



20N70K-MT

Power MOSFET

20A, 700V N-CHANNEL POWER MOSFET

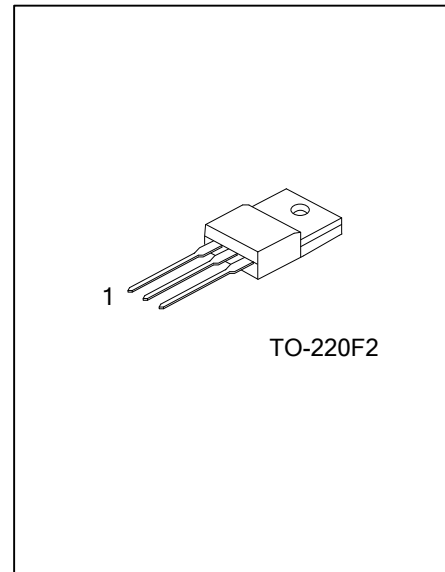
DESCRIPTION

The UTC **20N70K-MT** is an N-channel Power MOSFET using UTC's advanced technology to provide customers a minimum on-state resistance and superior switching performance, etc.

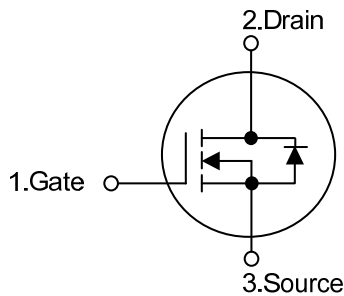
The UTC **20N70K-MT** is generally applied in high efficient DC to DC converters, PWM motor controls and bridge circuits, etc.

FEATURES

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



SYMBOL



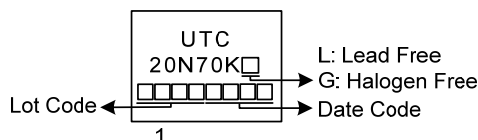
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
20N70KL-TF2-T	20N70KG-TF2-T	TO-220F2	G	D	S	Tube

Note: Pin Assignment: G: Gate D: Drain S: Source

<p>20N70KG-TF2-T</p> <ul style="list-style-type: none"> (1) Packing Type (2) Package Type (3) Green Package 	<ul style="list-style-type: none"> (1) T: Tube (2) TF2: TO-220F2 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	700	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous	I_D	20	A
	Pulsed (Note 2)	I_{DM}	40	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	360	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.58	V/ns
Power Dissipation		P_D	40	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. $L = 10\text{mH}$, $I_{AS} = 8.48\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$ Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 20\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	3.125	$^\circ\text{C}/\text{W}$

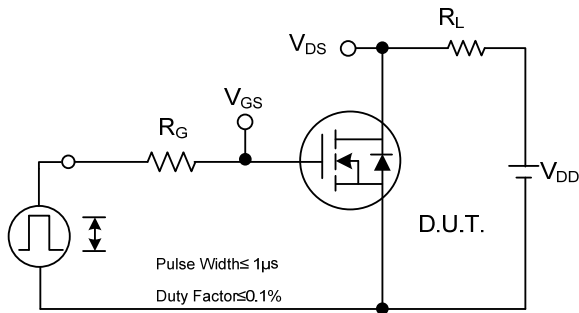
■ ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$	700			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=700\text{V}$, $V_{GS}=0\text{V}$			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}			100	nA
	Reverse				-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=10\text{A}$			0.65	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		2508		pF
Output Capacitance	C_{OSS}			220		pF
Reverse Transfer Capacitance	C_{RSS}			14		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 1)	Q_G	$V_{DS}=100\text{V}$, $V_{GS}=10\text{V}$, $I_D=20\text{A}$ $I_G=1\text{mA}$ (Note 1, 2)		54		nC
Gate-source Charge	Q_{GS}			11		nC
Gate-drain Charge	Q_{GD}			12		nC
Turn-on Delay Time (Note 1)	$t_{D(ON)}$	$V_{DS}=100\text{V}$, $V_{GS}=10\text{V}$, $I_D=20\text{A}$, $R_G=25\ \Omega$ (Note 1, 2)		28		ns
Rise Time	t_R			35		ns
Turn-off Delay Time	$t_{D(OFF)}$			135		ns
Fall-Time	t_F			73		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				20	A
Maximum Body-Diode Pulsed Current	I_{SM}				40	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$V_{GS}=0\text{V}$, $I_S=20\text{A}$			1.4	V
Reverse Recovery Time (Note 1)	t_{rr}	$V_{GS}=0\text{V}$, $I_S=20\text{A}$,		482		ns
Reverse Recovery Charge	Q_{rr}	$di_F/dt=100\text{A}/\mu\text{s}$ (Note 1)		8.5		μC

