

15A, 650V N-CHANNEL POWER MOSFET

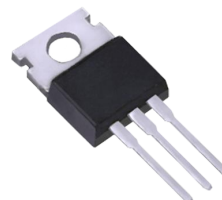
■ DESCRIPTION

The UTC **15N65** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology is specialized in allowing a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

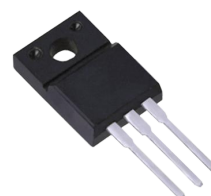
The UTC **15N65** is universally applied in active power factor correction and high efficient switched mode power supplies.

■ FEATURES

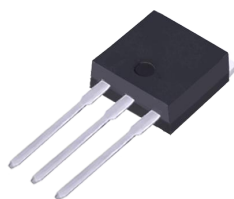
- * $R_{DS(ON)} \leq 0.65\Omega$ @ $V_{GS}=10V$, $I_D=7.5A$
- * High switching speed
- * Improved dv/dt capability



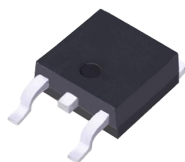
TO-220



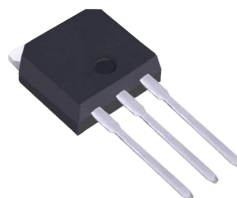
TO-220F



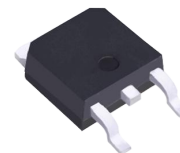
TO-262



TO-263



TO-251



TO-252

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain to Source Voltage		V_{DSS}	650	V
Gate to Source Voltage		V_{GSS}	± 30	V
Continuous Drain Current	Continuous	I_D	15	A
	Pulsed (Note 2)	I_{DM}	60	A
Avalanche Current (Note 2)		I_{AR}	6.4	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	205	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.45	V/ns
Power Dissipation	TO-220/TO-263	P_D	250	W
	TO-220F		54	W
	TO-220F1/TO-220F2		52	W
	TO-247		312	W
Junction Temperature		T_J	+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 maximum junction temperature.

3. $L=10\text{mH}$, $I_{AS}=6.4\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

4. $I_{SD}\leq 15\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$.

■ THERMAL CHARACTERISTICS

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F TO-220F1/TO-220F2 TO-263	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-247		40	$^\circ\text{C}/\text{W}$
	TO-220/TO-263		0.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220F	θ_{JC}	2.3	$^\circ\text{C}/\text{W}$
	TO-220F1/TO-220F2		2.4	$^\circ\text{C}/\text{W}$
	TO-247		0.4	$^\circ\text{C}/\text{W}$

