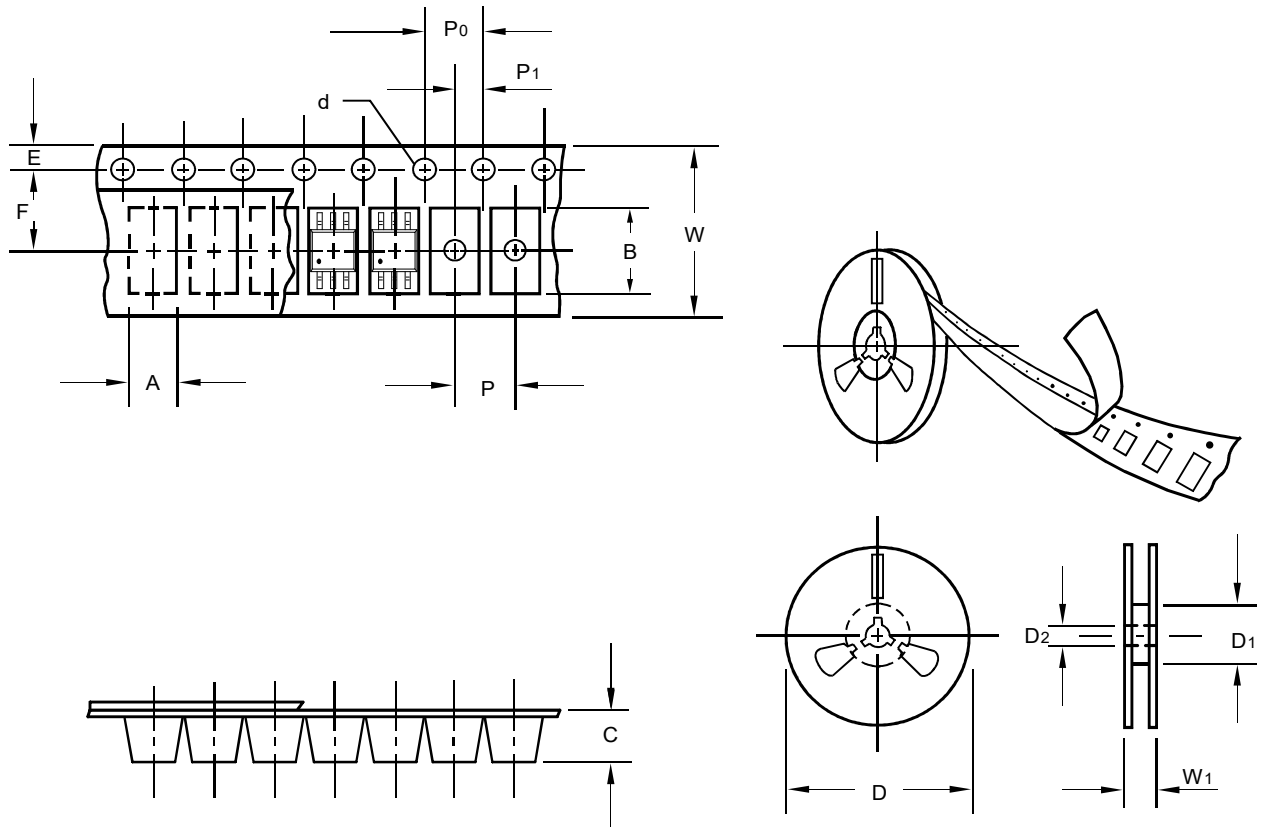
Type number	Marking Code
FMOSTHF0P3DN03E-H	K38J2

*K38: the model code.
J:fixed code.
M:Month

Suggested solder pad layout



Dimensions in inches and (millimeters)

FMOSTHF0P3DN03E-H**Packing information**

unit:mm

Item	Symbol	Tolerance	SOT-363
Carrier width	A	0.5	2.25
Carrier length	B	0.5	2.55
Carrier depth	C	0.5	1.20
Sprocket hole	d	0.5	1.50
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	53.40
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
Tape width	W	0.5	8.00
Reel width	W1	5.0	12.30

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

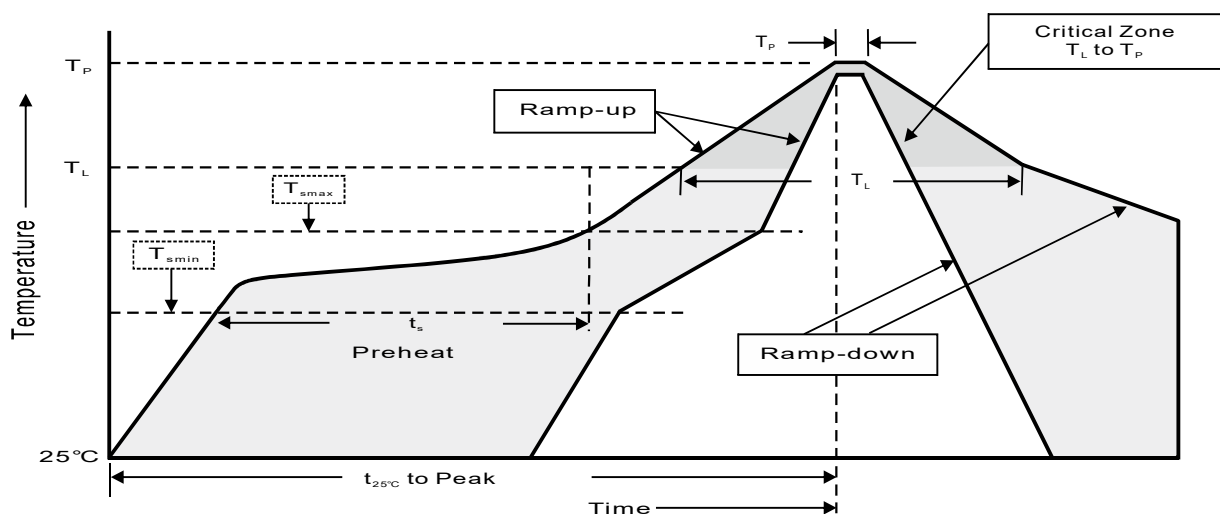
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Reel packing

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)
SOT-363	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000

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 ~ 120 sec
T_{smax} to T_L - Ramp-up rate	< 3 °C/sec
Time maintained above : - Temperature (T_L) - Time (T_L)	217°C 60 ~ 260 sec
Peak temperature (T_P)	255 °C -0/+5°C
Time with 5°C of actual peak temperature (T_P)	10 ~30 sec
Ramp-down rate	< 6 °C/sec
Time 25°C to peak temperature	< 6 minutes