

# 8N65

Power MOSFET

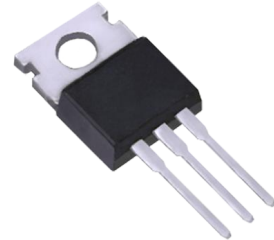
## 8A, 650V N-CHANNEL POWER MOSFET

### ■ DESCRIPTION

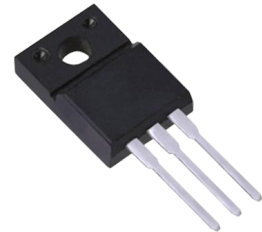
The UTC **8N65** is a high voltage and high current power MOSFET designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics. This power MOSFET is usually used in high speed switching applications at power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

### ■ FEATURES

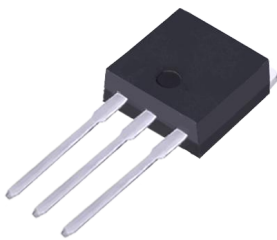
- \*  $R_{DS(ON)} < 1.4\Omega @ V_{GS} = 10V$
- \* Fast switching capability
- \* Avalanche energy specified
- \* Improved dv/dt capability, high ruggedness



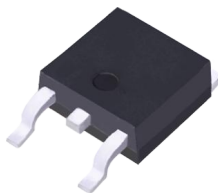
TO-220



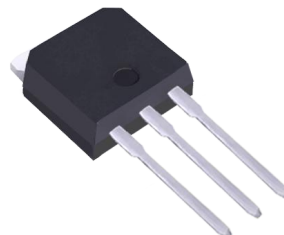
TO-220F



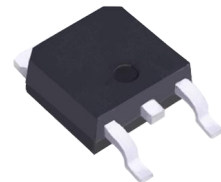
TO-262



TO-263



TO-251



TO-252

■ ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	650	V
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V
Avalanche Current (Note 2)		$I_{AR}$	8	A
Drain Current	Continuous	$I_D$	8	A
	Pulsed (Note 2)	$I_{DM}$	32	A
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	230	mJ
	Repetitive (Note 2)	$E_{AR}$	14.7	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	TO-220/TO-262	$P_D$	147	W
	TO-220F/TO-220F1		48	W
	TO-220F3			
Junction Temperature		$T_J$	+150	$^\circ\text{C}$
Operating Temperature		$T_{OPR}$	-55 ~ +150	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating : Pulse width limited by  $T_J$

3.  $L=7.1\text{mH}$ ,  $I_{AS}=8\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$

4.  $I_{SD} \leq 8\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J=25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient		$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220/TO-262	$\theta_{JC}$	0.85	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		2.6	$^\circ\text{C}/\text{W}$
	TO-220F3			

