

FMOSTHB150N15-H

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FMOSTHB150N15-H

150A 150V N-Channel Trench Enhancement Mode Power MOSFET

Features

- $V_{DS}=150V$, $I_D=150A$.
- $R_{DS(ON)} \leq 6.0m\Omega$, @ $V_{GS}=10V$, $I_D=40A$.
- Low gate charge minimize switching loss.
- Fast recovery body diode.
- Lead-free parts meet RoHS requirements.
- Halogen-free (IEC61249-2-21).

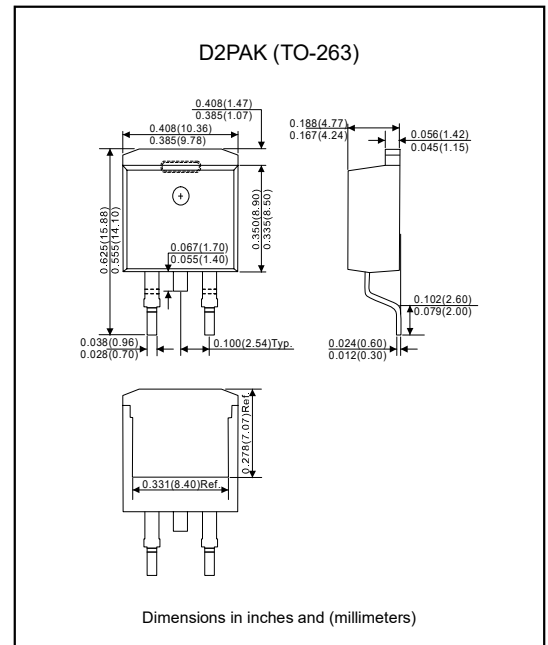
Applications

- DC/DC converter.
- Motor control.
- Synchronous rectification in SMPS.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, D2PAK (TO-263).
- Weight : Approximated 1.60g.

Package outline



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

Parameter	Symbol	Ratings	Unit
Drain-source voltage (Note 1)	V_{DS}	150	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current (Note 2)	I_D	150 ($T_c=25^\circ C$)	A
		100 ($T_c=100^\circ C$)	
Pulsed drain current (Note 2, 3)	I_{DM}	560	A
Single pulsed avalanche energy	E_{AS}	1600	mJ
Power dissipation Derating factor above $25^\circ C$	P_D	266 ($T_c=25^\circ C$)	W
		2.13	W/ $^\circ C$
Thermal resistance, junction to ambient	$R_{\theta JA}$	62	$^\circ C/W$
Thermal resistance, junction to case	$R_{\theta JC}$	0.4	$^\circ C/W$
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)

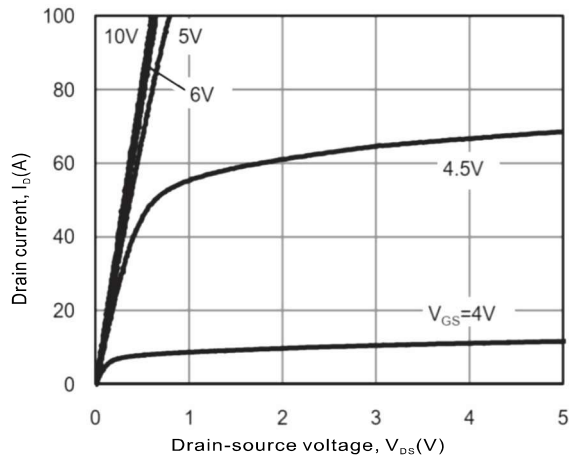
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off characteristics						
Drain-source breakdown voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	150			V
Drain-source leakage current	I _{DSS}	V _{DS} =150V, V _{GS} =0V, T _J =25°C			1	μA
Gate-source leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
On characteristics						
Gate threshold voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250μA	2		4	V
Static drain-source on-resistance	R _{DS(ON)}	V _{GS} =10V, I _D =40A		4.8	6.0	mΩ
Dynamic parameters						
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =75V, f=1.0MHz		10132		pF
Out capacitance	C _{oss}			665		
Reverse transfer capacitance	C _{rss}			39		
Switching parameters						
Total gate charge	Q _g	V _{GS} =10V, V _{DS} =75V, I _D =20A		142		nC
Gate to source charge	Q _{gs}			42		
Gate to drain charge	Q _{gd}			30		
Turn-on delay time	t _{d(on)}	V _{DS} =75V, V _{GS} =10V, R _G =3Ω, I _D =40A		38.6		ns
Rise time	t _r			18		
Turn-off delay time	t _{d(off)}			70		
Fall time	t _f			21		
Source-drain diode ratings and characteristics						
Diode forward voltage	V _{SD}	I _S =80A, V _{GS} =0V			1.2	V
Diode continuous current (Note2)	I _S	Integral PN-diode in MOSFET			150	A
Pulsed forward current (Note2)	I _{SM}				560	A
Body diode Reverse recovery time	t _{rr}	V _{GS} =0V, I _F =40A, dI _F /dt=100A/μs		159		nS
Body diode Reverse recovery charge	Q _{rr}			423		nC

