

**UT134N02L**

Preliminary

Power MOSFET

20V N-CHANNEL POWER MOSFET**DESCRIPTION**

The UTC **UT134N02L** 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**For PDFN3×3**

* $R_{DS(ON)} \leq 5.0 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=20\text{A}$

* $R_{DS(ON)} \leq 7.0 \text{ m}\Omega$ @ $V_{GS}=2.5\text{V}$, $I_D=10\text{A}$

For PDFN5×6

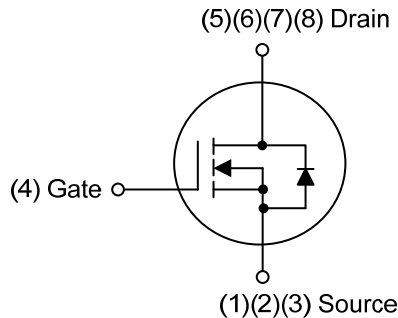
* $R_{DS(ON)} \leq 3.5 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=50\text{A}$

* $R_{DS(ON)} \leq 5.5 \text{ m}\Omega$ @ $V_{GS}=2.5\text{V}$, $I_D=50\text{A}$

* 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	
UT134N02LK-P3030-R	UT134N02LG-P3030-R	PDFN3×3	S	S	S	G	D	D	D	D	Tape Reel
UT134N02LK-P5060-R	UT134N02LG-P5060-R	PDFN5×6	S	S	S	G	D	D	D	D	Tape Reel

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

UT134N02LG-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 134N02L • □□□ → Date Code	UTC UT 134N02L • □□□□□ Lot Code ← → Date Code

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

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V _{DSS}	20	V
Gate-Source Voltage			V _{GSS}	±8	V
Drain Current	Continuous	PDFN3×3	I _D	60	A
		PDFN5×6		134	A
	Pulsed (Note 2)	PDFN3×3	I _{DM}	120	A
		PDFN5×6		268	A
Avalanche energy	Single Pulsed (Note 3)		E _{AS}	235	mJ
Power Dissipation		PDFN3×3	P _D	31	W
		PDFN5×6		34	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. $L = 0.1\text{mH}$, $I_{AS} = 68.6\text{A}$, $V_{DD} = 30\text{V}$, $R_G = 25\Omega$ Starting $T_J = 25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction-to-Ambient	PDFN3×3	θ_{JA}	75	$^{\circ}\text{C/W}$
	PDFN5×6		65	$^{\circ}\text{C/W}$
Junction-to-Case	PDFN3×3	θ_{JC}	4	$^{\circ}\text{C/W}$
	PDFN5×6		3.68	$^{\circ}\text{C/W}$

