

FMOSPFA05N90-H

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FMOSPFA05N90-H

5A 900V N-Channel Enhancement Mode Power MOSFET

Features

- $V_{DS}=900V$, $I_D=5A$.
- $R_{DS(ON)} \leq 3.2\Omega$, @ $V_{GS}=10V$, $I_D=2.5A$.
- Low gate-charge and low on-resistance.
- Improved dv/dt capability.
- 100% avalanche tested.
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.FMOSPFA05N90-H.

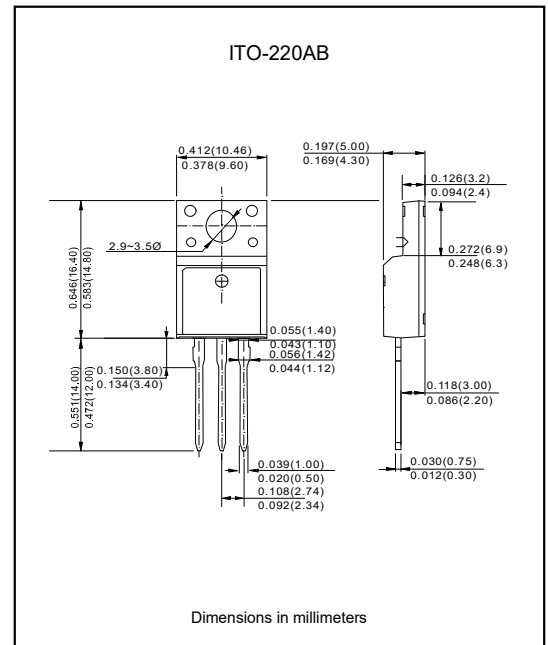
Applications

- Switching mode power supplies (SMPS).
- PWM motor controls.
- LED lighting and adapter.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, ITO-220AB.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Weight : Approximated 1.70g.

Package outline



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

Parameter	Symbol	Ratings	Unit
Drain to source voltage	V_{DS}	900	V
Gate-source voltage	V_{GS}	± 30	V
Continuous drain current (Note 1) ($T_c=25^\circ C$)	I_D	5	A
Pulsed drain current (Note 2)	I_{DM}	16	A
Avalanche energy, single pulse (Note 3)	E_{AS}	144	mJ
Power dissipation ($T_c=25^\circ C$)	P_D	24	W
Derating factor above $25^\circ C$		0.19	W/ $^\circ C$
Thermal resistance, junction to ambient	$R_{\theta JA}$	69	$^\circ C/W$
Thermal resistance, junction to case	$R_{\theta JA}$	5.2	
Lead temperature for soldering purpose	T_L	260	$^\circ C$
Junction temperature	T_J	+150	$^\circ C$
Storage temperature range	T_{STG}	-55 to +150	$^\circ C$

