

FMOSTHAB35N03A-H

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35A 30V N-Channel Trench
Enhancement Mode Power MOSFET

Features

- $V_{DS} = 30V$, $I_D = 35A$.
- $R_{DS(ON)} \leq 8.0m\Omega$, @ $V_{GS} = 10V$, $I_D = 10A$.
- $R_{DS(ON)} \leq 13m\Omega$, @ $V_{GS} = 4.5V$, $I_D = 10A$.
- High density cell design for ultra-low on-resistance.
- Fully characterized avalanche voltage and current.
- Excellent package for good heat dissipation.
- Good stability and uniformity with high E_{AS} .
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC 61249-2-21).

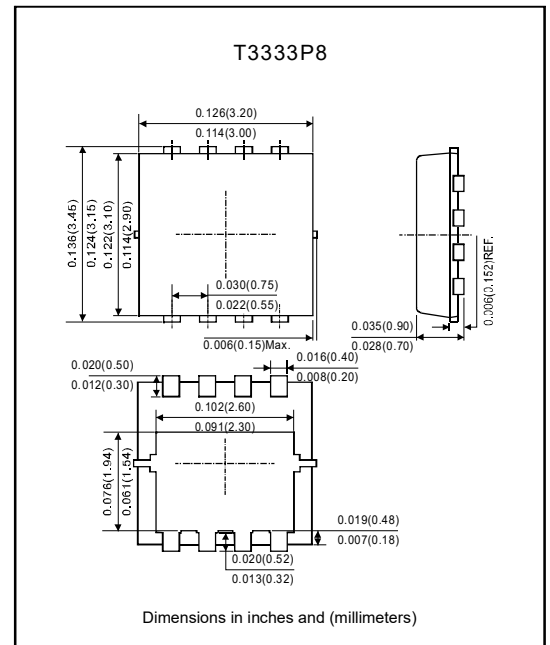
Applications

- High side switch in POL DC/DC converter.
- Secondary side synchronous rectifier.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant.
- Case : Molded plastic, T3333P8 (DFN3333-8).
- Weight : Approximated 20mg.

Package outline

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

Parameter	Symbol	Ratings	Unit
Drain-Source voltage	V_{DS}	30	V
Gate-Source voltage	V_{GS}	± 20	V
Continuous drain current	I_D	35	A
Pulsed drain current	I_{DM}	140	A
Avalanche energy, single pulse (Note 2)	E_{AS}	80	mJ
Power dissipation	P_D	25	W
Thermal resistance, Junction to ambient (Note 2)	$R_{\theta JA}$	83.3	$^\circ C/W$
Thermal resistance, Junction to case (Note 2)	$R_{\theta JC}$	5	
Operating junction temperature	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off characteristics						
Drain-Source breakdown voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	30			V
Drain-Source leakage current	I_{DSS}	$V_{DS}=30\text{V}$, $V_{GS}=0\text{V}$			1	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 (Note3)	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	1.0	1.5	2.5	V
Static drain-source on-resistance (Note3)	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=10\text{A}$		6.0	8.0	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=10\text{A}$		9.5	13.0	

Dynamic characteristics (Note5)

Input capacitance	C_{iss}	$V_{DS}=15\text{V}$, $V_{GS}=0\text{V}$, $f=1.0\text{MHz}$		1310		pF
Output capacitance	C_{oss}			150		
Reverse transfer capacitance	C_{rss}			124		
Gate resistance	R_G	$f=1.0\text{MHz}$		2.2		Ω

Switching characteristics

Total gate charge	Q_g	$V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $I_D=12\text{A}$		41		nC
Gate-Source charge	Q_{gs}			5.2		
Gate-Drain Charge	Q_{gd}			9.0		
Turn-on delay time	$t_{d(on)}$	$V_{DS}=15\text{V}$, $V_{GS}=10\text{V}$, $R_G=10\Omega$		9		ns
Turn-on rise time	t_r			36		
Turn-off delay time	$t_{d(off)}$			35		
Turn-off fall time	t_f			8		

