

# MSF6N65

## N-Channel Enhancement Mode Power MOSFET

### Description

The MSF6N65 is a N-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The TO-220F package is universally preferred for all commercial-industrial applications

### Features

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

### Application

- Open Framed Power Supply
- Adapter
- STB

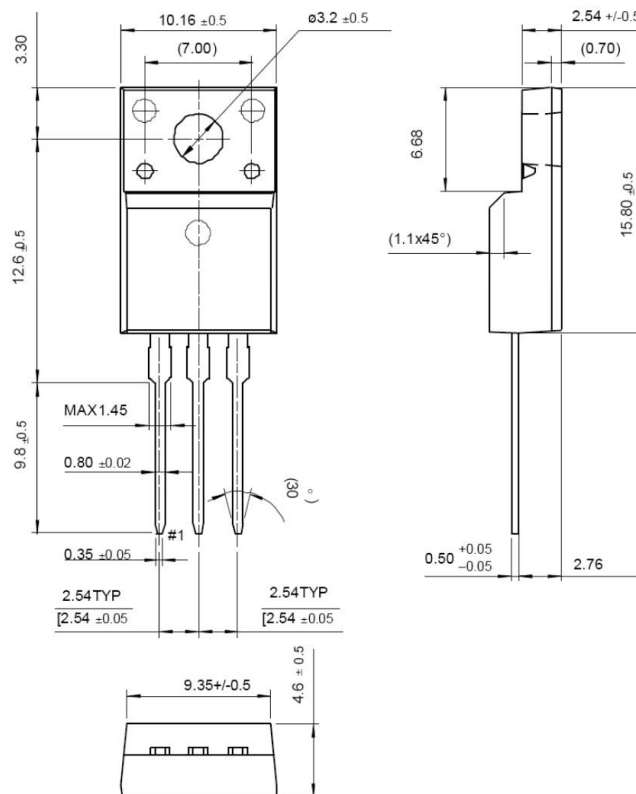
Package type : ITO220-AB

### Packing & Order Information

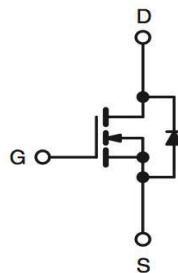
50/Tube ; 1,000/Box



**RoHS**  
COMPLIANT



### Graphic symbol



## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

### Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V <sub>DSS</sub>	Drain-Source Voltage	650	V
V <sub>GS</sub>	Gate-Source Voltage	±30	V
I <sub>D</sub>	Drain Current -Continuous (TC=25°C)	6.0	A
	Drain Current -Continuous (TC=100°C)	3.6	A
I <sub>DM</sub>	Drain Current Pulsed	24	A
I <sub>AR</sub>	Avalanche Current	6.0	A
E <sub>AS</sub>	Single Pulsed Avalanche Energy	135	mJ
E <sub>AR</sub>	Repetitive Avalanche Energy	5.4	mJ
dv/dt	Peak Diode Recovery dv/dt	4.5	V/ns

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Absolute Maximum Ratings			
Symbol	Parameter	Value	Unit
$T_L$	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	°C
TPKG	Maximum Temperature for Soldering @ Package Body for 10 seconds	260	°C
$P_D$	Total Power Dissipation (TC = 25 °C)	54	W
	Derating Factor above 25 °C	0.3	W/°C
$T_{STG}$	Operating and Storage Temperature Range	-55 to +150	°C
$T_J$	Storage Temperature	150	°C

Notes ;

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $I_{AS}=7A$ ,  $V_{DD}=50V$ ,  $L=7mH$ ,  $V_G=10V$ , Starting  $T_J=25^\circ C$
3.  $I_{SD}\leq 7A$ ,  $di/dt\leq 200A/\mu s$ ,  $V_{DD}\leq BV_{DSS}$ , Starting  $T_J=25^\circ C$

Thermal Characteristics			
Symbol	Parameter	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	2.3	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	

Static Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0 V$ , $I_D = 250\mu A$	600	--	--	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 250\mu A$ , Referenced to 25°C	--	0.65	--	V/°C
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ , $I_D = 250\mu A$	2.0	--	4.0	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 650 V$ , $V_{GS} = 0 V$ $V_{DS} = 540 V$ , $T_C = 125^\circ C$	--	--	1 10	$\mu A$
$I_{GSS}$	Gate-Body Leakage Forward	$V_{GS} = \pm 30$	--	--	$\pm 100$	nA
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = 10 V$ , $I_D = 3.0 A$	--	1.23	1.5	$\Omega$

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$Q_g$	Total Gate Charge	$V_{DS} = 520 V, I_D = 6 A$ , $V_{GS} = 10 V$	--	19	--	nC
$Q_{gs}$	Gate-Source Charge		--	5.1	--	nC
$Q_{gd}$	Gate-Drain Charge		--	6.9	--	nC

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Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Time	$V_{DS} = 325 \text{ V}$ , $I_D = 6 \text{ A}$ , $R_G = 25 \Omega$ , $V_{GS} = 10 \text{ V}$	--	12	--	ns
$t_r$	Turn-On Time		--	13	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	25	--	ns
$t_f$	Turn-Off Fall Time		--	13	--	ns
$C_{ISS}$	Input Capacitance	$V_{DS} = 25 \text{ V}$ , $V_{GS} = 0 \text{ V}$ , $f = 1.0\text{MHz}$	--	1350	--	pF
$C_{OSS}$	Output Capacitance		--	120	--	pF
$C_{RSS}$	Reverse Transfer Capacitance		--	26	--	pF

Source-Drain Diode						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$I_S$		$V_D = V_G = 0$	--	--	6.0	A
$I_{SM}$		$V_S = 1.3 \text{ V}$	--	--	24	
$V_{SD}$		$I_S = 6 \text{ A}$ , $V_{GS} = 0 \text{ V}$	--	--	1.5	V
$t_{rr}$		$I_F = 6 \text{ A}$ , $V_{GS} = 0 \text{ V}$	--	330	--	ns
$Q_{rr}$		$diF/dt = 100\text{A}/\mu\text{s}$	--	2.8	--	$\mu\text{C}$

Notes;

1. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$

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#### Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE

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