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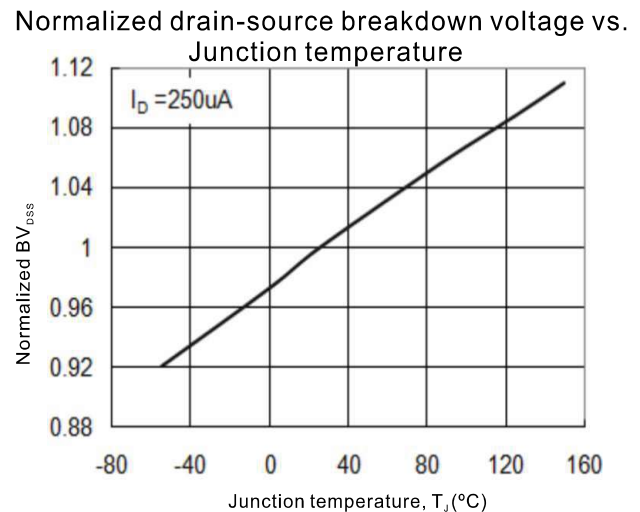
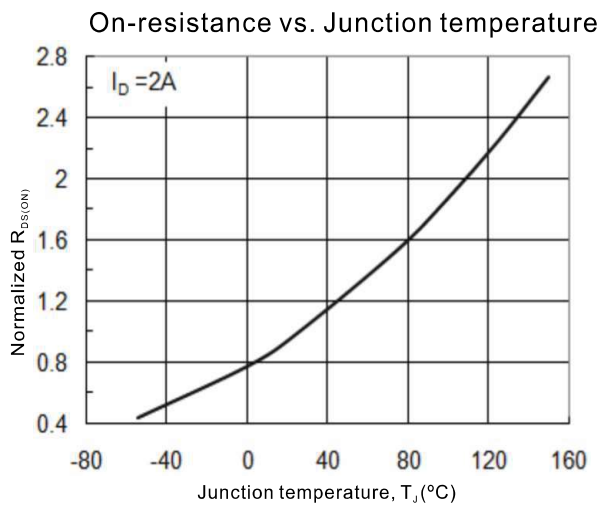
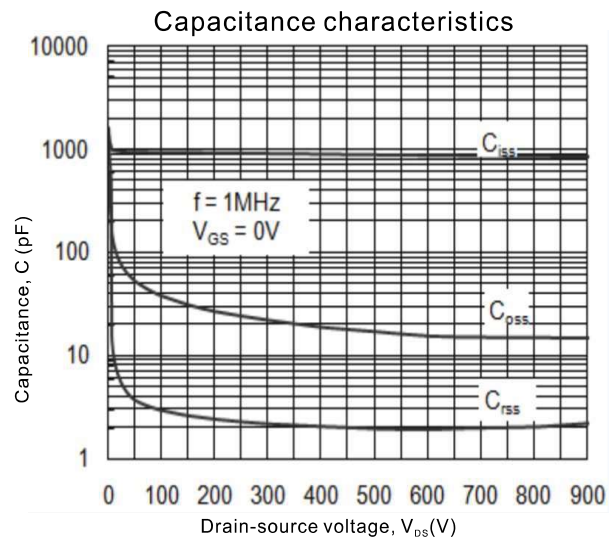
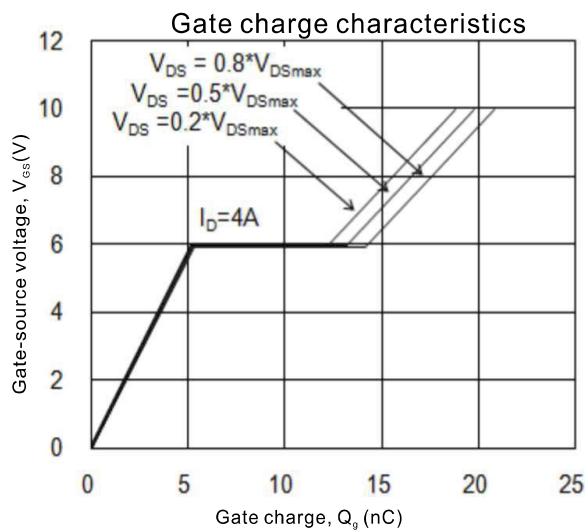
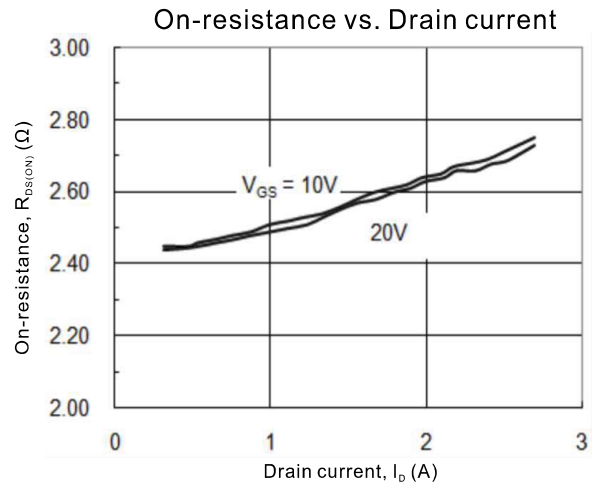
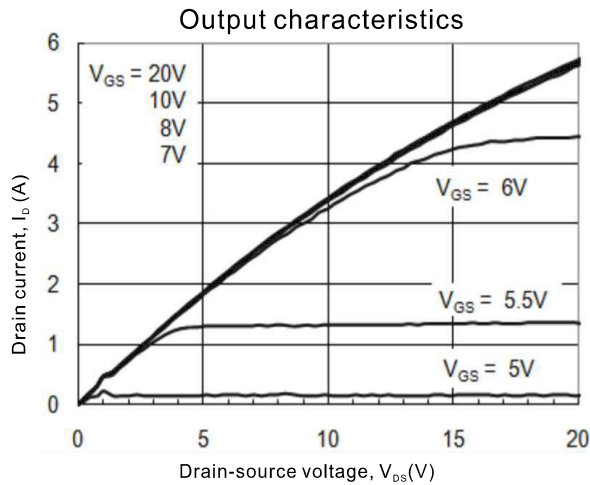
Electrical characteristics (At $T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	900			V
Drain-source leakage current	I _{DSS}	V _{DS} =900V, V _{GS} =0V			10	μA
		V _{DS} =720V, V _{GS} =0V, T _C =125°C		100		
Gate-source leakage current	I _{GSS}	V _{GS} =±30V, V _{DS} =0V			±100	nA
On characteristics						
Gate threshold voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	3	4	5	V
Static drain-source on-state resistance	R _{DS(ON)}	V _{GS} =10V, I _D =2.5A		2.7	3.2	Ω
Forward transconductance	g _{FS}	V _{DS} =10V, I _D =2.5A		4.5		S
Dynamic parameters						
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		944		pF
Output capacitance	C _{oss}			74		
Reverse transfer capacitance	C _{rss}			5.3		
Gate resistance	R _g	V _{DS} =0V, scan F mode		3		Ω
Switching parameters						
Total gate charge	Q _g	V _{GS} =10V, V _{DS} =720V, I _D =5A		20.8		nC
Gate to source charge	Q _{gs}			5.2		
Gate to drain charge	Q _{gd}			8		
Turn-on delay time	t _{d(on)}	V _{DS} =450V, V _{GS} =10V, I _D =5A, R _{GEN} =25Ω		25		ns
Rise time	t _r			24		
Turn-off delay time	t _{d(off)}			52		
Fall time	t _f			23		
Source-drain diode ratings and characteristics						
Continuous source current	I _S	Integral reverse p-n junction diode in the MOSFET			4	A
Pulsed source current	I _{SM}				16	
Drain-source diode forward voltage	V _{SD}	I _S =5A, V _{GS} =0V			1.3	V
Reverse recovery time	t _{rr}	I _S =5A, V _{GS} =0V, di/dt=100A/μs		546		ns
Reverse recovery charge	Q _{rr}			2.85		μC

