



**17N40K-MT**

Preliminary

*Power MOSFET*

**17A, 400V N-CHANNEL  
POWER MOSFET**

■ DESCRIPTION

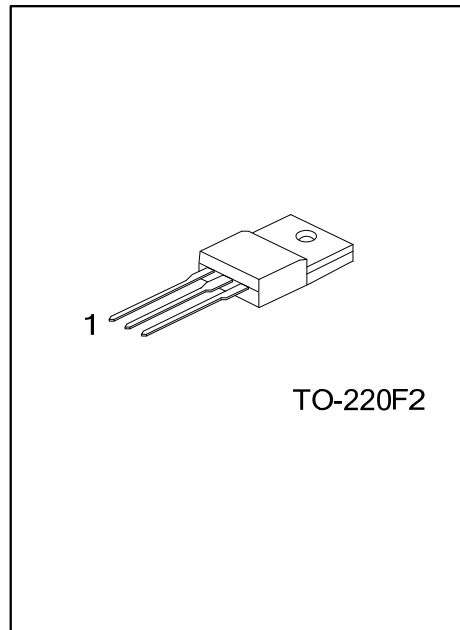
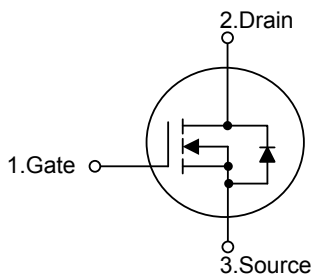
The UTC **17N40K-MT** is an N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology allows a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **17N40K-MT** is generally applied in high efficiency switch mode power supplies.

■ FEATURES

- \*  $R_{DS(ON)} < 0.24\Omega @ V_{GS} = 10V, I_D = 7.5A$
- \* Low Gate Charge (Typical 47nC)
- \* Low  $C_{RSS}$  (Typical 11pF)
- \* High Switching Speed

■ SYMBOL



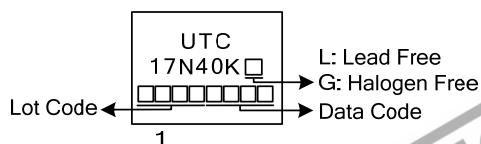
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
17N40KL-TF2-T	17N40KG-TF2-T	TO-220F2	G	D	S	Tube

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

<p>17N40KL-TF2-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube (2) TF2: TO-220F2 (3) L: Lead Free, G: Halogen Free</p>
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■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	400	V
Gate-Source Voltage		$V_{GSS}$	$\pm 30$	V
Drain Current	Continuous $T_C=25^\circ\text{C}$	$I_D$	17	A
	Pulsed (Note 2)	$I_{DM}$	68	A
Avalanche Energy		$E_{AS}$	811	mJ
Peak Diode Recovery $dv/dt$ (Note 4)		$dv/dt$	4.5	V/ns
Power Dissipation ( $T_C=25^\circ\text{C}$ )		$P_D$	39	W
Derate above $25^\circ\text{C}$			3.2	W/ $^\circ\text{C}$
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.  $L = 5.61\text{mH}$ ,  $I_{AS} = 17\text{A}$ ,  $V_{DD} = 50\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$

4.  $I_{SD} \leq 17\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	$\theta_{JC}$	3.2	$^\circ\text{C}/\text{W}$