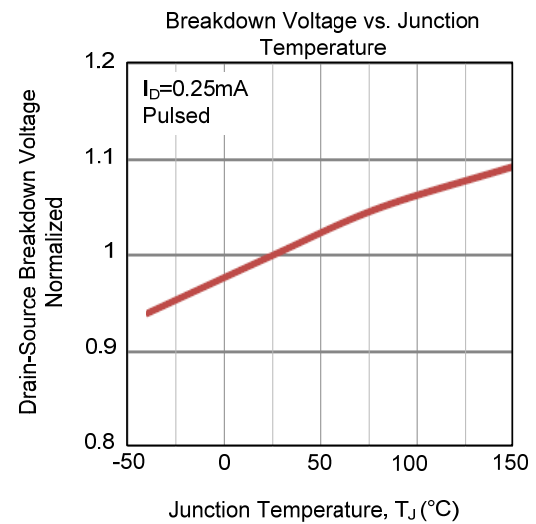
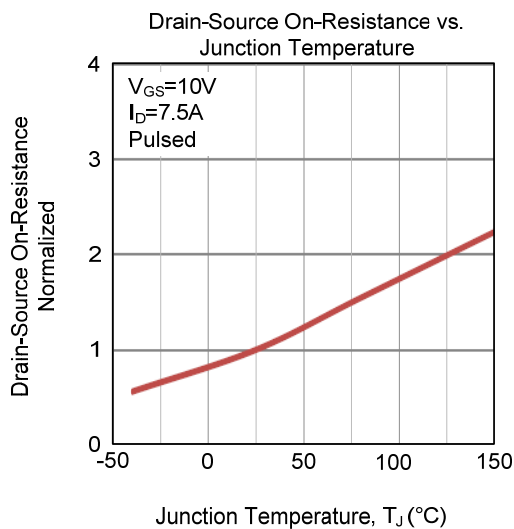
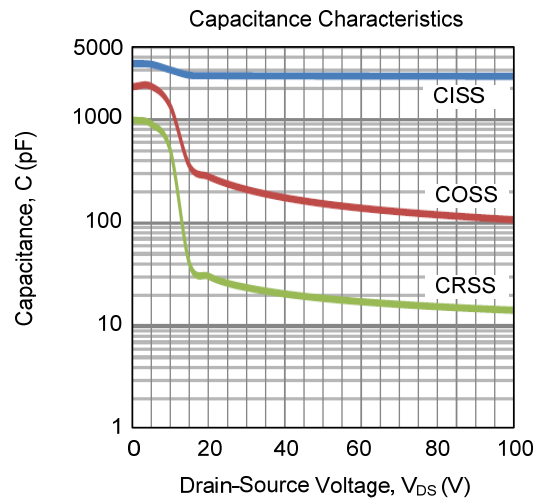
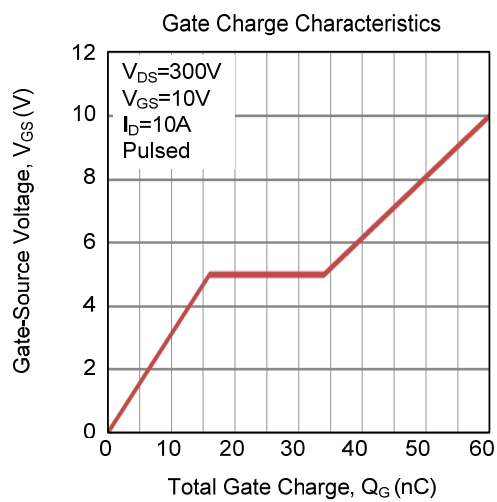
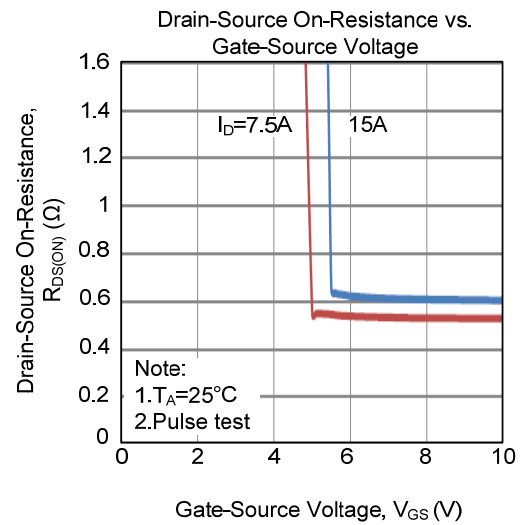
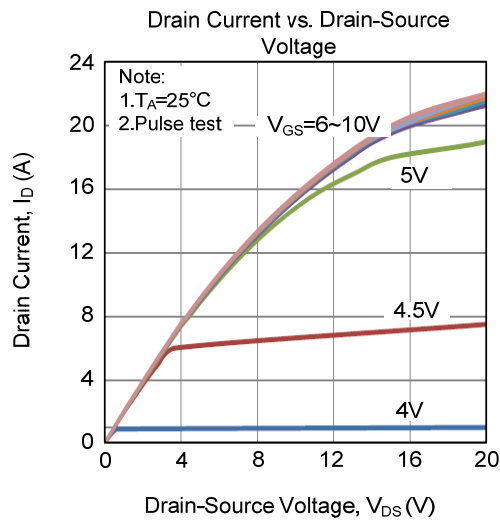
■ ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	650			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V$			1	μA
Gate- Source Leakage Current	Forward	$V_{GS}=+30V, V_{DS}=0V$			+100	nA
	Reverse		$V_{GS}=-30V, V_{DS}=0V$			-100
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0		4.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=7.5A$			0.65	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V, f=1.0\text{MHz}$		2700		pF
Output Capacitance	C_{OSS}			240		pF
Reverse Transfer Capacitance	C_{RSS}			26		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q_G	$V_{DS}=300V, V_{GS}=10V, I_D=10A,$ $I_G = 1\text{mA}$ (Note 1, 2)		60		nC
Gate-Source Charge	Q_{GS}			16		nC
Gate-Drain Charge	Q_{GD}			18		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	$V_{DD}=300V, V_{GS}=10V, I_D=10A,$ $R_G=25\Omega$ (Note 1, 2)		30		ns
Turn-ON Rise Time	t_R			28		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			194		ns
Turn-OFF Fall Time	t_F			43		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				15	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				60	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$I_S=15A, V_{GS}=0V$			1.4	V
Body Diode Reverse Recovery Time (Note 1)	t_{rr}	$I_S=15A, V_{GS}=0V,$ $dI_F/dt=100A/\mu s$		510		ns
Body Diode Reverse Recovery Charge	Q_{rr}				8.2	