Drain-Source diode characteristics and maximum ratings

Drain-Source diode forward voltage	V_{SD}	$I_S=20\text{A}$, $V_{GS}=0\text{V}$			1.2	V
Body diode reverse recovery time (Note3)	I_S				35	A

Note :

1. Pulse width limited by maximum allowable junction temperature.
2. Limited by T_{Jmax} , Part not recommended for use above this value.
3. Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

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Rating and characteristic curves

Fig.1 Output Characteristics

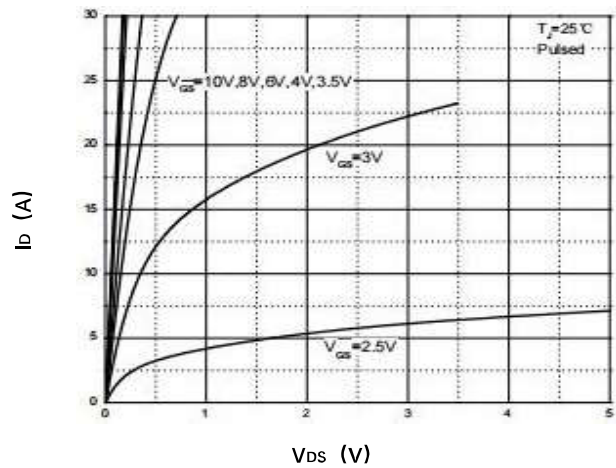


Fig.2 Transfer Characteristics

