



25N40

Preliminary

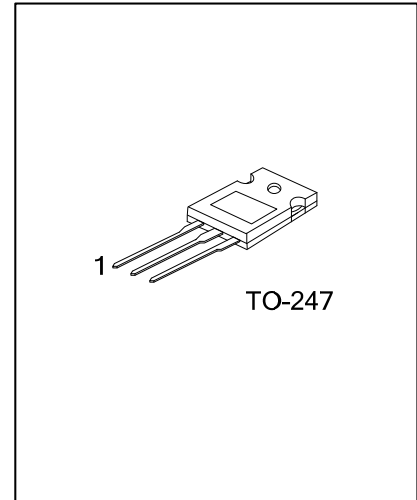
Power MOSFET

**400V, 26A N-CHANNEL
POWER MOSFET**

■ DESCRIPTION

The UTC **25N40** 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.

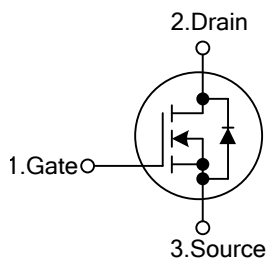
The UTC **25N40** is generally applied in high efficiency switch mode power supplies.



■ FEATURES

- * $R_{DS(ON)}=0.16\Omega @ V_{GS}=10V, I_D=13A$
- * Low Gate Charge (Typical 48nC)
- * Low C_{RSS} (Typical 30pF)
- * High Switching Speed

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
25N40L-T47-T	25N40G-T47-T	TO-247	G	D	S	Tube

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

<p>25N40L-T47-T</p> <ul style="list-style-type: none"> (1)Packing Type (2)Package Type (3)Lead Free 	<ul style="list-style-type: none"> (1) T: Tube (2) T47: TO-247 (3) G: Halogen Free, L: Lead Free
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■ ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ\text{C}$, unless otherwise specified) (Note 5)

PARAMETER			SYMBOL	RATINGS	UNIT
Drain to Source Voltage			V_{DSS}	400	V
Gate-Source Voltage			V_{GSS}	± 30	V
Drain Current (Note 5)	Continuous	$T_C=25^\circ\text{C}$	I_D	26	A
		$T_C=100^\circ\text{C}$		15.6	A
Pulsed (Note 2)			I_{DM}	104	A
Avalanche Current (Note 2)			I_{AR}	26	A
Avalanche Energy	Single Pulsed (Note 3)		E_{AS}	1352	mJ
	Repetitive (Note 2)		E_{AR}	26.5	mJ
Peak Diode Recovery dv/dt (Note 4)			dv/dt	4.5	V/ns
Power Dissipation ($T_C=25^\circ\text{C}$)			P_D	297	W
Derate above 25°C				2.4	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. $L=4\text{mH}$, $I_{AS}=26\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$
4. $I_{SD}\leq 26\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$
5. Drain current limited by maximum junction temperature

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	40	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	0.42	$^\circ\text{C}/\text{W}$

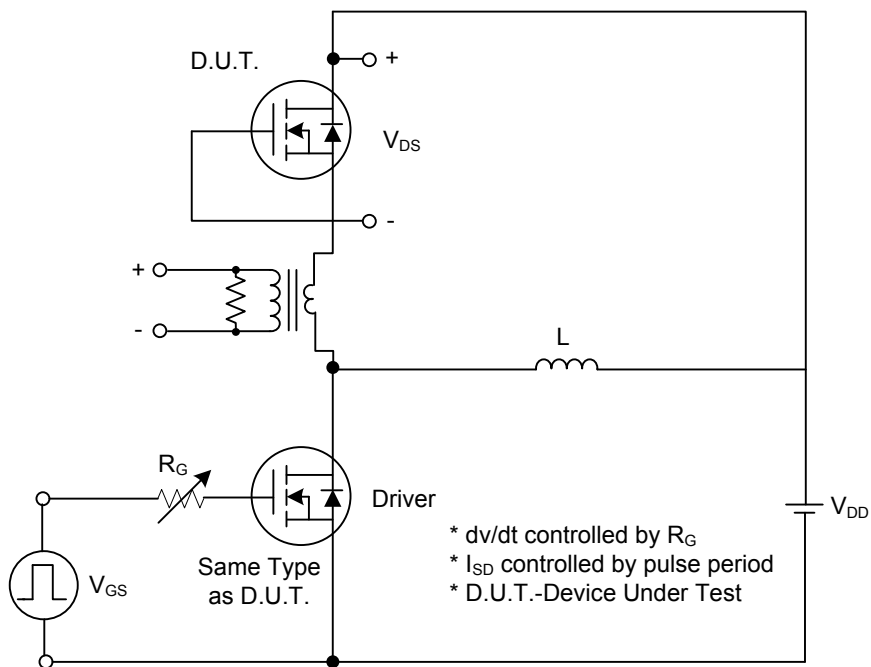
■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V, T_J=150^\circ C$	400			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ C, I_D=250\mu A$		0.5		V/ $^\circ C$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=400V, V_{GS}=0V,$			1	μA
Gate- Source Leakage Current	Forward	$V_{GS}=+30V, V_{DS}=0V$			+100	nA
	Reverse	$V_{GS}=-30V, V_{DS}=0V$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=13A$		0.11	0.16	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=25, V_{GS}=0V, f=1.0MHz$		2400	3185	pF
Output Capacitance	C_{OSS}			390	520	pF
Reverse Transfer Capacitance	C_{RSS}			30	45	pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DS}=320V, V_{GS}=10V, I_D=26A$ (Note 1, 2)		48	60	nC
Gate to Source Charge	Q_{GS}			15		nC
Gate to Drain ("Miller") Charge	Q_{GD}			20		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=200V, I_D=26A, R_G=25\Omega$ (Note 1, 2)		45	100	ns
Rise Time	t_R			100	210	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			115	240	ns
Fall-Time	t_F			66	140	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				26	A
Maximum Body-Diode Pulsed Current	I_{SM}				104	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_{SD}=26A, V_{GS}=0V$			1.4	V
Body Diode Reverse Recovery Time	t_{rr}	$I_{SD}=26A, V_{GS}=0V,$		406		ns
Body Diode Reverse Recovery Charge	Q_{RR}	$di_f/dt=100A/\mu s$ (Note 1)		5.17		μC