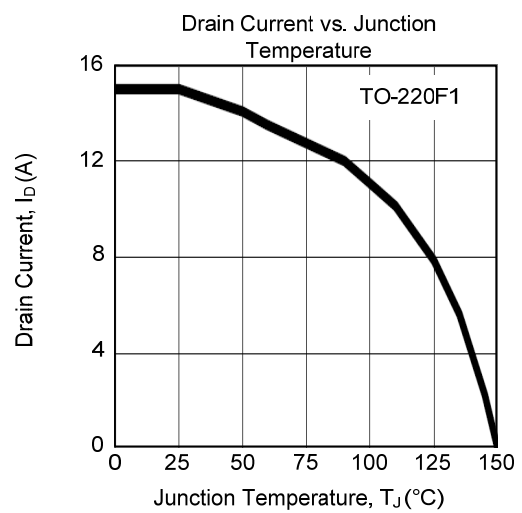
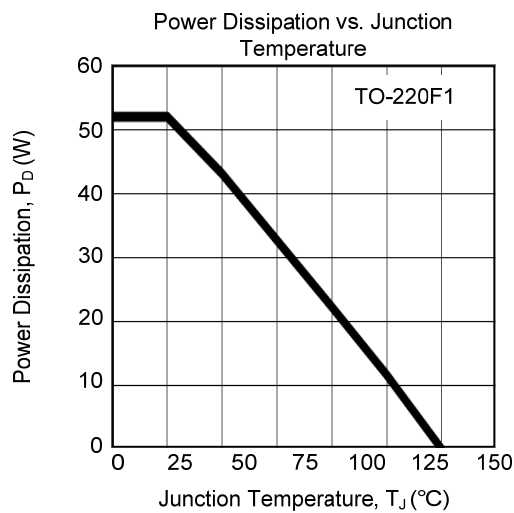
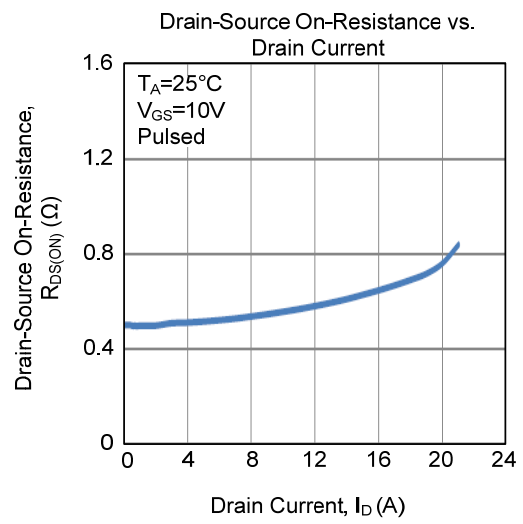
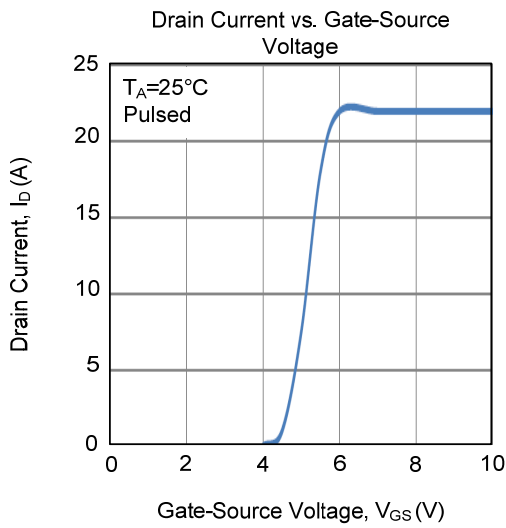
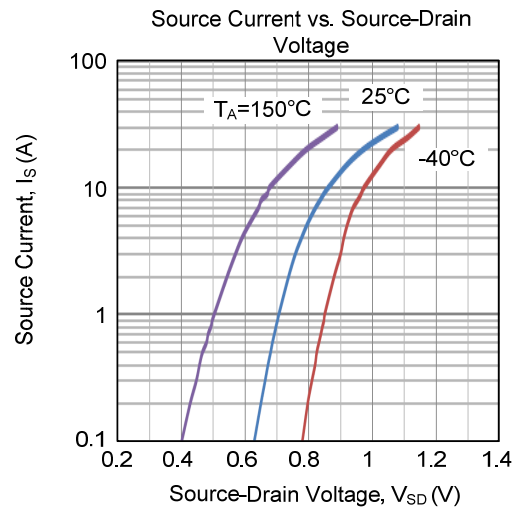
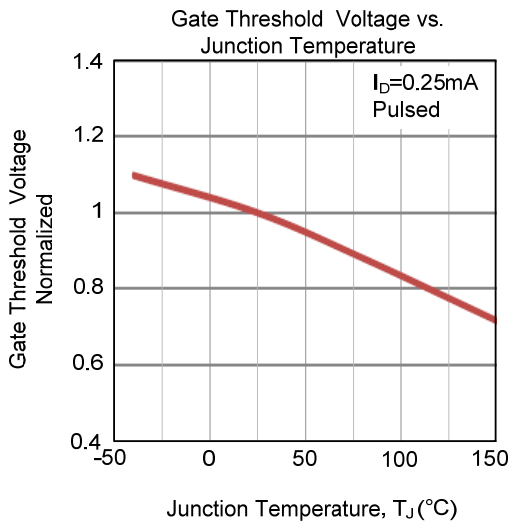
Notes: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)