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

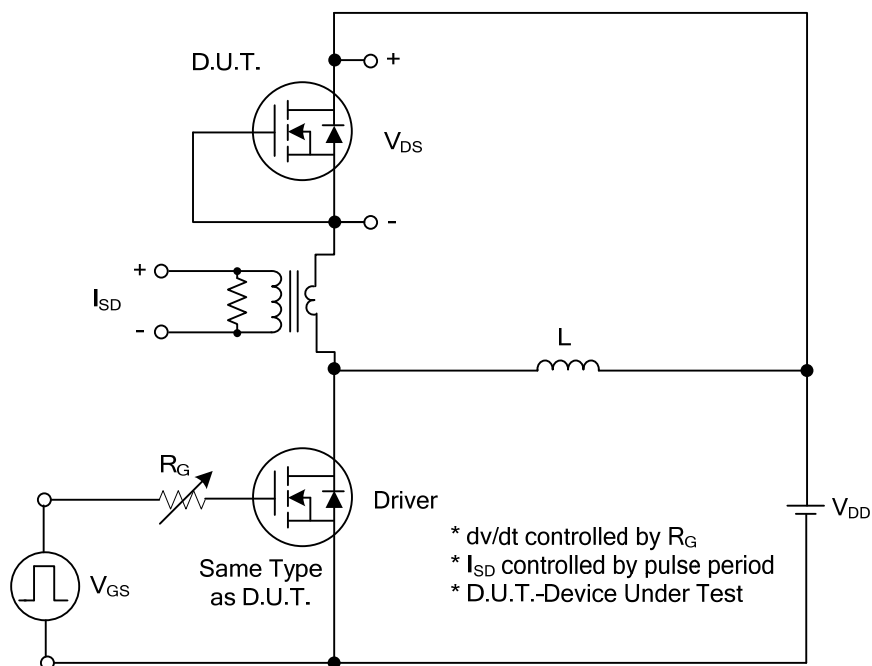
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	20			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =20V, V _{GS} =0V			1	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =+8V, V _{DS} =0V			100	nA
	Reverse		V _{GS} =-8V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	0.3		1.2	V
Static Drain-Source On-State Resistance	PDFN3×3	R _{DS(ON)}	V _{GS} =4.5V, I _D =20A			5.0	mΩ
			V _{GS} =2.5V, I _D =10A			7.0	mΩ
	PDFN5×6		V _{GS} =4.5V, I _D =50A			3.5	mΩ
			V _{GS} =2.5V, I _D =50A			5.5	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =15V, V _{GS} =0V, f=1MHz		3807		pF
Output Capacitance		C _{OSS}			735		pF
Reverse Transfer Capacitance		C _{RSS}			671		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q _G	V _{DS} =20V, V _{GS} =10V, I _D =134A, (Note 1, 2)		117		nC
Gate to Source Charge		Q _{GS}			8		nC
Gate to Drain Charge		Q _{GD}			29		nC
Turn-ON Delay Time (Note 1)		t _{D(ON)}	V _{DD} =12.5V, V _{GS} =10V, I _D =134A, R _G =3Ω (Note 1, 2)		9		ns
Rise Time		t _R			19		ns
Turn-OFF Delay Time		t _{D(OFF)}			120		ns
Fall-Time		t _F			65		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Maximum Body-Diode Continuous Current		I _S				134	A
Maximum Body-Diode Pulsed Current (Note 1)		I _{SM}				268	A
Drain-Source Diode Forward Voltage (Note 1)		V _{SD}	I _S =134A, V _{GS} =0V			1.4	V

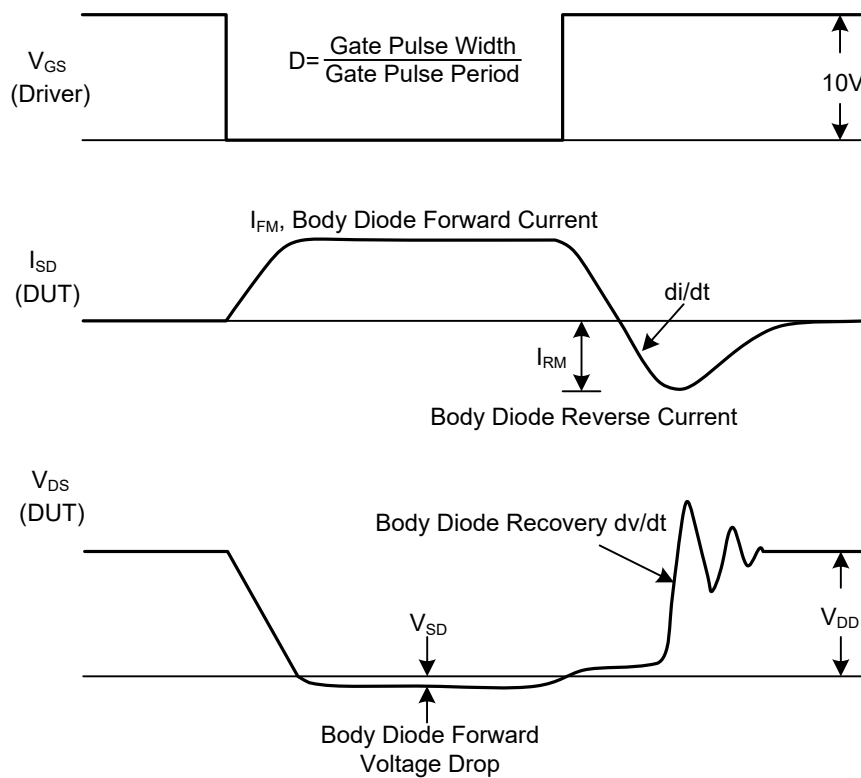
Notes: 1. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