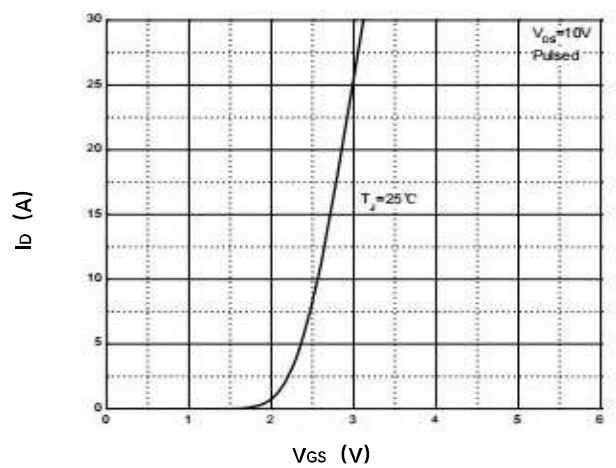


Fig.3 On-Resistance vs. Drain Current and Gate Voltage

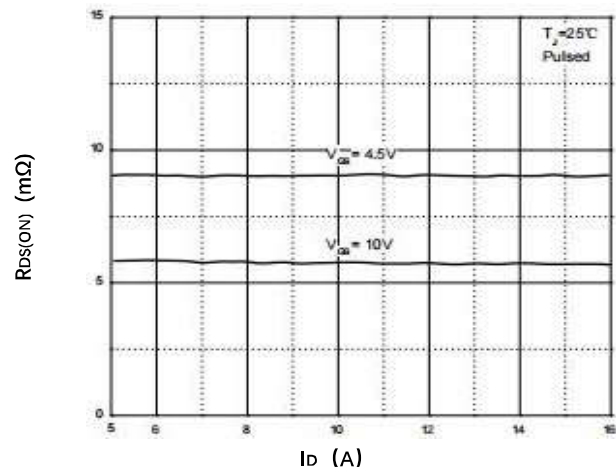


Fig.4 On-Resistance vs. G-S Voltage

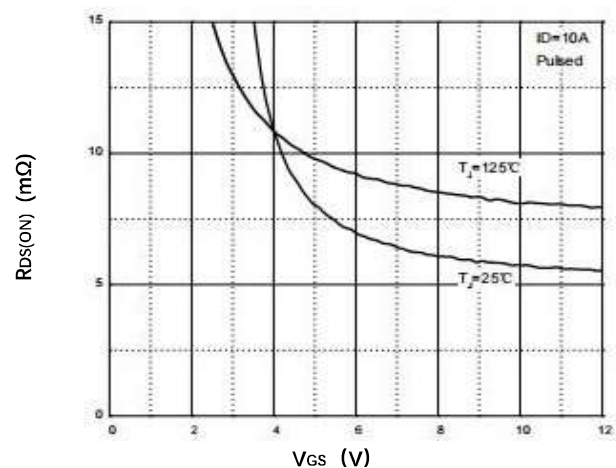


Fig.5 Threshold Voltage

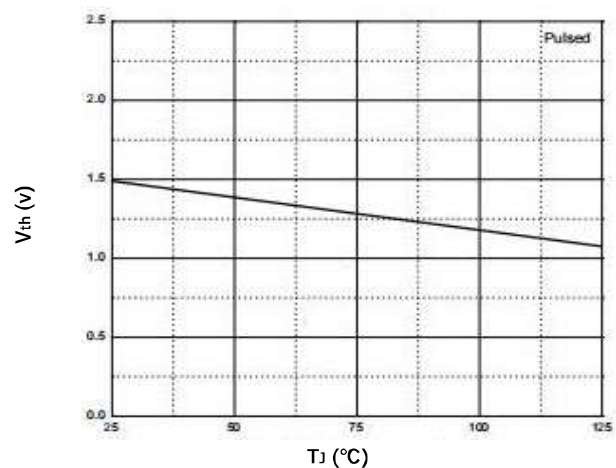
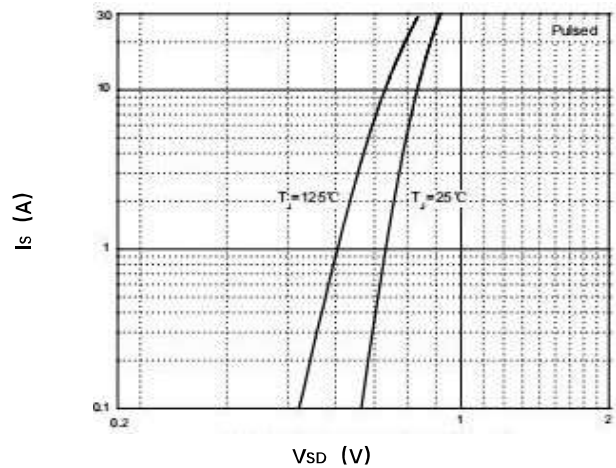


Fig.6 Body-Diode Characteristics



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Rating and characteristic curves

Fig.7 Gate-Charge Characteristics

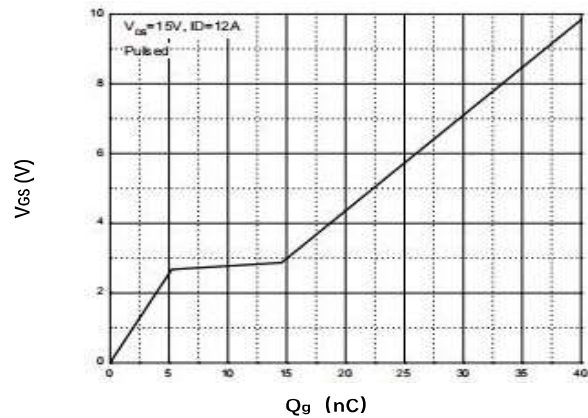
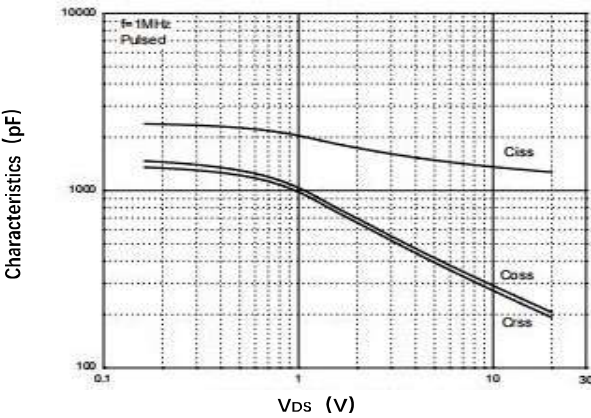