Note: 1. $T_J=+25^{\circ}\text{C}$ to $+150^{\circ}\text{C}$.
2. Silicon limited current only.
3. Repetitive rating: pulse width limited by maximum junction temperature.
4. Pulse width $\leq 380\mu\text{s}$, duty cycle $\leq 2\%$.

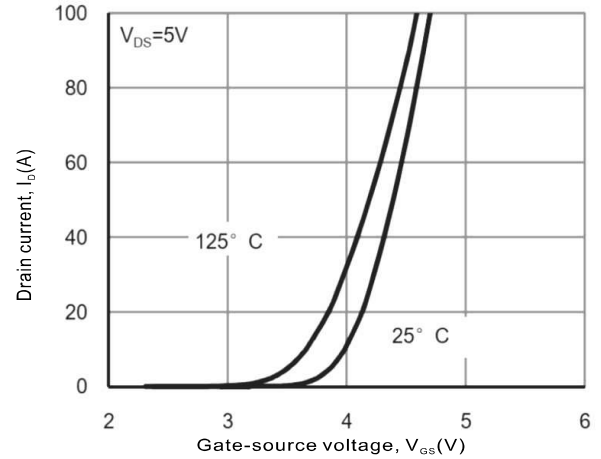
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Rating and characteristic curves

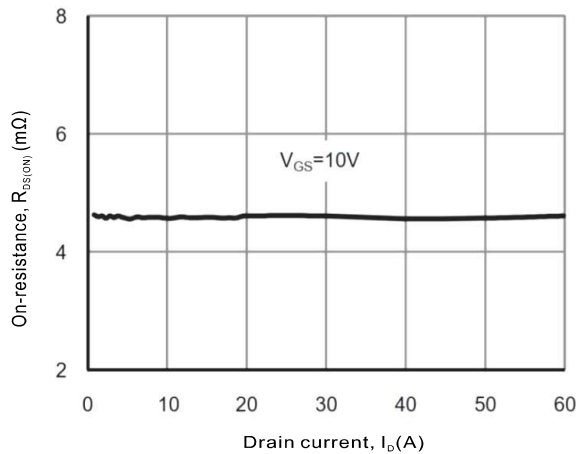
