



**5N65 N-Channel Power MOSFET**

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
650V	2.5 $\Omega$ @10V	5A

**GENERAL DESCRIPTION**

This advanced high voltage MOSFET is designed to stand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode fast recovery time. Designed for high voltage, high speed switching applications such as power supplies, converters, power motor controls and bridge circuits.

**FEATURE**

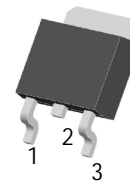
- High Current Rating
- Lower  $R_{DS(on)}$
- Lower Capacitance
- Lower Total Gate Charge
- Tighter  $V_{SD}$  Specifications
- Avalanche Energy Specified

1. GATE
2. DRAIN
3. SOURCE

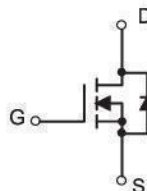
**TO-251**



**TO-252**



**EQUIVALENT CIRCUIT**



**Maximum ratings ( $T_a=25^\circ\text{C}$  unless otherwise noted)**

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	650	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	
Continuous Drain Current	$I_D$	5	A
Pulsed Drain Current	$I_{DM}$	16	
Single Pulsed Avalanche Energy (note1)	$E_{AS}$	280	mJ
Power Dissipation	$P_D$	1.25	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	100	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 ~+150	$^\circ\text{C}$
Maximum lead temperature for soldering purposes , 1/8" from case for 5 seconds	$T_L$	260	

**Electrical characteristics (T<sub>a</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Off characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	650			V
Drain-source diode forward voltage(note2)	V <sub>SD</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = 4.0A			1.5	
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = 600V, V <sub>GS</sub> = 0V			25	μA
Gate-body leakage curren (note2)	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±30V			± 100	nA
<b>On characteristics (note2)</b>						
Gate-threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2.0	3.5	4.0	V
Static drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2.0A		2.2	2.5	Ω
<b>Dynamic characteristics (note 3)</b>						
Input capacitance	C <sub>ISS</sub>	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1MHz			760	pF
Output capacitance	C <sub>OSS</sub>				180	
Reverse transfer capacitance	C <sub>rss</sub>				20	
<b>Switching characteristics (note 3)</b>						
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> = 480V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 4.0A		5.0	10	nC
Gate-source charge	Q <sub>gs</sub>			2.7		
Gate-drain charge	Q <sub>gd</sub>			2.0		
Turn-on delay time (note3)	t <sub>d(on)</sub>	V <sub>DD</sub> = 300V, V <sub>GS</sub> = 10V, R <sub>G</sub> = 9.1Ω, I <sub>D</sub> = 4.0A			20	ns
Turn-on rise time (note3)	t <sub>r</sub>				10	
Turn-off delay time (note3)	t <sub>d(off)</sub>				40	
Turn-off fall time (note3)	t <sub>f</sub>				20	

**Notes :**

1. L=30mH, I<sub>L</sub>=4 A, V<sub>DD</sub>=100V, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C.
2. Pulse Test : Pulse width ≤ 300μs, duty cycle ≤ 2%.
3. These parameters have no way to verify.