Fig.8 Capacitance Characteristics



Pinning information

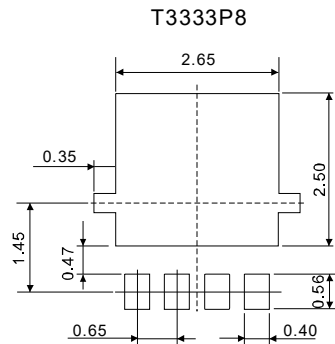
Pin	Simplified outline	Symbol
Pin 1, 2, 3 Source		
Pin 4 Gate		
Pin 5, 6, 7, 8 Drain		

Marking

Type number	Marking code
FMOSTHAB35N03A-H	PSTE 010N030 YYXX

*YYXX : Wafer lot code
YY : Year
XX : Week

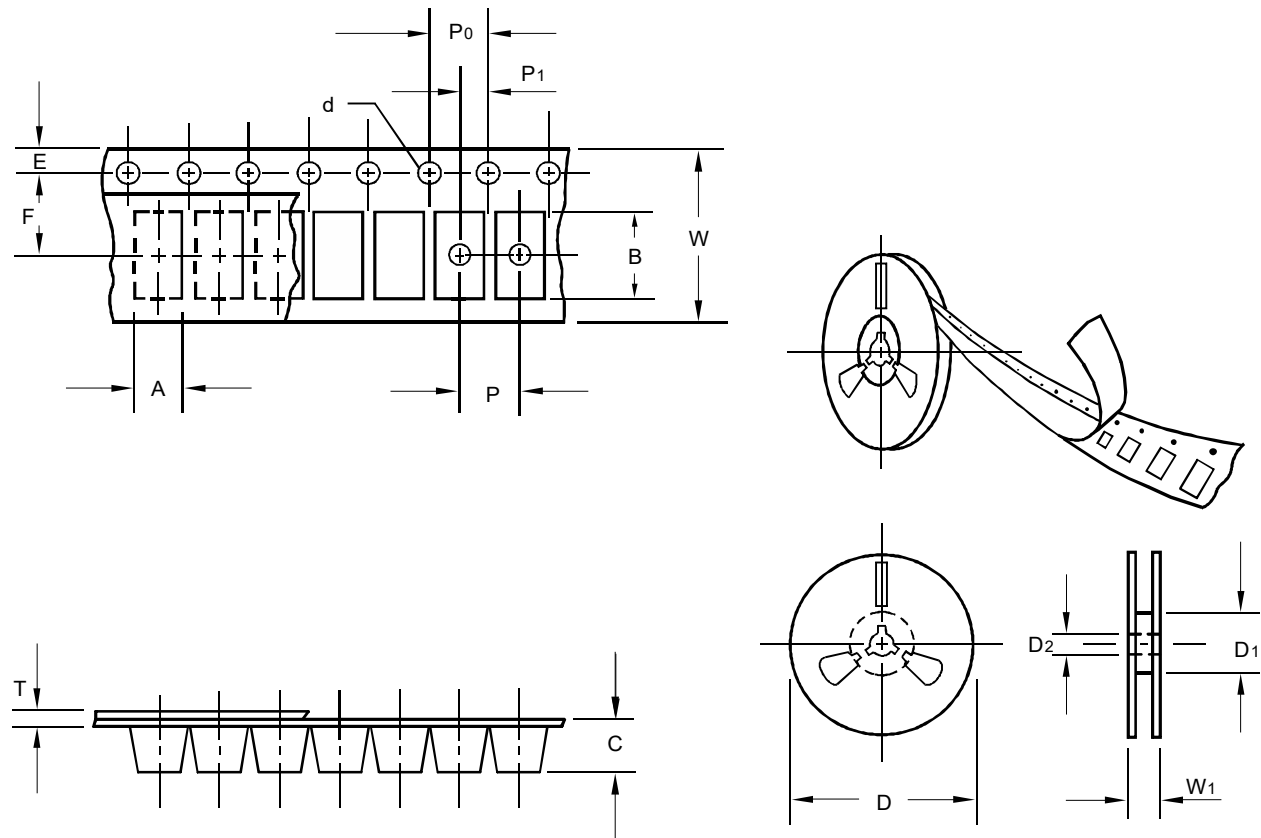
Suggested solder pad layout



Note:
1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

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Packing information



unit:mm

Item	Symbol	Tolerance	T3333P8
Carrier width	A	0.1	3.55
Carrier length	B	0.1	3.55
Carrier depth	C	0.1	1.10
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	330.00
13" Reel inner diameter	D1	min	100.00
7" Reel outside diameter	D	2.0	-
7" Reel inner diameter	D1	min	-
Feed hole diameter	D2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	5.50