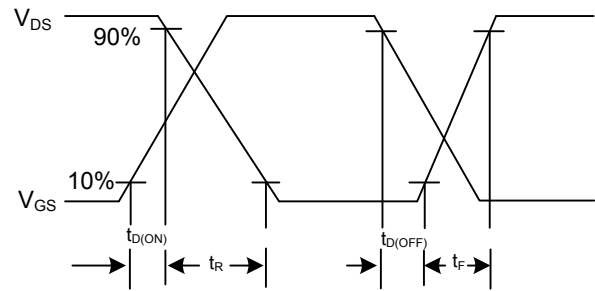
Notes: 1. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

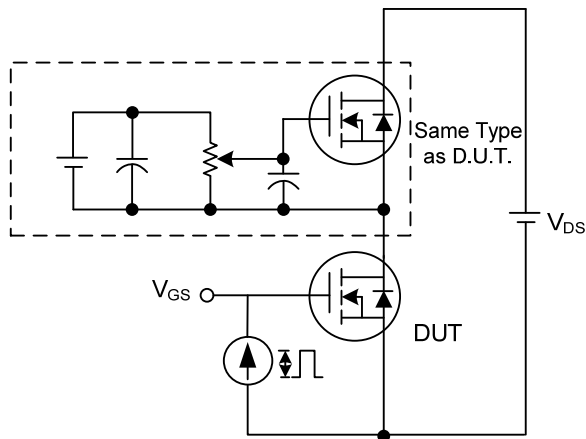
TEST CIRCUITS AND WAVEFORMS



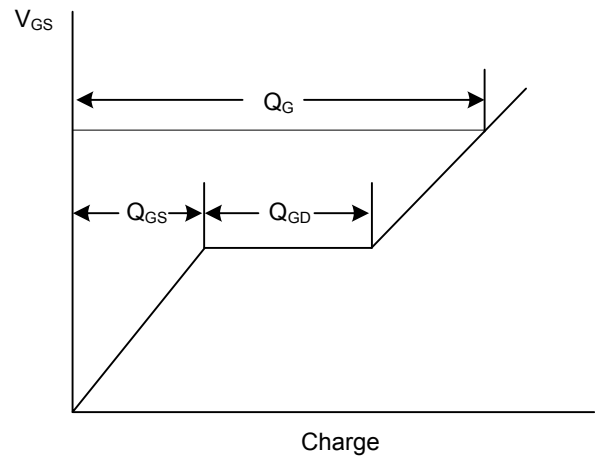
Switching Test Circuit



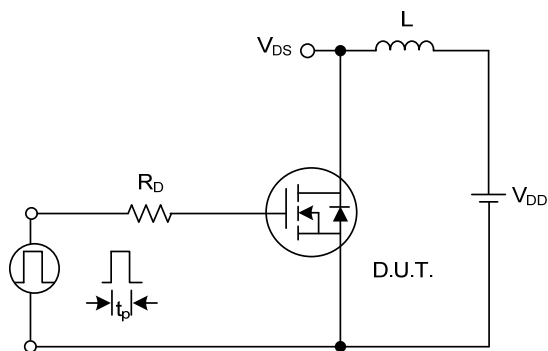
Switching Waveforms



