

**UT40N025**

Preliminary

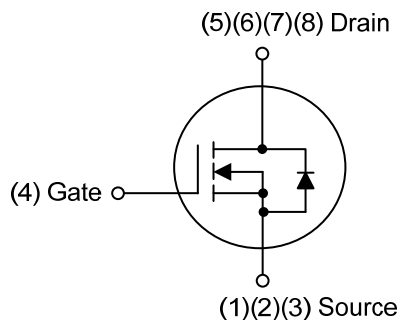
Power MOSFET

**40A, 25V N-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **UT40N025** is a N-Channel MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low $R_{DS(ON)}$ and fast switching speed.

FEATURES

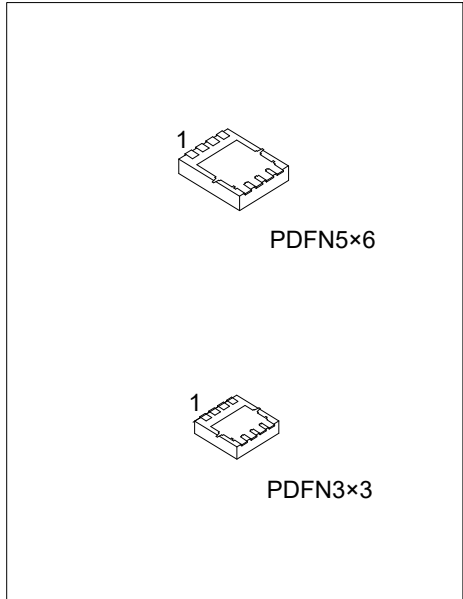
- * $R_{DS(ON)} \leq 6.0 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=20\text{A}$
- * $R_{DS(ON)} \leq 8.0 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=20\text{A}$
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

SYMBOL**ORDERING INFORMATION**

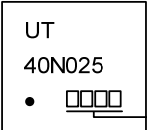
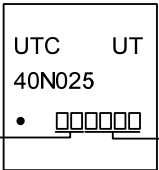
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT40N025L-P3030-R	UT40N025G-P3030-R	PDFN3×3	S	S	S	G	D	D	D	D	Tape Reel
UT40N025L-P5060-R	UT40N025G-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

UT40N025G-P3030-R	(1) Packing Type	(1) R: Tape Reel
	(2) Package Type	(2) P3030: PDFN3×3, P5060: PDFN5×6
	(3) Green Package	(3) G: Halogen Free and Lead Free, K: Lead Free



■ MARKING

PDFN3×3	PDFN5×6
 UT 40N025 • □□□□ → Date Code	 UTC UT 40N025 • □□□□□□ → Date Code ← Lot Code

■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	25	V
Gate-Source Voltage		V _{GSS}	±20	V
Drain Current	Continuous	I _D	40	A
	Pulsed (Note 2)	I _{DM}	80	A
Avalanche energy	Single Pulsed (Note 3)	E _{AS}	54	mJ
Power Dissipation	PDFN3×3	P _D	32	W
	PDFN5×6		41	W
Junction Temperature		T _J	+150	°C
Storage Temperature		T _{STG}	-55 ~ +150	°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=0.1mH, I_{AS}=33A, V_{DD}=20V, R_G=25Ω, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction-to-Ambient	PDFN3×3	θ _{JA}	75	°C/W
	PDFN5×6		65	°C/W
Junction-to-Case	PDFN3×3	θ _{JC}	3.9	°C/W
	PDFN5×6		3.05	°C/W

Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

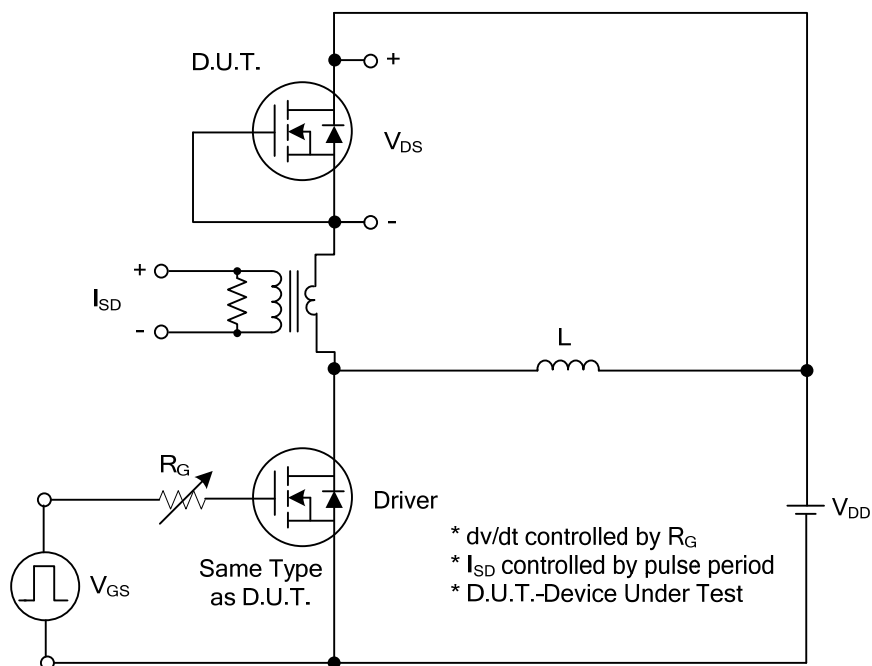
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	25			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =25V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =20V, V _{DS} =0V			100	nA
	Reverse		V _{GS} =-20V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	1.0		3.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =20A			6.0	mΩ
			V _{GS} =4.5V, I _D =20A			8.0	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =15V, V _{GS} =0V, f=1MHz		2090		pF
Output Capacitance		C _{OSS}			530		pF
Reverse Transfer Capacitance		C _{RSS}			500		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =20V, V _{GS} =4.5V, I _D =40A, (Note 1, 2)		51		nC
Gate to Source Charge		Q _{GS}			11		nC
Gate to Drain Charge		Q _{GD}			27		nC
Turn-ON Delay Time (Note 1)		t _{D(ON)}	V _{DD} =12.5V, V _{GS} =10V, I _D =40A, R _G =3Ω (Note 1, 2)		10		ns
Rise Time		t _R			20		ns
Turn-OFF Delay Time		t _{D(OFF)}			60		ns
Fall-Time		t _F			36		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Body-Diode Continuous Current		I _S				40	A
Maximum Body-Diode Pulsed Current (Note 1)		I _{SM}				80	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =40A, V _{GS} =0V			1.4	V

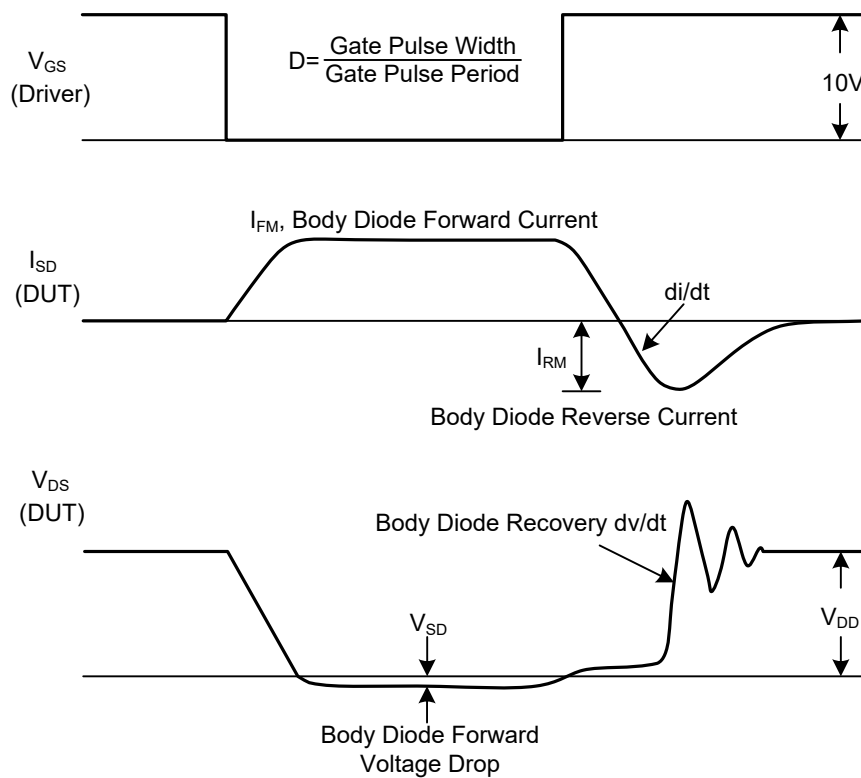
Notes: 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