On-region characteristics



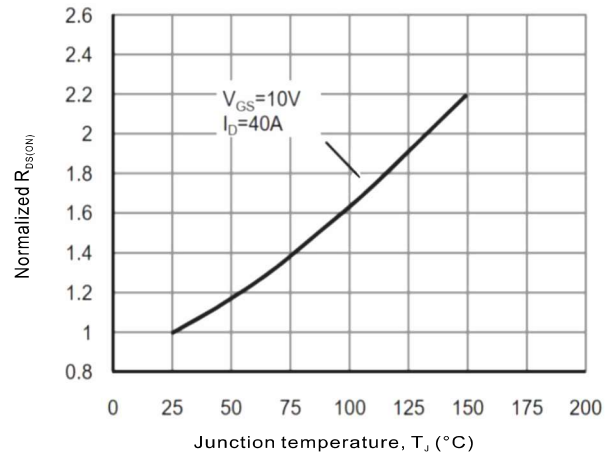
Transfer characteristics



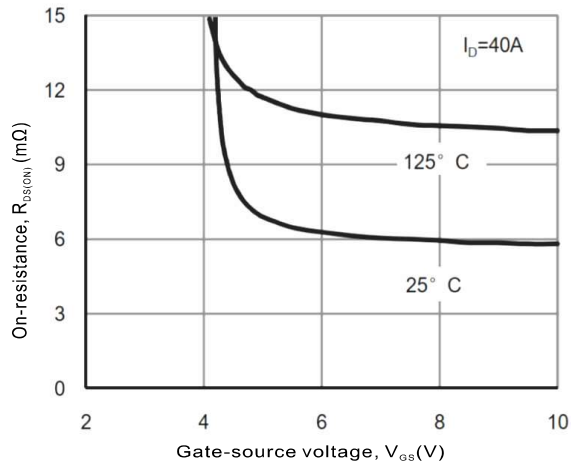
On-resistance vs. Drain current



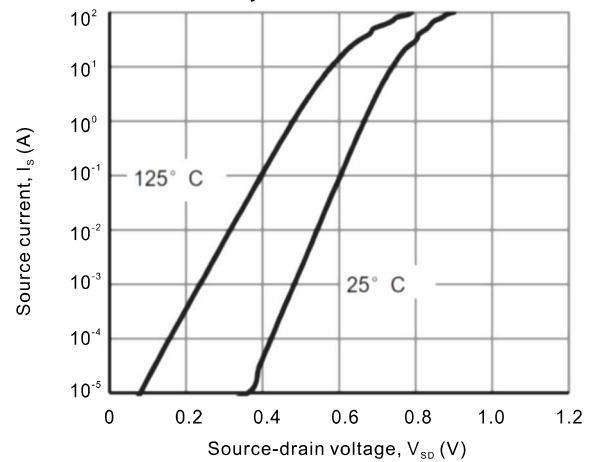
On-resistance vs. Junction temperature



On-resistance vs. Gate-source voltage

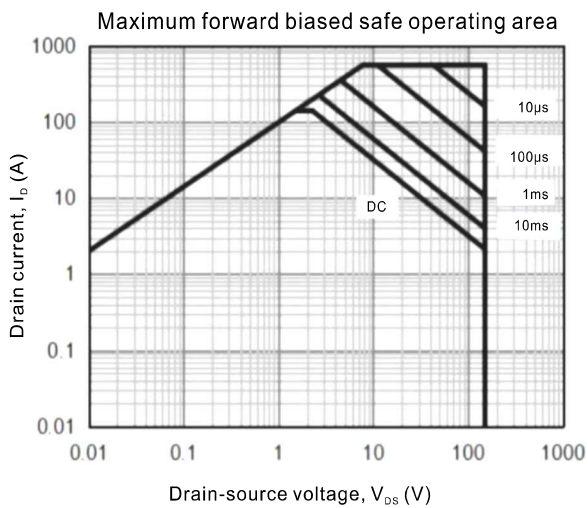
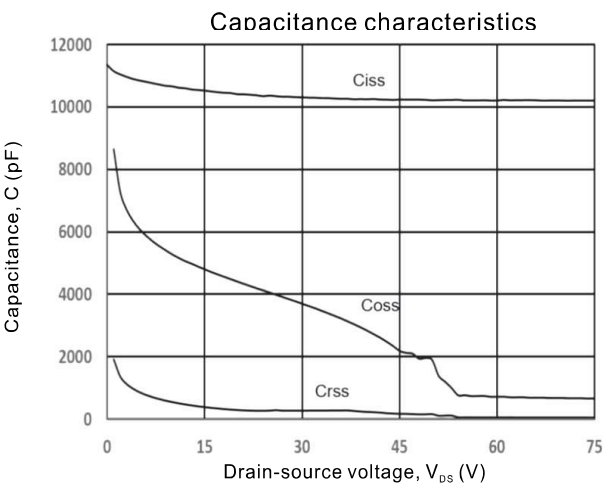
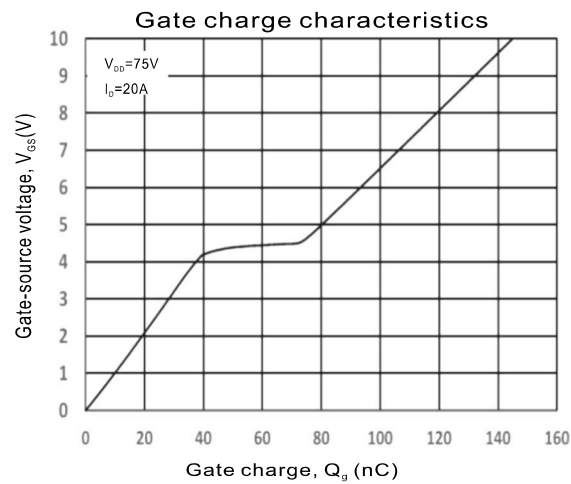