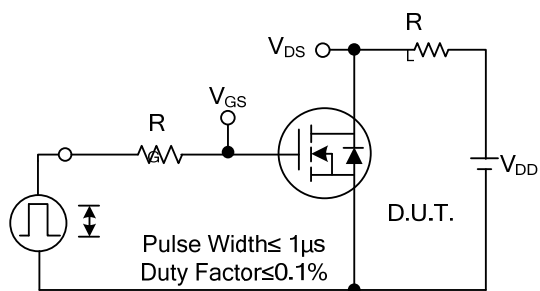


Peak Diode Recovery dv/dt Test Circuit

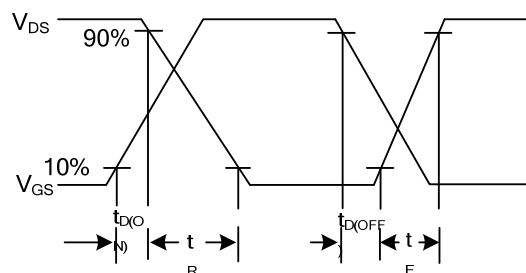


Peak Diode Recovery dv/dt Waveforms

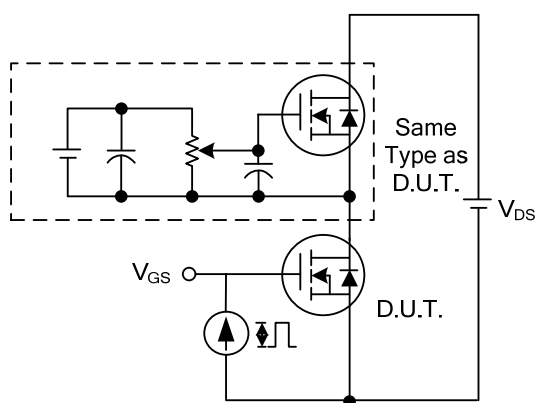
■ TEST CIRCUITS AND WAVEFORMS



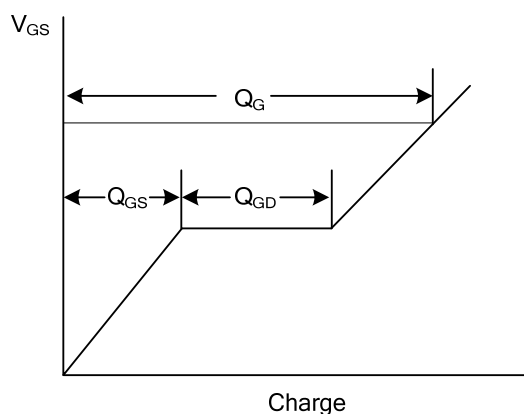
Switching Test Circuit



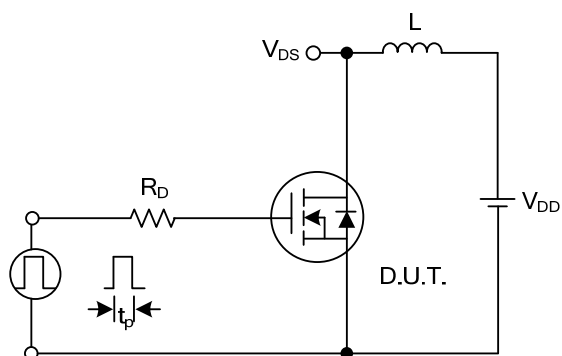
Switching Waveforms



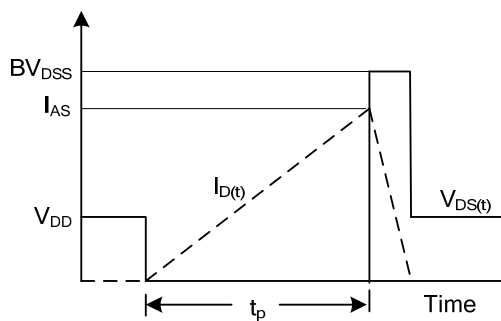
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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