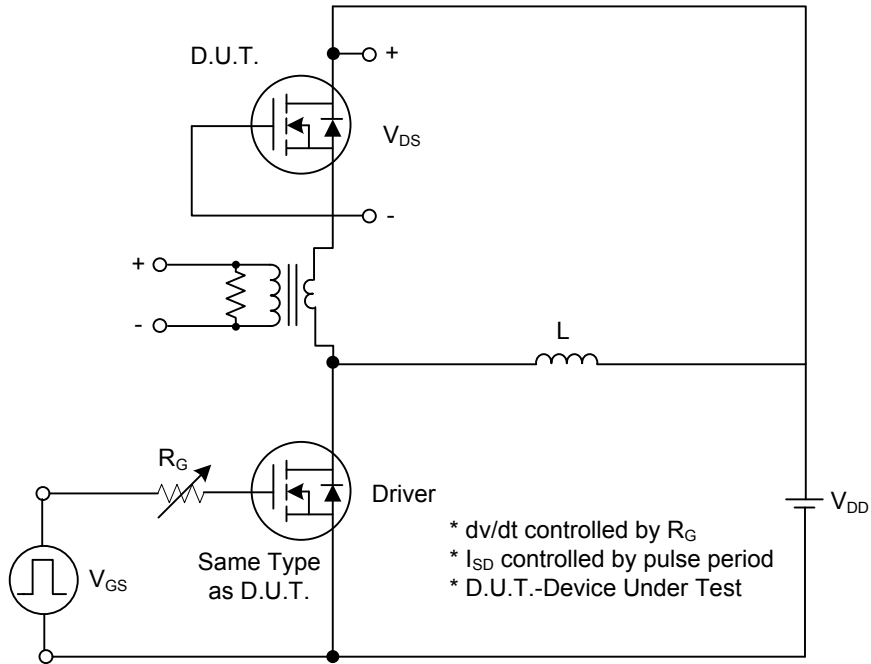
■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	400			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=250\mu\text{A}$		0.5		V/ $^\circ\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=400\text{V}$ , $V_{GS}=0\text{V}$			10	$\mu\text{A}$
Gate- Source Leakage Current	Forward	$V_{GS}=+30\text{V}$ , $V_{DS}=0\text{V}$			+100	nA
	Reverse	$V_{GS}=-30\text{V}$ , $V_{DS}=0\text{V}$			-100	nA
<b>ON CHARACTERISTICS</b>						
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	$R_{DS(ON)}$	$V_{GS}=10\text{V}$ , $I_D=8.5\text{A}$		0.18	0.24	$\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0\text{V}$ , $V_{DS}=25\text{V}$ , $f=1.0\text{MHz}$		980		pF
Output Capacitance	$C_{OSS}$			240		pF
Reverse Transfer Capacitance	$C_{RSS}$			11.4		pF
<b>SWITCHING PARAMETERS</b>						
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DS}=30\text{V}$ , $I_D=0.5\text{A}$ , $R_G=25\Omega$ (Note 1, 2)		82		ns
Rise Time	$t_R$			136		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			270		ns
Fall-Time	$t_F$			152		ns
Total Gate Charge at 10V	$Q_{G(TOT)}$	$V_{GS}=10\text{V}$ , $V_{DS}=50\text{V}$ , $I_D=1.3\text{A}$ (Note 1, 2)		47		nC
Gate to Source Charge	$Q_{GS}$			12.5		nC
Gate to Drain Charge	$Q_{GD}$			13		nC
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	$I_S$				17	A
Maximum Body-Diode Pulsed Current	$I_{SM}$				68	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$I_{SD}=17\text{A}$ , $V_{GS}=0\text{V}$			1.5	V

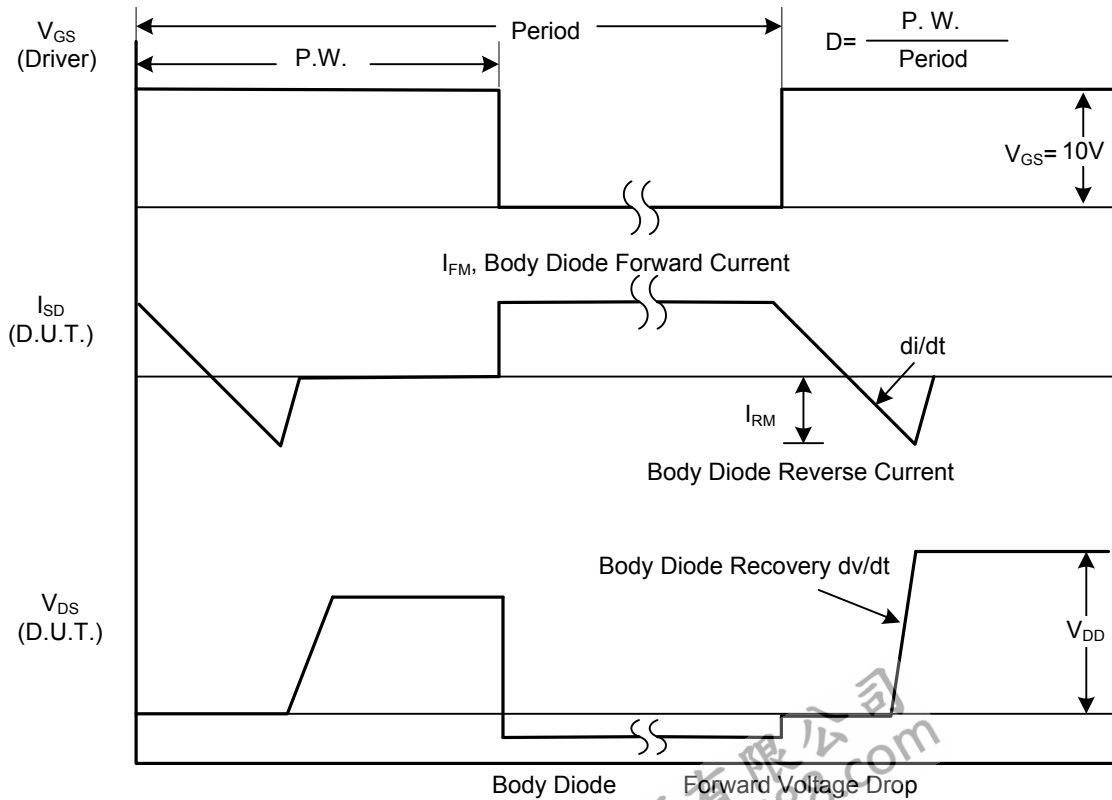
Notes: 1. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$