Note : 1. Drain current is limited by maximum junction temperature.
 2. Repetitive rating: pulse width limited by junction temperature.
 3. $L=18\text{mH}$, $I_{AS}=4\text{A}$, $V_{DO}=50\text{V}$, $R_G=25\Omega$, starting at $T_J=25^\circ\text{C}$.

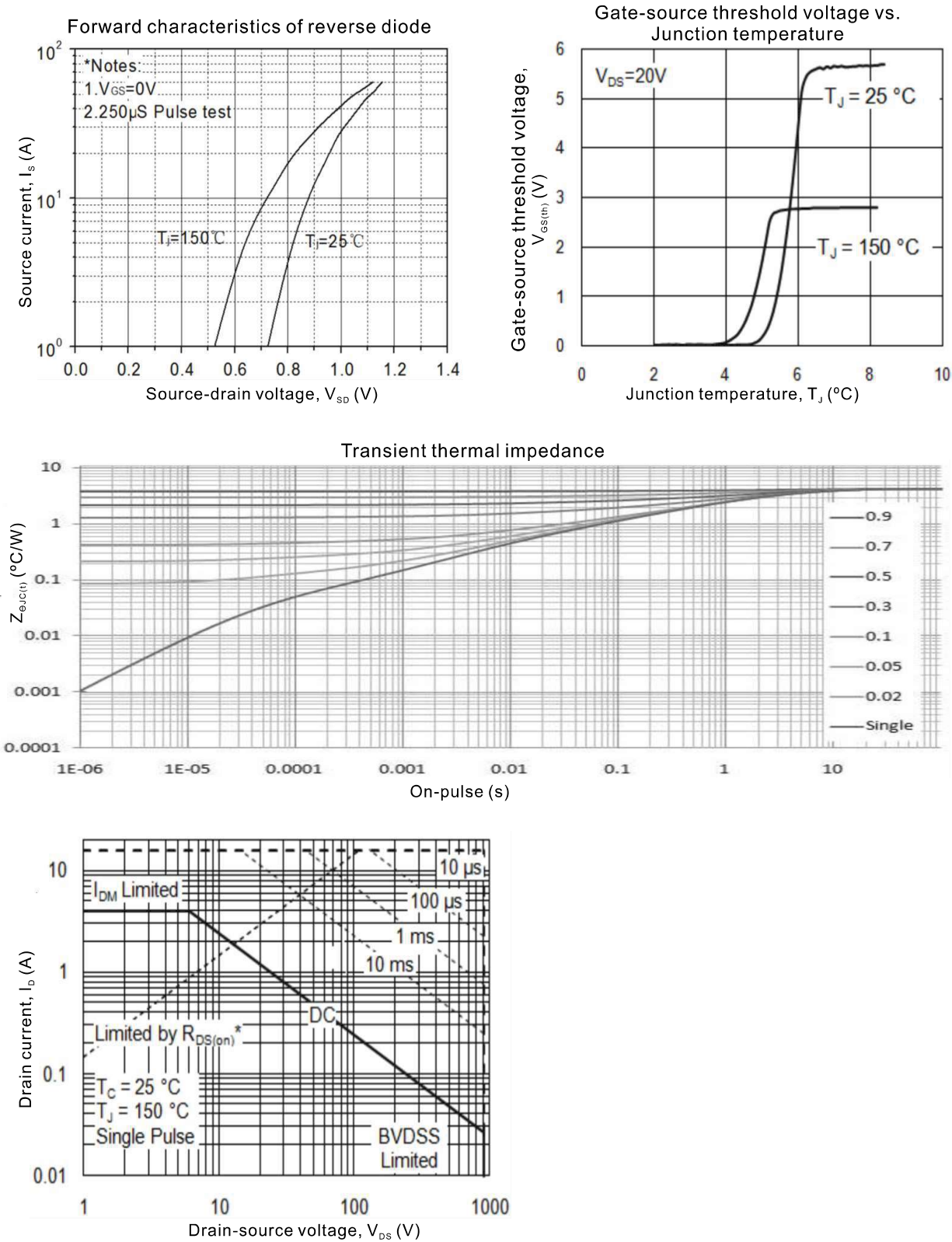
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Rating and characteristic curves



