



## UT35N04

Preliminary

POWER MOSFET

### 35A, 40V N-CHANNEL POWER MOSFET

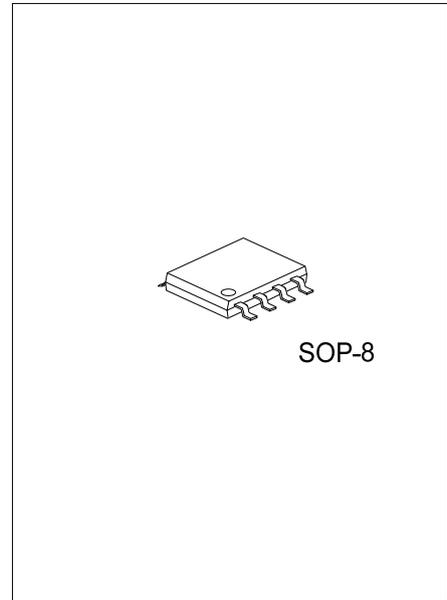
#### DESCRIPTION

The UTC **UT35N04** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect  $R_{DS(ON)}$  and high switching speed.

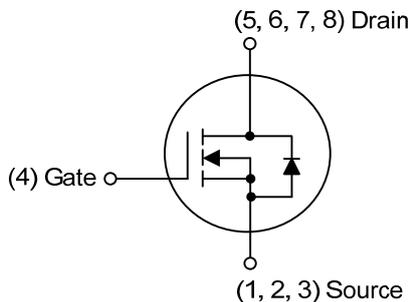
The UTC **UT35N04** is suitable for all commercial-industrial applications at power dissipation levels to approximately 50 watts, etc.

#### FEATURES

- \*  $R_{DS(ON)} \leq 12 \text{ m}\Omega$  @  $V_{GS}=10\text{V}$ ,  $I_D=17.5\text{A}$
- $R_{DS(ON)} \leq 17 \text{ m}\Omega$  @  $V_{GS}=4.5\text{V}$ ,  $I_D=17.5\text{A}$
- \* High Switching Speed



#### SYMBOL



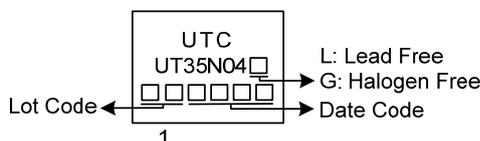
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment						Packing		
Lead Free	Halogen Free		1	2	3	4	5	6		7	8
UT35N04L-S08-R	UT35N04G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UT35N04G-S08-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) S08: SOP-8</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT	
Drain-Source Voltage	$V_{DSS}$	40	V	
Gate-Source Voltage	$V_{GSS}$	±20	V	
Continuous Drain Current	$I_D$	35	A	
Pulsed Drain Current (Note 2)	$I_{DM}$	70	A	
Avalanche Energy	Single Pulsed (Note 3)	$E_{AS}$	3.4	mJ
Peak Diode Recovery dv/dt (Note 4)	dv/dt	2.2	V/ns	
Power Dissipation	$P_D$	4.5	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.  $L = 0.1\text{mH}$ ,  $I_{AS} = 8.2\text{A}$ ,  $V_{DD} = 50\text{V}$ ,  $R_G = 25\ \Omega$ , Starting  $T_J = 25^\circ\text{C}$

4.  $I_{SD} \leq 40\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	125	°C/W
Junction to Case	$\theta_{JC}$	27.7	°C/W