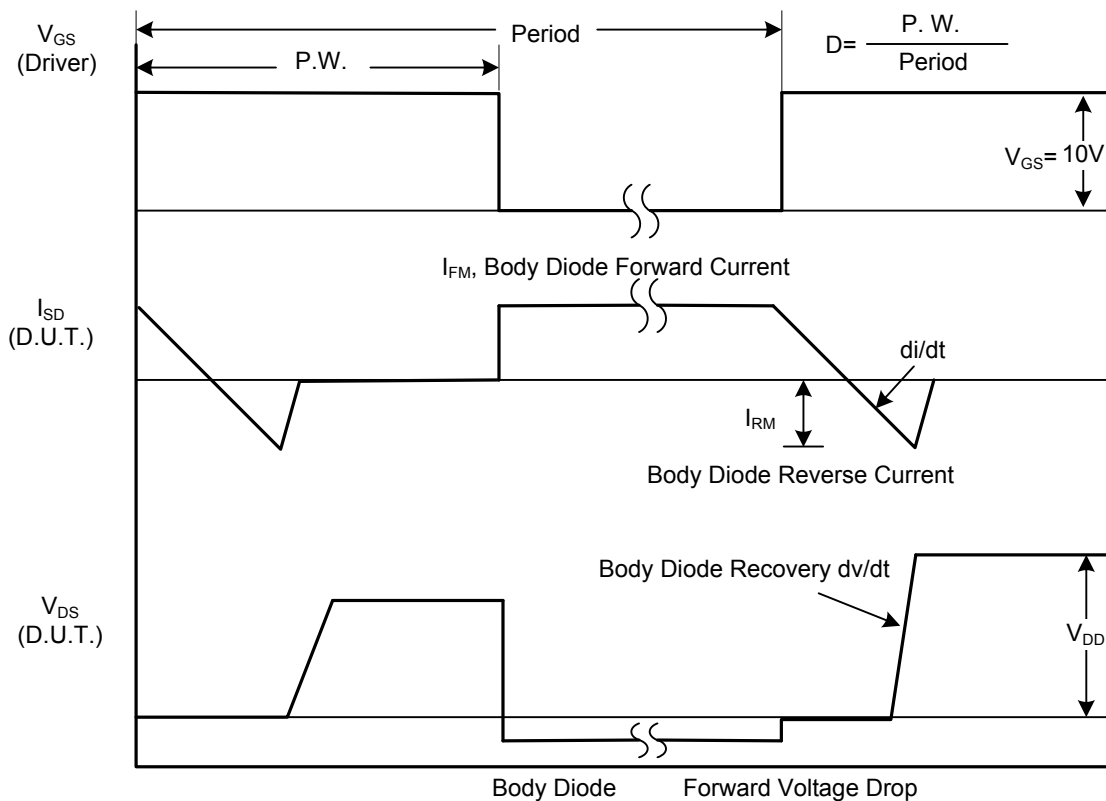
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$; Duty Cycle $\leq 2\%$.