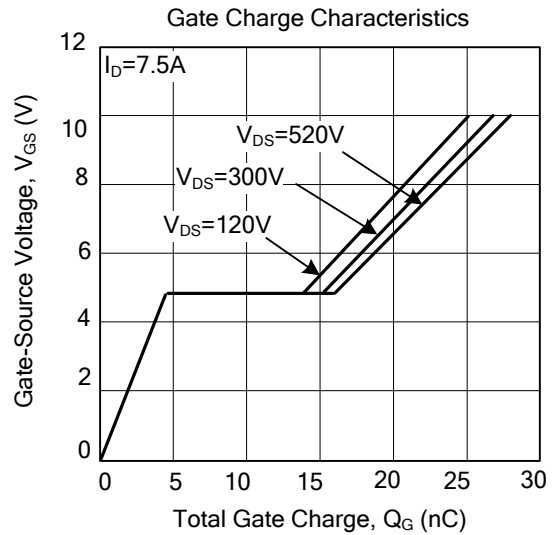
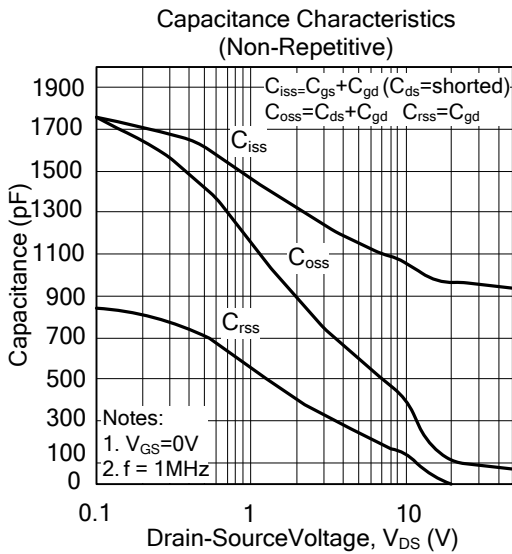
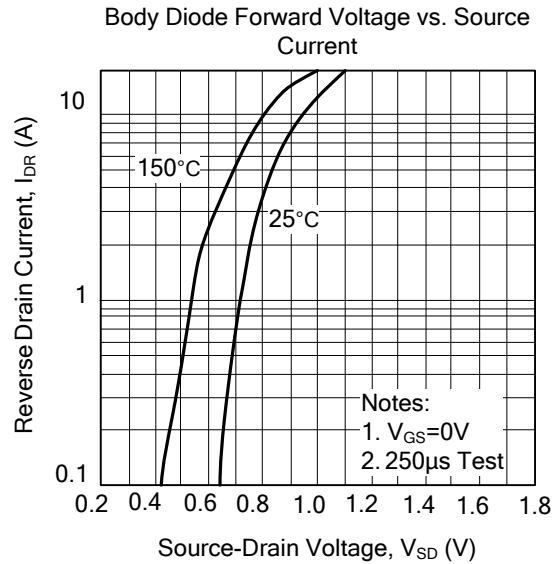
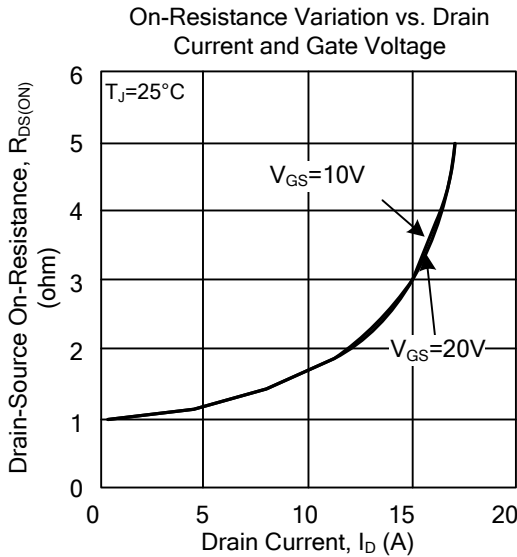
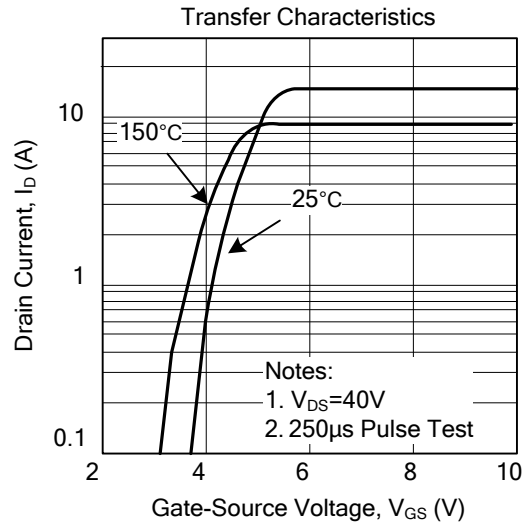
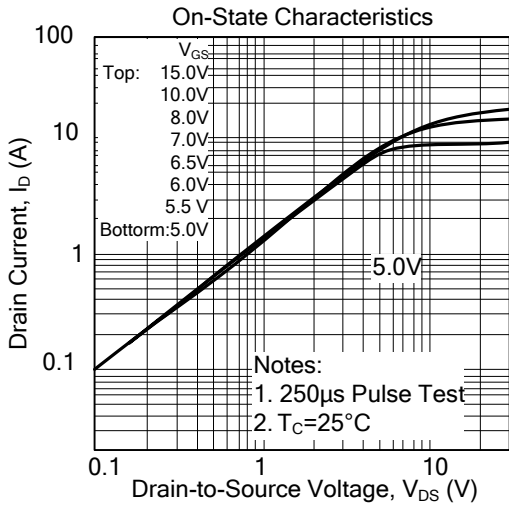
■ ELECTRICAL CHARACTERISTICS (T<sub>C</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	650			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> = 650 V, V <sub>GS</sub> = 0 V			10	μA
Gate-Source Leakage Current	Forward	I <sub>GSS</sub>			100	nA
	Reverse				-100	nA
Breakdown Voltage Temperature Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	I <sub>D</sub> = 250 μA, Referenced to 25°C		0.7		V/°C
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	2.0		4.0	V
Static Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 4 A		1.2	1.4	Ω
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f = 1 MHz		1145	1255	pF
Output Capacitance	C <sub>OSS</sub>			118	135	pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			19	25	pF
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> = 325 V, I <sub>D</sub> = 8 A, R <sub>G</sub> = 25 Ω (Note 1, 2)		84	100	ns
Turn-On Rise Time	t <sub>R</sub>			100	130	ns
Turn-Off Delay Time	t <sub>D(OFF)</sub>			275	320	ns
Turn-Off Fall Time	t <sub>F</sub>			64.5	140	ns
Total Gate Charge	Q <sub>G</sub>	V <sub>DS</sub> = 520 V, I <sub>D</sub> = 8 A, V <sub>GS</sub> = 10 V (Note 1, 2)		115	130	nC
Gate-Source Charge	Q <sub>GS</sub>			12		nC
Gate-Drain Charge	Q <sub>GD</sub>			40		nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b>						
Drain-Source Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 8 A			1.4	V
Maximum Continuous Drain-Source Diode Forward Current	I <sub>S</sub>				8	A
Maximum Pulsed Drain-Source Diode Forward Current	I <sub>SM</sub>				32	A
Reverse Recovery Time	t <sub>RR</sub>	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 8 A, dI <sub>F</sub> /dt = 100 A/μs (Note 2)		365		ns
Reverse Recovery Charge	Q <sub>RR</sub>			3.4		μC

Notes: 1. Pulse Test: Pulse width ≤ 300 μs, Duty cycle ≤ 2%

2. Essentially independent of operating temperature

■ TYPICAL CHARACTERISTICS



## TYPICAL CHARACTERISTICS(Cont.)