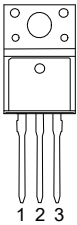
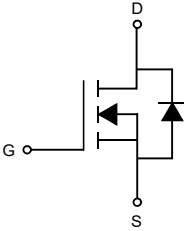
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Rating and characteristic curves



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Pinning information

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

Marking

Type number	Marking code
FMOSPFA05N90	PSD5N90F YYWWX

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

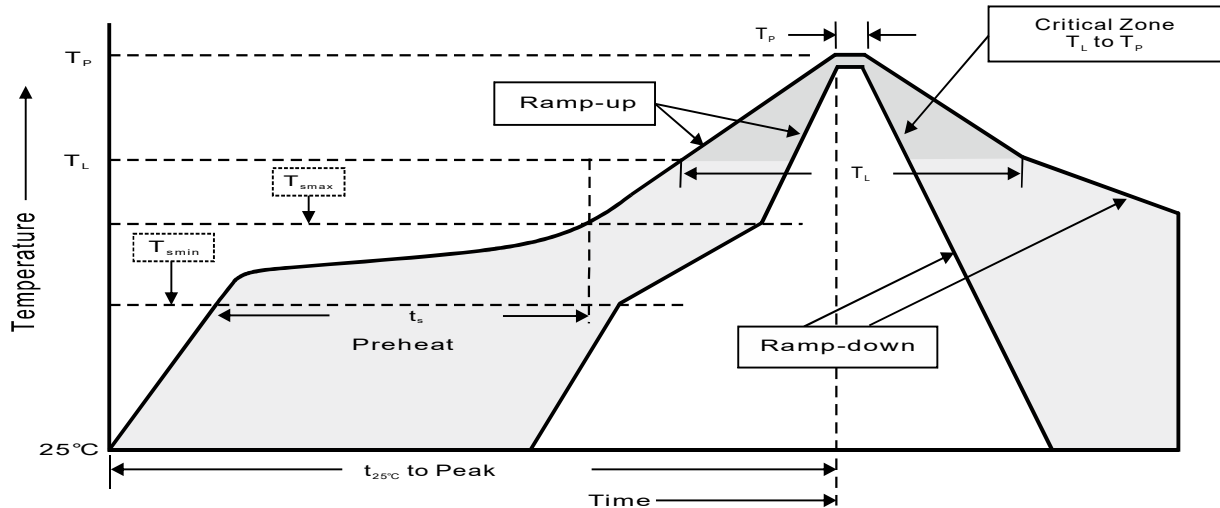
Package Information

Outline	Tube (pcs)	Inner Box (pcs)
Tube	50	1,000

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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