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

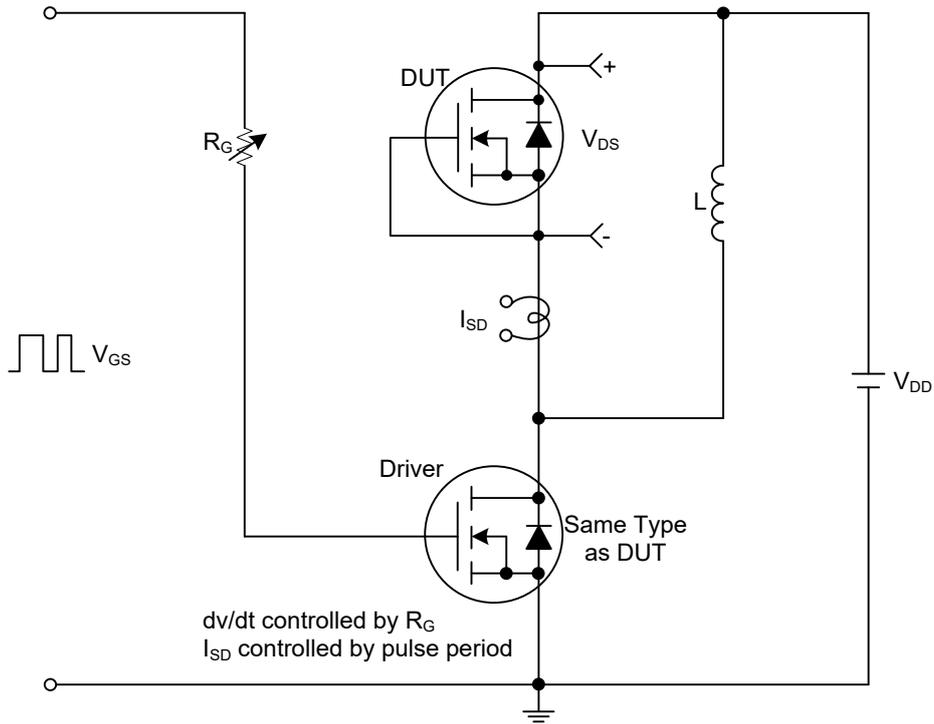
■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	40			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V			1	μA
Gate-Source Leakage Current	Forward	I <sub>GSS</sub> V <sub>GS</sub> =+20V, V <sub>DS</sub> =0V V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V			+100	nA
	Reverse				-100	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0		3.0	V
Static Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =17.5A			12	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =17.5A			17	mΩ
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz		1161		pF
Output Capacitance	C <sub>OSS</sub>			144.3		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			126		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge (Note 1)	Q <sub>G</sub>	V <sub>DS</sub> =32V, V <sub>GS</sub> =10V, I <sub>D</sub> =35A, I <sub>G</sub> =1mA (Note 1, 2)		37.8		nC
Gate to Source Charge	Q <sub>GS</sub>			5.2		nC
Gate to Drain Charge	Q <sub>GD</sub>			11.5		nC
Turn-on Delay Time (Note 1)	t <sub>D(ON)</sub>	V <sub>DD</sub> =20V, V <sub>GS</sub> =10V, I <sub>D</sub> =35A, R <sub>G</sub> =3Ω (Note 1, 2)		8		ns
Rise Time	t <sub>R</sub>			15.8		ns
Turn-off Delay Time	t <sub>D(OFF)</sub>			25.5		ns
Fall-Time	t <sub>F</sub>			19.5		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	I <sub>S</sub>				35	A
Maximum Body-Diode Pulsed Current	I <sub>SM</sub>				70	A
Drain-Source Diode Forward Voltage (Note 1)	V <sub>SD</sub>	I <sub>S</sub> =17.5A, V <sub>GS</sub> =0V			1.4	V
Reverse Recovery Time (Note 1)	t <sub>rr</sub>	I <sub>S</sub> =17.5A, V <sub>GS</sub> =0V,		31.4		nS
Reverse Recovery Charge	Q <sub>rr</sub>	dI <sub>F</sub> /dt = 100A/μs		34.4		nC

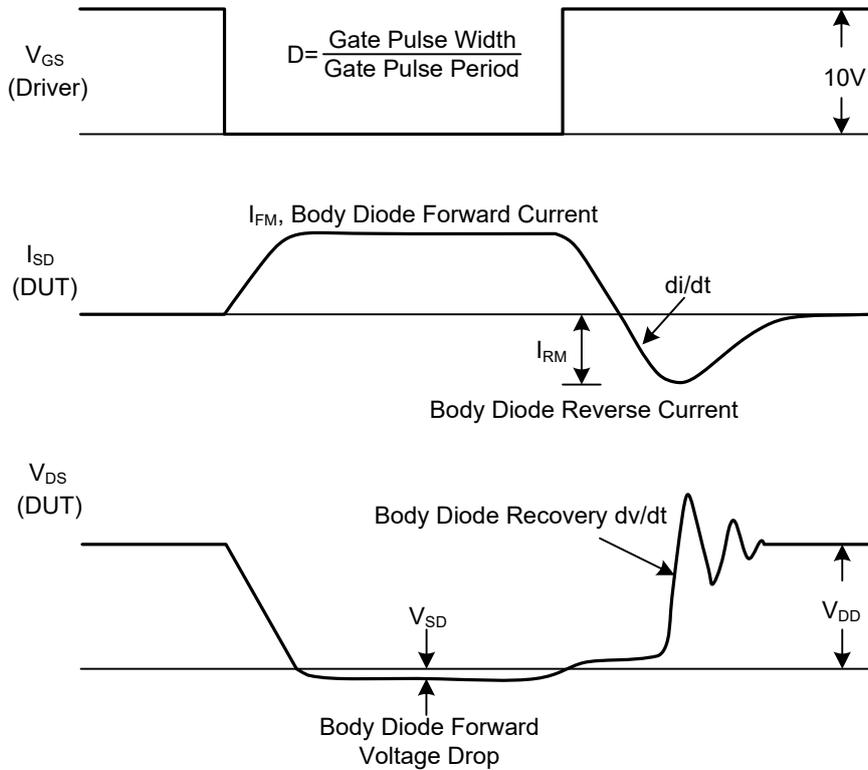
Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS



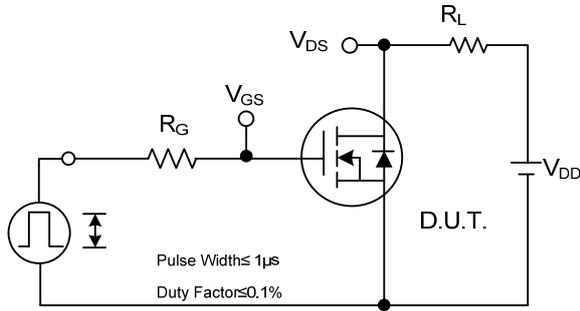
Peak Diode Recovery dv/dt Test Circuit



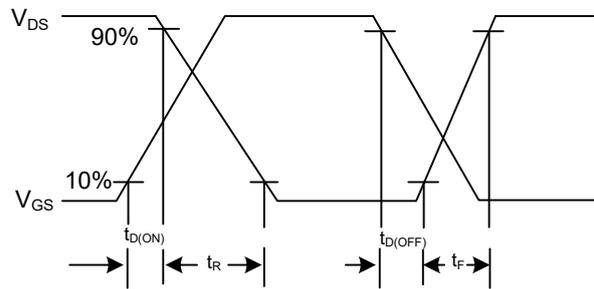
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

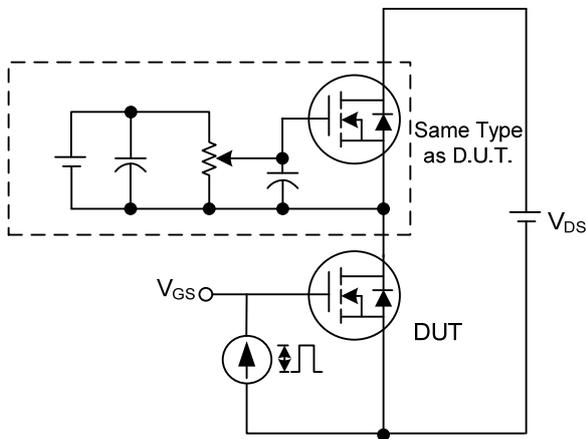
■ TEST CIRCUITS AND WAVEFORMS



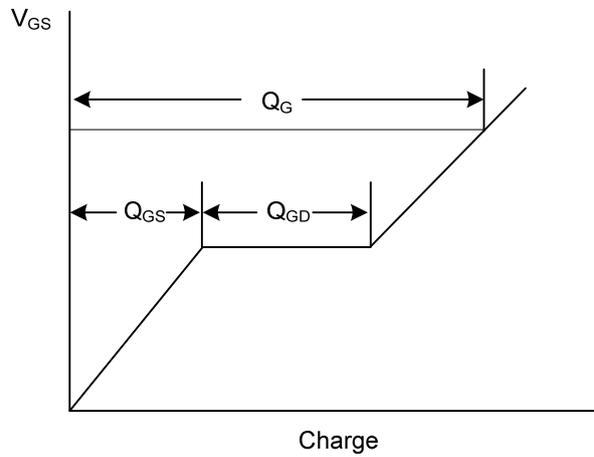
Switching Test Circuit



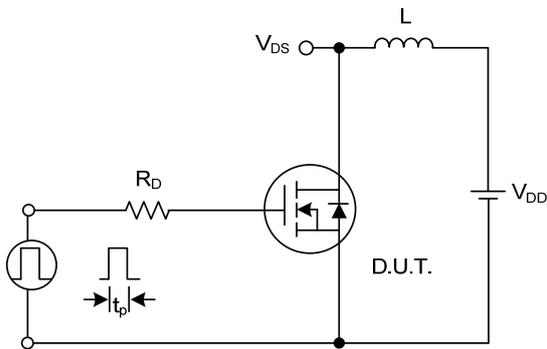
Switching Waveforms



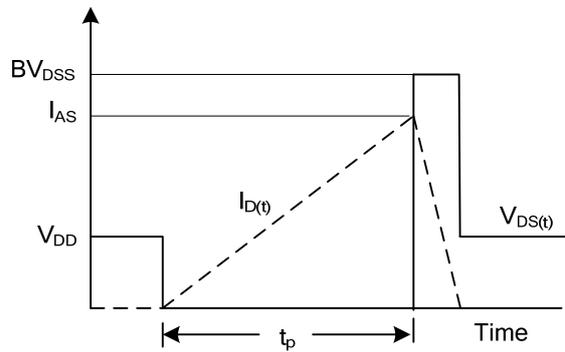
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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