2. Essentially Independent of Operating Temperature Typical Characteristics

■ TEST CIRCUITS AND WAVEFORMS

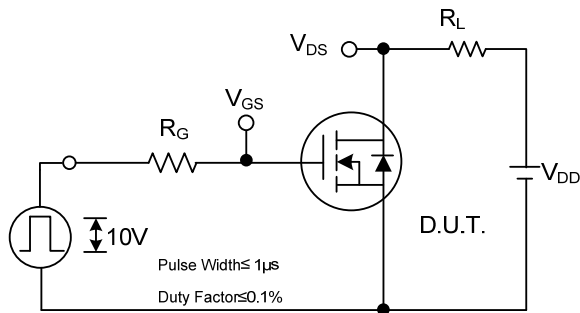


Peak Diode Recovery dv/dt Test Circuit

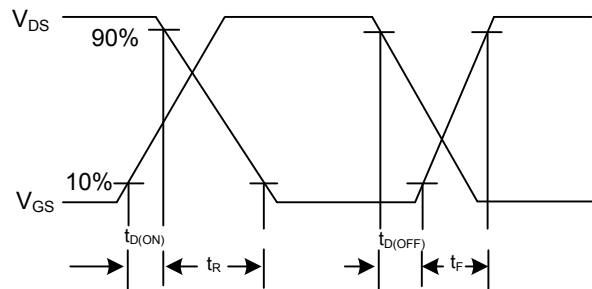


Peak Diode Recovery dv/dt Waveforms

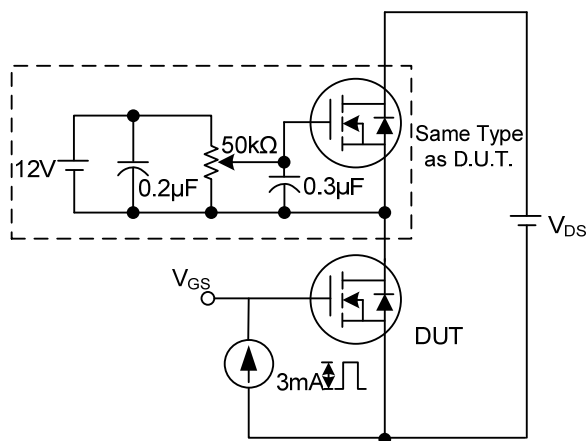
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



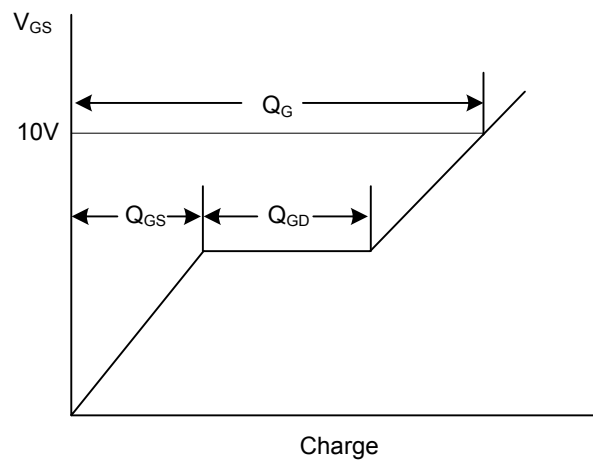
Switching Test Circuit



Switching Waveforms

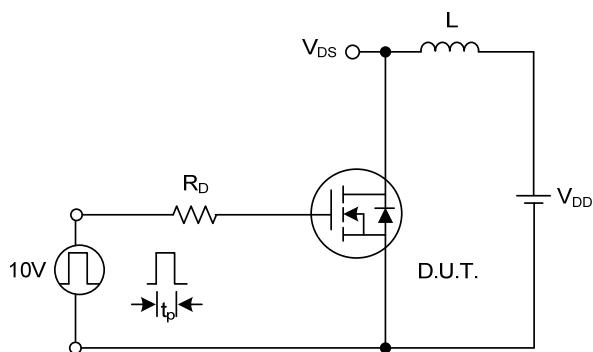


Gate Charge Test Circuit

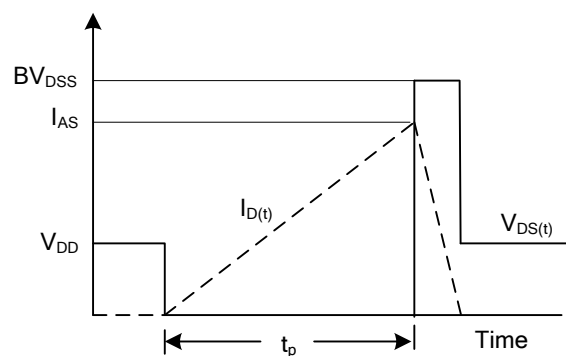


Charge

Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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