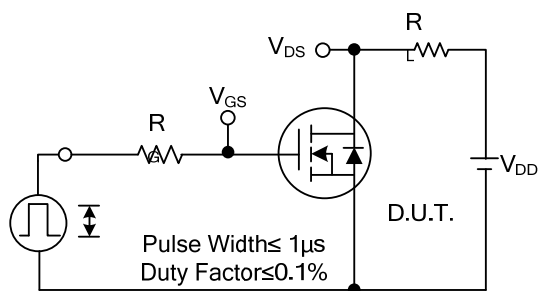


Peak Diode Recovery dv/dt Test Circuit

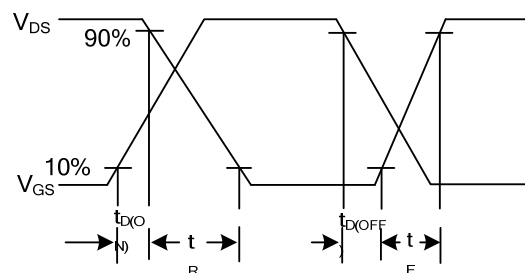


Peak Diode Recovery dv/dt Waveforms

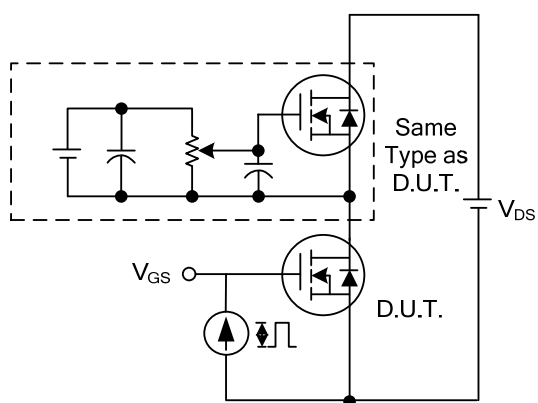
■ TEST CIRCUITS AND WAVEFORMS



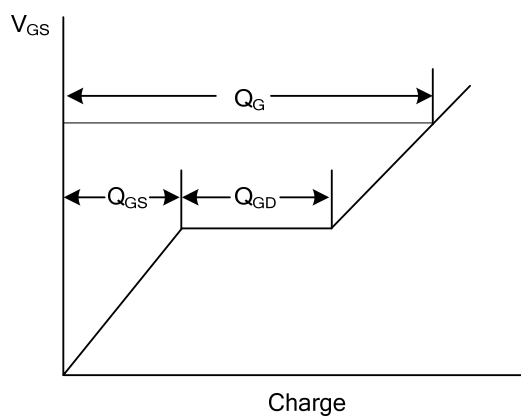
Switching Test Circuit



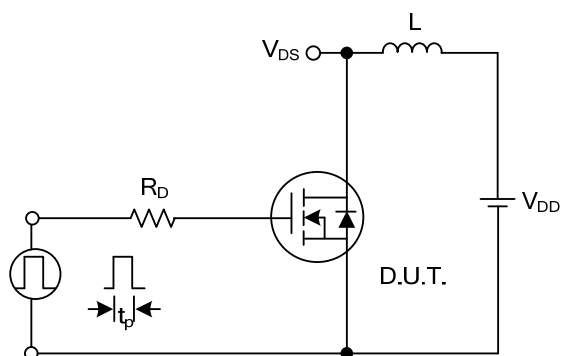
Switching Waveforms



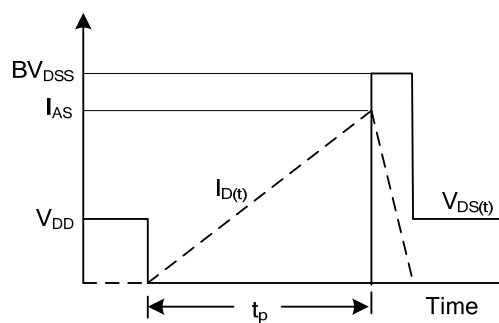
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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