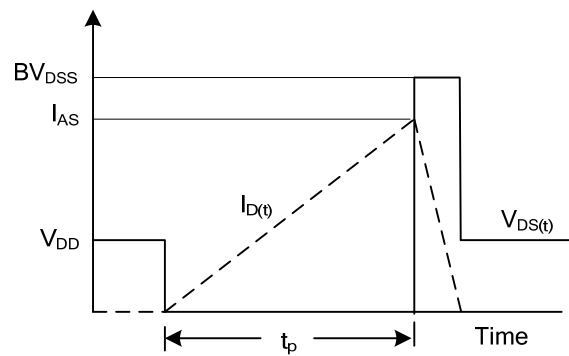
Gate Charge Test Circuit



Gate Charge Waveform

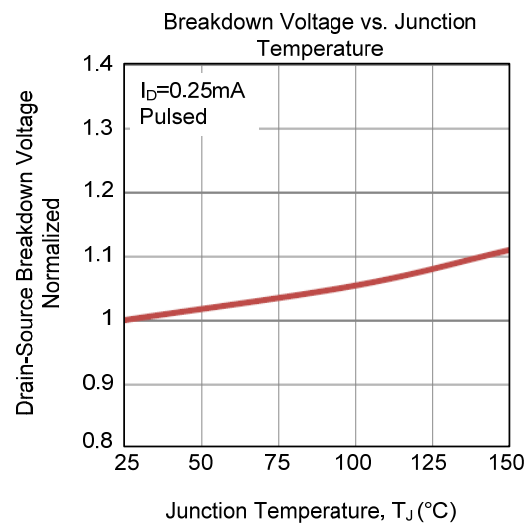
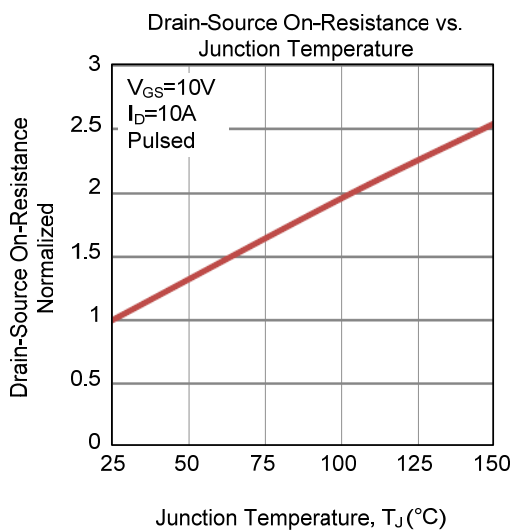
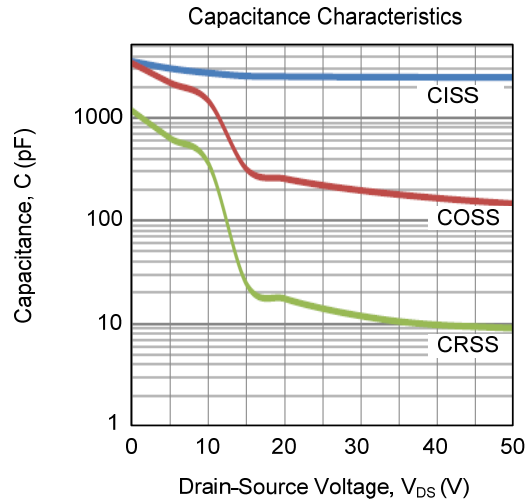
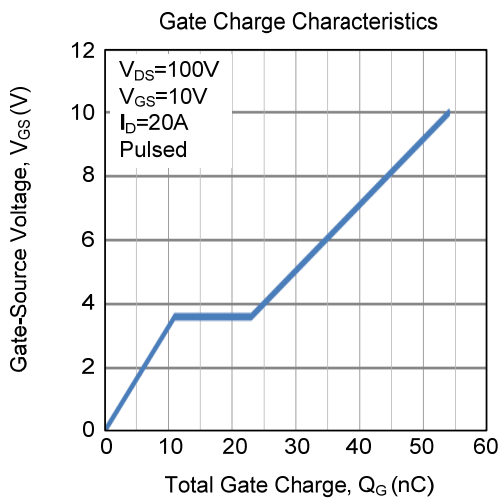
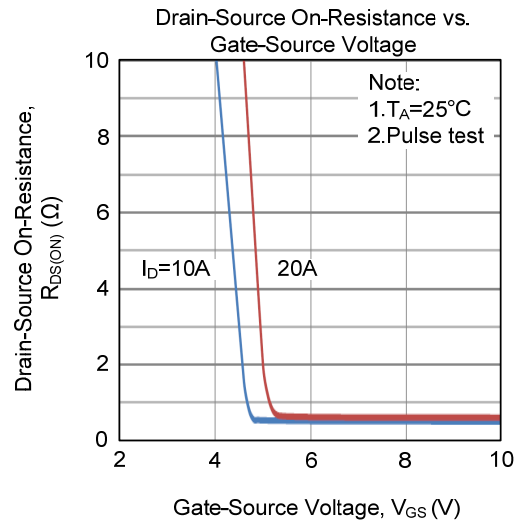
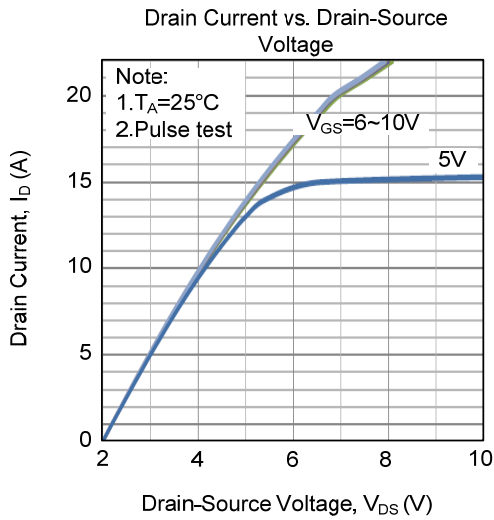