2. Essentially Independent of Operating Temperature Typical Characteristics

■ TEST CIRCUITS AND WAVEFORMS

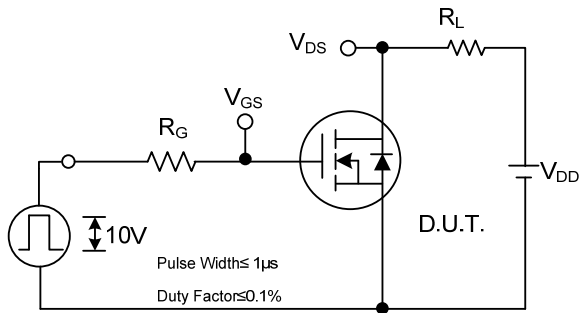


Peak Diode Recovery  $dv/dt$  Test Circuit

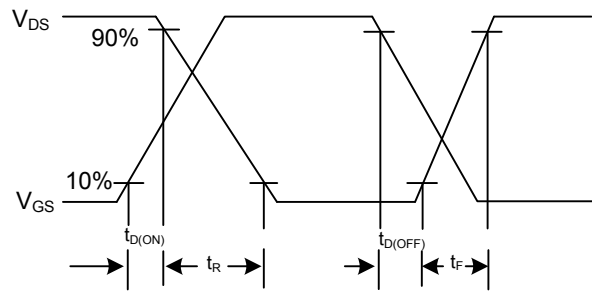


Peak Diode Recovery  $dv/dt$  Waveforms

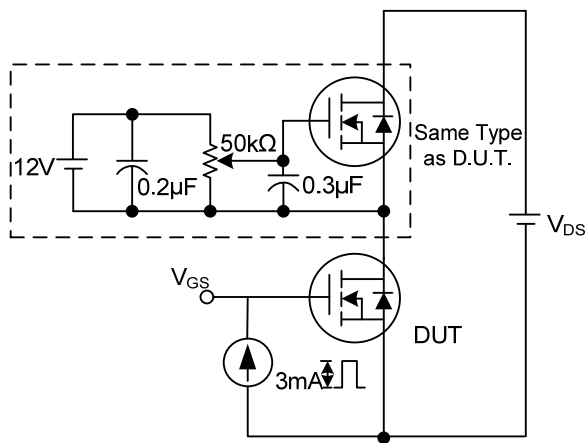
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



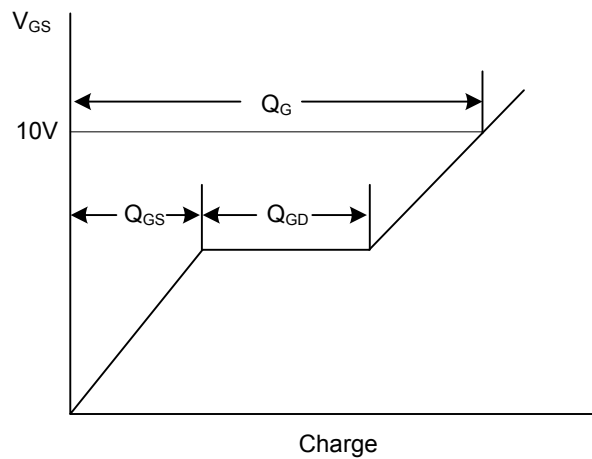
Switching Test Circuit



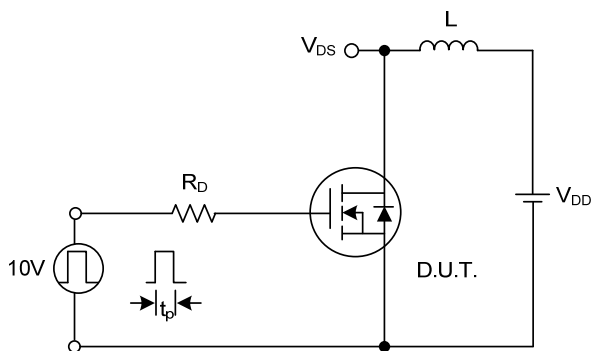
Switching Waveforms



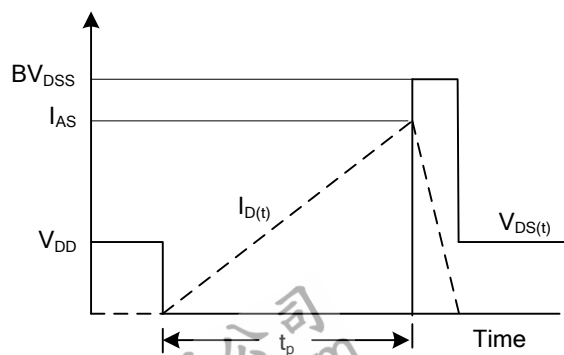
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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