Body-diode characteristics



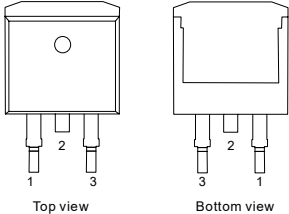
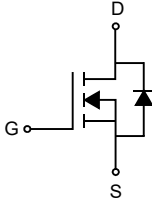
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Rating and characteristic curves



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Pinning information

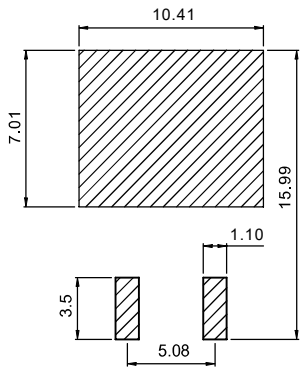
Pin	Simplified outline	Symbol
Pin 1 Gate Pin 2 Drain Pin 3 Source	 Top view Bottom view	

Marking

Type number	Marking code
FMOSTHB150N15-H	PSP1560K YYWWX

*YYWW:Wafer lot code
YY:Year
WW:Week
X:Assy. code

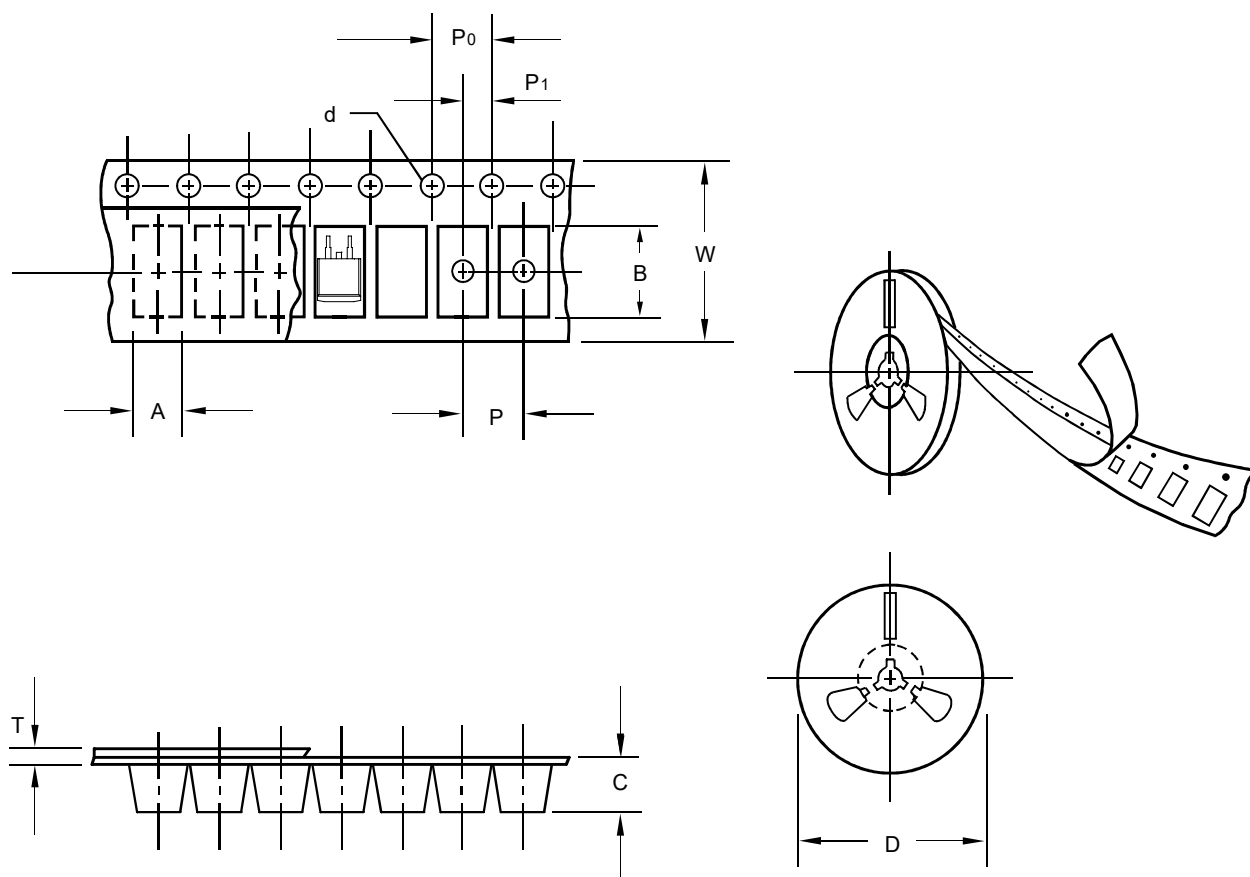
Suggested solder pad layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.1 mm.
3.The pad layout is for reference purposes only.