Unclamped Inductive Switching Test Circuit

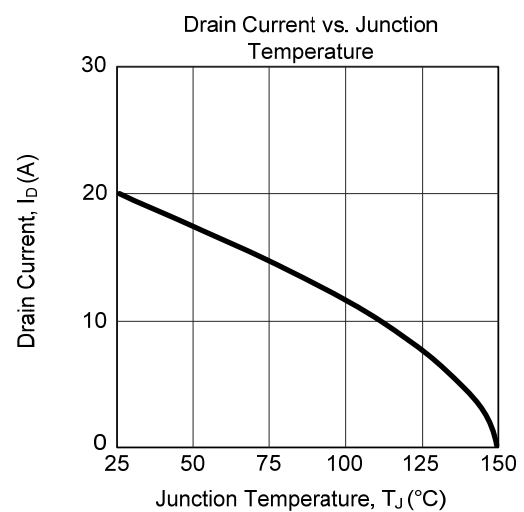
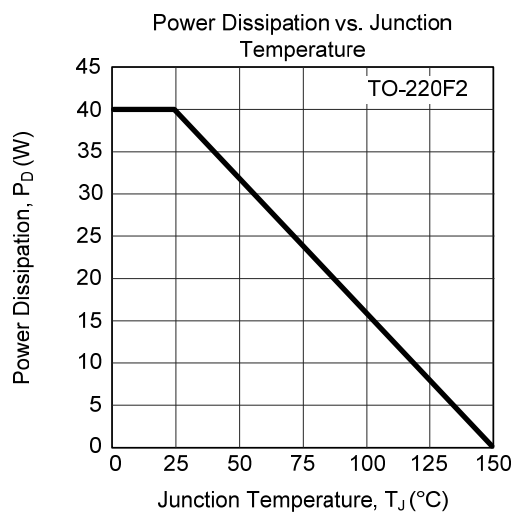
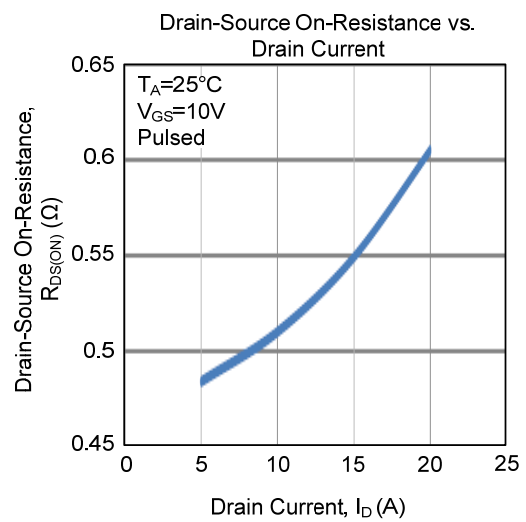
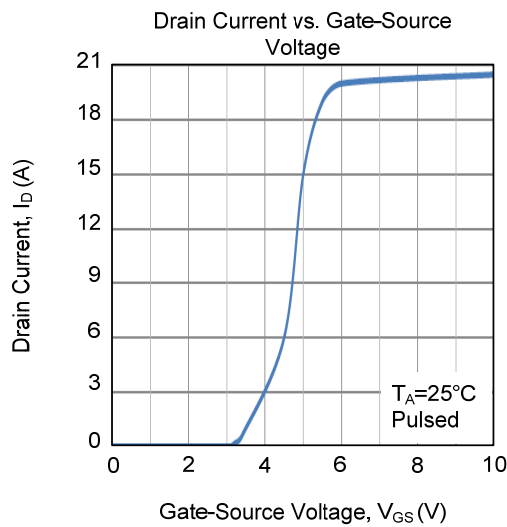
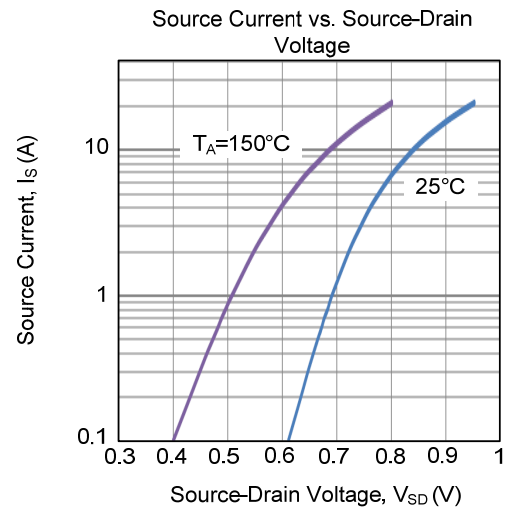