Punch hole pitch	P	0.1	8.00
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	12.00
Reel width	W1	1.0	17.60

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

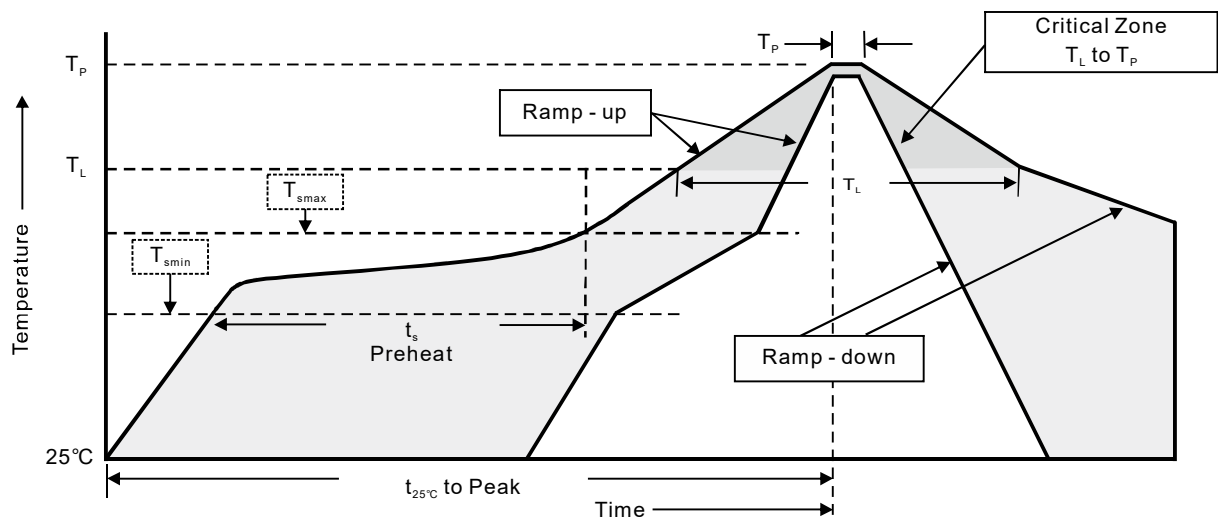
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Reel packing

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)
T3333P8	13"	5,000	8.0	10,000	355*335*38	330	350*330*360	80,000

Suggested thermal profiles for soldering processes

- Storage environment : Temperature = 5°C ~ 40°C, Humidity = 55%, $\pm 25\%$.
- Reflow soldering of surface - Mount devices.



3. Reflow soldering

Profile feature	Soldering condition
Average ramp-up rate (T_L to T_p)	$< 3^\circ\text{C/sec}$
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	$< 3^\circ\text{C/sec}$
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	$< 6^\circ\text{C/sec}$
Time 25°C to peak temperature	< 6 minutes