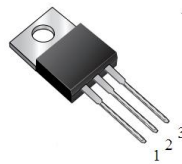
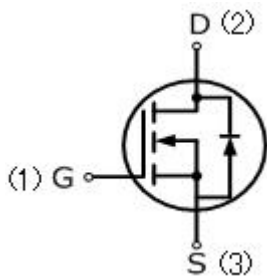


## 4N65(F,B,H,G,D)

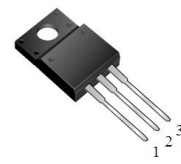
4A mps,650 Volts N-CHANNEL MOSFET

### FEATURE

- 4A,650V, $R_{DS(ON)}=2.2\ \Omega$  @ $V_{GS}=10V/2A$
- Low gate charge
- Low  $C_{iss}$
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



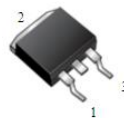
TO-220AB  
4N65



ITO-220AB  
4N65F



TO-262  
4N65H



TO-263  
4N65B



TO-252  
4N65G



TO-251  
4N65D

### Absolute Maximum Ratings( $T_C=25^\circ\text{C}$ , unless otherwise noted)

Parameter	Symbol	4N65	UNIT
Drain-Source Voltage	$V_{DSS}$	600	V
Gate-Source Voltage	$V_{GSS}$	$\pm 30$	
Continuous Drain Current	$I_D$	4	A
Pulsed Drain Current(Note1)	$I_{DM}$	16	
Single Pulse Avalanche Energy (Note 2)	$E_{AS}$	300	mJ
Avalanche Current(Note1)	$I_{AR}$	4	A
Repetitive Avalanche Energy (Note1)	$E_{AR}$	30	mJ
Reverse Diode dV/dt (Note 3)	dV/dt	4.5	V/ns
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	$T_L$	260	$^\circ\text{C}$
Mounting Torque	6-32 or M3 screw	10	lbf • in
		1.1	N • m

### Thermal Characteristics

Parameter	Symbol	ITO-220	TO-220	TO-262 TO-263	TO-251 TO-252	Units
Maximum Junction-to-Case	$R_{thJC}$	2.2	1.8	1.8	5.7	$^\circ\text{C}/\text{W}$
Maximum Power Dissipation	$P_D$	57	70	70	22	W

<b>Electrical Characteristics</b> ( $T_c=25^\circ\text{C}$ , unless otherwise noted)						
Parameter	Symbol	Test Conditions	Mix	Typ	Max	Units
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	650	—	—	V
Breakdown Temperature Coefficient	$\Delta BV_{DSS} / \Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=250\mu A$	—	0.6	—	$V/^\circ\text{C}$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$	—	—	1	$\mu A$
Gate-Body Leakage Current, Forward	$I_{GSSF}$	$V_{GS}=30V, V_{DS}=0V$	—	—	10	$\mu A$
Gate-Body Leakage Current, Reverse	$I_{GSSR}$	$V_{GS}=-30V, V_{DS}=0V$	—	—	-10	$\mu A$
<b>On Characteristics</b>						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	—	4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=2A$	—	2.2	2.5	$\Omega$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0\text{MHZ}$	—	520	670	pF
Output Capacitance	$C_{oss}$		—	70	90	pF
Reverse Transfer Capacitance	$C_{rss}$		—	8	11	pF
<b>Switching Characteristics</b>						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=300V, I_D=4A,$ $R_g=25\Omega$ (Note4,5)	—	13	35	ns
Turn-On Rise Time	$t_r$		—	45	100	ns
Turn-Off Delay Time	$t_{d(off)}$		—	25	60	ns
Turn-Off Fall Time	$t_f$		—	35	80	ns
Total Gate Charge	$Q_g$	$V_{DS}=520V, I_D=4A,$ $V_{GS}=10V,$ (Note4,5)	—	15	20	nC
Gate-Source Charge	$Q_{gs}$		—	3.4	—	nC
Gate-Drain Charge	$Q_{gd}$		—	7.1	—	nC
<b>Drain-Source Body Diode Characteristics and Maximum Ratings</b>						
Continuous Diode Forward Current	$I_S$		—	—	4	A
Pulsed Diode Forward Current	$I_{SM}$		—	—	16	A
Diode Forward Voltage	$V_{SD}$	$I_S=4A, V_{GS}=0V$	—	—	1.5	V
Reverse Recovery Time	$t_{rr}$	$V_{GS}=0V, I_S=4A,$ $di_f/dt=100A/\mu s,$ (Note4)	—	250	—	ns
Reverse Recovery Charge	$Q_{rr}$		—	1.5	—	$\mu C$

#### Notes

1. Repetitive Rating: pulse width limited by maximum junction temperature.
2.  $V_{DD}=50V$ , starting,  $L=36mH, R_g=25\Omega, I_{AS}=4A, T_J=25^\circ\text{C}$ .
3.  $I_{SD} \leq I_D, di/dt=200A/\mu s, V_{DD} \leq BV_{DSS}$ , starting  $T_J=25^\circ\text{C}$ .
4. Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .
5. Repetitive rating; pulse width limited by maximum junction temperature.