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Packing information



unit:mm

Item	Symbol	Tolerance	D2PAK (TO-263)
Carrier width	A	0.5	10.80
Carrier length	B	0.5	16.30
Carrier depth	C	0.5	5.26
Sprocket hole	d	0.1	1.55
13" Reel outside diameter	D	2.0	330
7" Reel outside diameter	D	2.0	-
7" Reel inner diameter	D1	min	-
Punch hole pitch	P	0.2	16.0
Sprocket hole pitch	P0	0.2	4.0
Embossment center	P1	0.2	2.0
Overall tape thickness	T	0.	0.35
Tape width	W	0.3	24.0

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

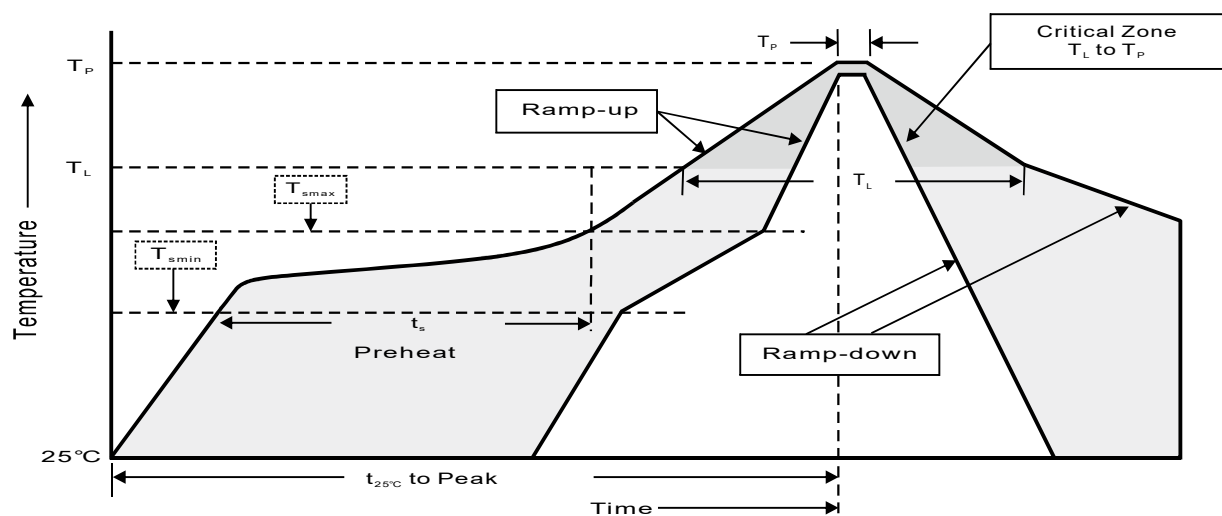
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Reel Packing

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)
D2PAK/TO-263	13"	800	16.0	800	335*335*38	330	350*330*360	6,400

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_{min}) - Temperature Max (T_{max}) - 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