



## UT35N04

Preliminary

POWER MOSFET

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

### DESCRIPTION

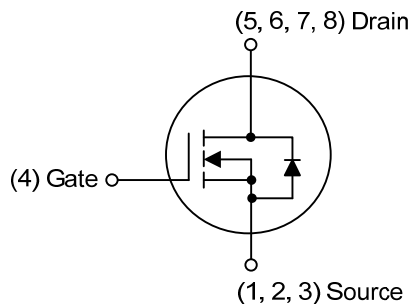
The UTC **UT35N04** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect  $R_{DS(ON)}$  and high switching speed.

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



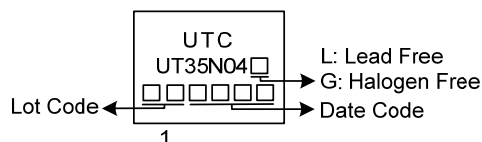
### ORDERING INFORMATION

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

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



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V <sub>DSS</sub>	40	V
Gate-Source Voltage		V <sub>GSS</sub>	±20	V
Continuous Drain Current		I <sub>D</sub>	35	A
Pulsed Drain Current (Note 2)		I <sub>DM</sub>	70	A
Avalanche Energy	Single Pulsed (Note 3)	E <sub>AS</sub>	3.4	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.2	V/ns
Power Dissipation		P <sub>D</sub>	4.5	W
Junction Temperature		T <sub>J</sub>	+150	°C
Storage Temperature		T <sub>STG</sub>	-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,  $I_{AS}$  = 8.2A,  $V_{DD}$  = 50V,  $R_G$  = 25  $\Omega$ , Starting  $T_J$  = 25°C

4.  $I_{SD}$  ≤ 40A, di/dt ≤ 200A/μs,  $V_{DD}$  ≤  $BV_{DSS}$ , Starting  $T_J$  = 25°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.

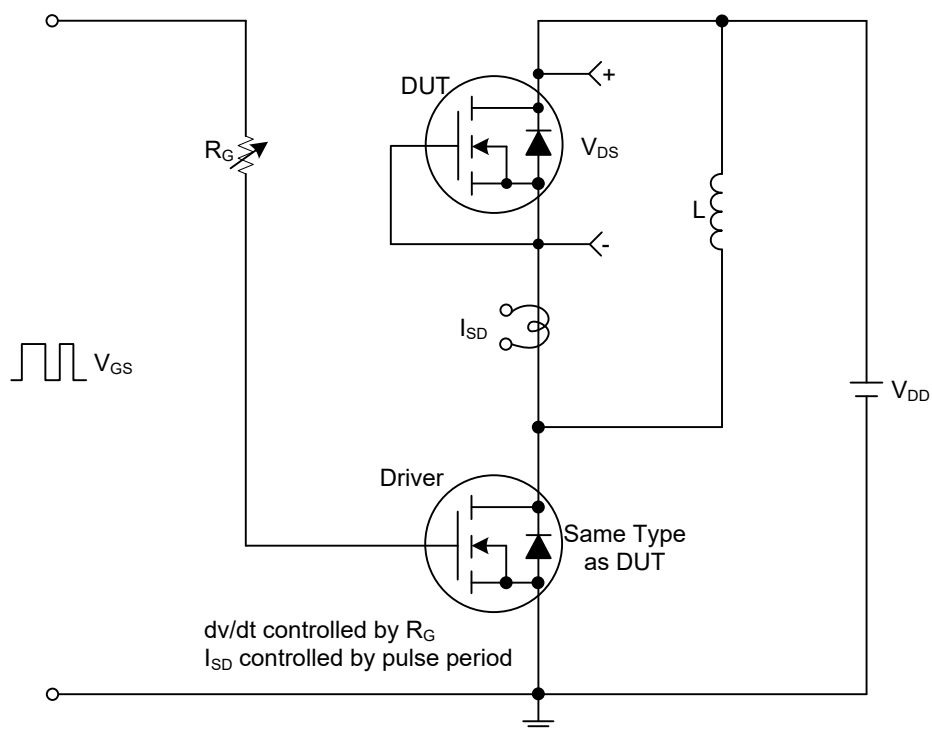
■ ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
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			+100	nA
	Reverse		V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V			-100	nA
ON CHARACTERISTICS							
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
DYNAMIC PARAMETERS							
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
SWITCHING PARAMETERS							
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
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
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>	dl <sub>F</sub> /dt =100A/μs		34.4		nC

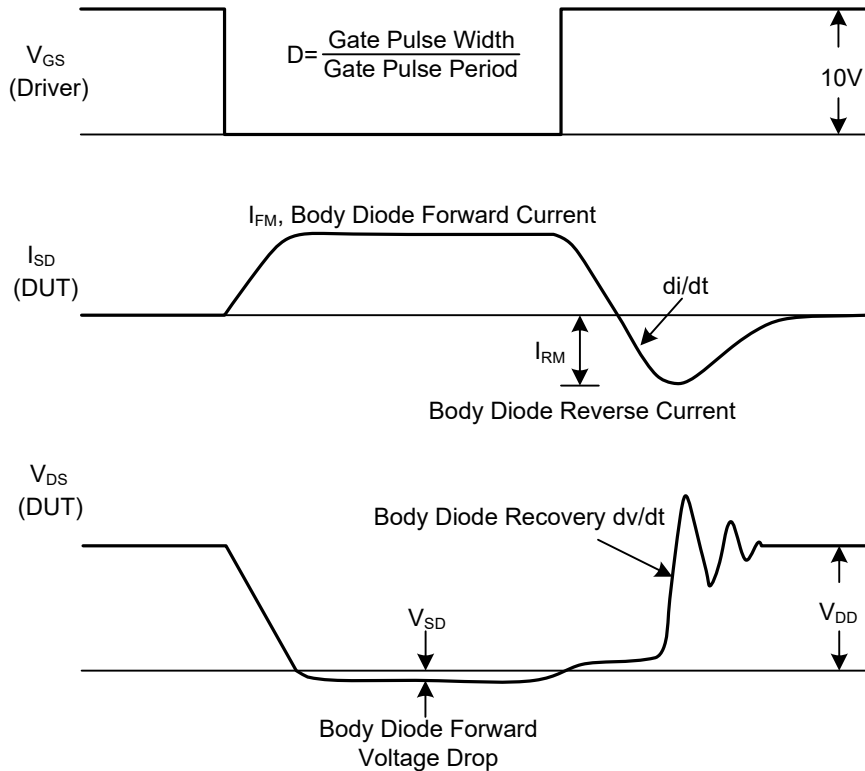
Notes: 1. Pulse Test : Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating ambient temperature.