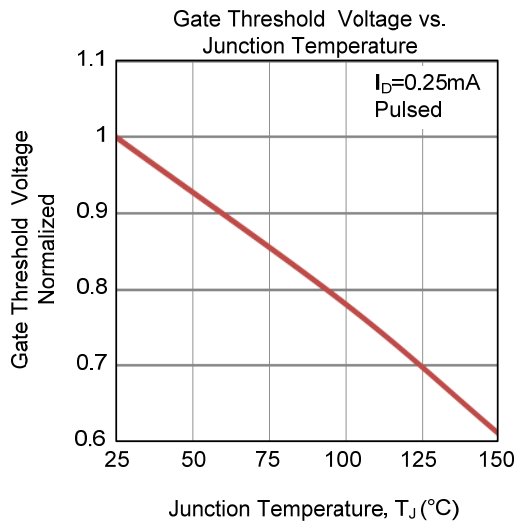


Unclamped Inductive Switching Waveforms

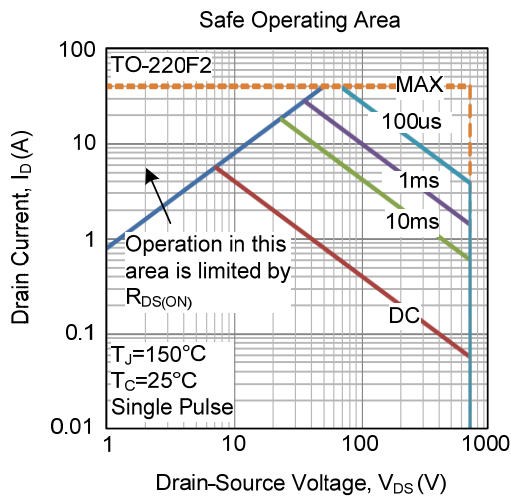
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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