# ■ TEST CIRCUITS AND WAVEFORMS



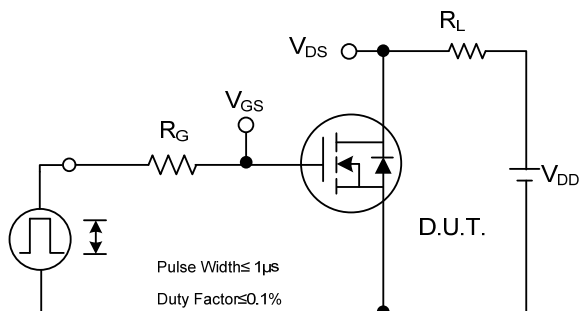
**Peak Diode Recovery dv/dt Test Circuit**



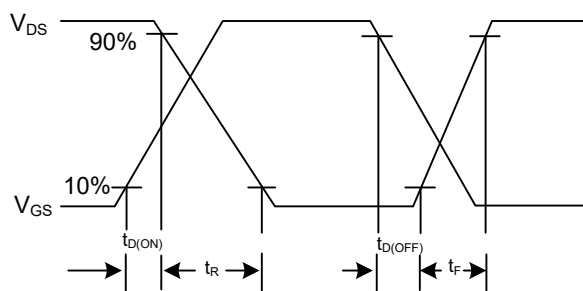
**Peak Diode Recovery dv/dt Test Circuit and Waveforms**

**Peak Diode Recovery dv/dt Waveforms**

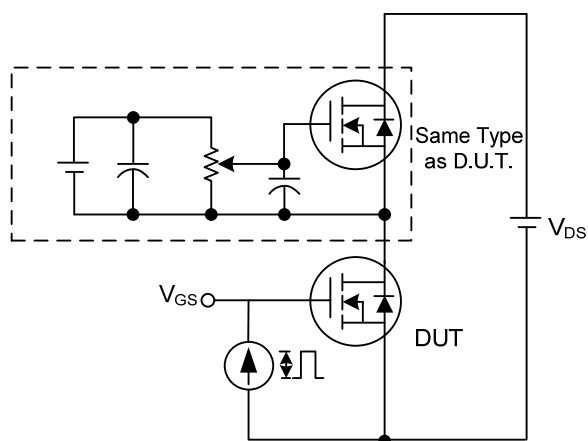
### ■ TEST CIRCUITS AND WAVEFORMS



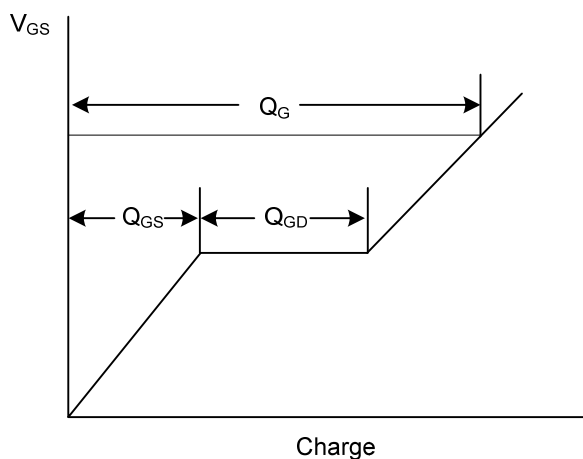
**Switching Test Circuit**



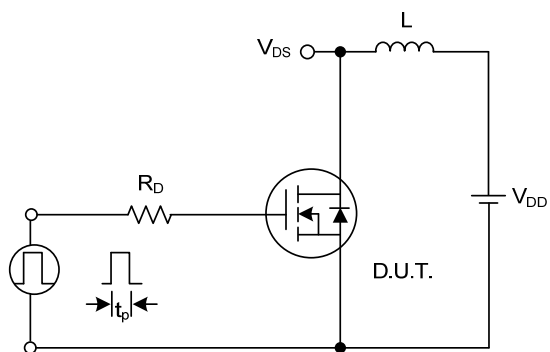
**Switching Waveforms**



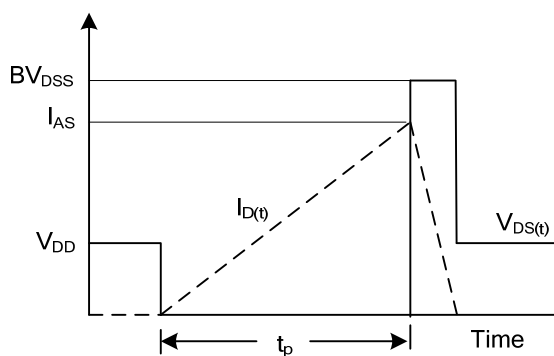
**Gate Charge Test Circuit**



**Gate Charge Waveform**



**Unclamped Inductive Switching Test Circuit**



**Unclamped Inductive Switching Waveforms**

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