



UT4N06

POWER MOSFET

4.0A, 60V SHIELDED GATE N-CHANNEL POWER MOSFET

DESCRIPTION

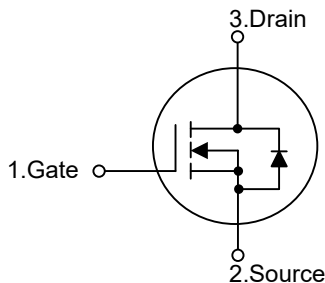
The UTC UT4N06 is N-Channel enhancement mode silicon gate power MOSFET, In addition to a significant reduction in onresistance, this device is designed to ensure a high level of dv/dt capability for the most demanding applications.

Is designed for high voltage, high speed power switching applications such as switching regulators, switching converters, solenoid, motor drivers, relay drivers.

FEATURES

- * $R_{DS(ON)} \leq 75 \text{ m}\Omega @ V_{GS}=10V, I_D=2.0A$
- * $R_{DS(ON)} \leq 105 \text{ m}\Omega @ V_{GS}=4.5V, I_D=2.0A$
- * Simple drive requirement
- * Single Pulse Avalanche Energy Rated
- * Fast Switching Speeds
- * Linear Transfer Characteristics
- * High Input Impedance

SYMBOL

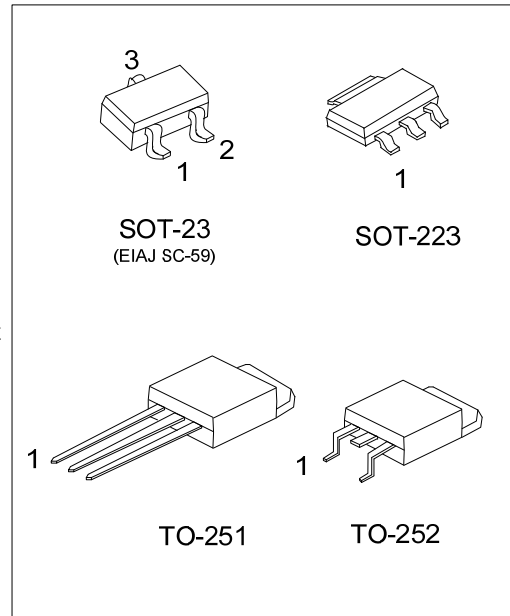


ORDERING INFORMATION

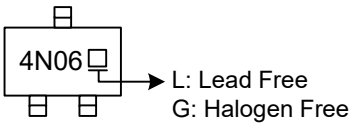
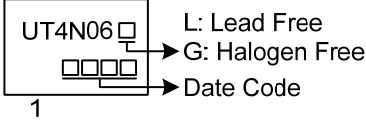
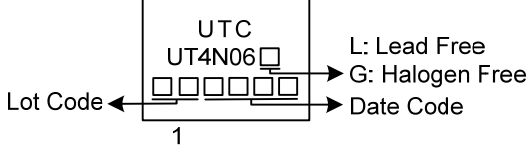
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT4N06L-AA3-R	UT4N06G-AA3-R	SOT-223	G	D	S	Tape Reel
UT4N06L-AE3-R	UT4N06G-AE3-R	SOT-23	G	S	D	Tape Reel
UT4N06L-TM3-T	UT4N06G-TM3-T	TO-251	G	D	S	Tube
UT4N06L-TN3-R	UT4N06G-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>UT4N06G-AA3-R</p>	<p>(1) R: Tape Reel, T: Tube (2) AA3: SOT-223, AE3: SOT-23, TM3: TO-251 TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING

SOT-23	SOT-223
 <p>4N06 → L: Lead Free G: Halogen Free</p>	 <p>UT4N06 → L: Lead Free G: Halogen Free Date Code</p> <p>1</p>
TO-251 / TO-252	-
 <p>UTC UT4N06 → L: Lead Free G: Halogen Free Date Code</p> <p>Lot Code ← 1</p>	-

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous	I_D	4.0	A
	Pulsed	I_{DM}	8.0	A
Peak Diode Recovery dv/dt (Note 5)		dv/dt	4.8	V/ns
Power Dissipation (Note 3)	SOT-223	P_D	1.5	W
	SOT-23		0.5	W
	TO-251		3	W
	TO-252			
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature Range		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. $I_{SD} \leq 4.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	83.3	$^\circ\text{C}/\text{W}$
	SOT-23		250	$^\circ\text{C}/\text{W}$
	TO-251		41.6	$^\circ\text{C}/\text{W}$
	TO-252			

Note: Surface mounted on 1 in² copper pad of FR-4 board. 270 $^\circ\text{C}/\text{W}$ when mounted on minimum copper pad.

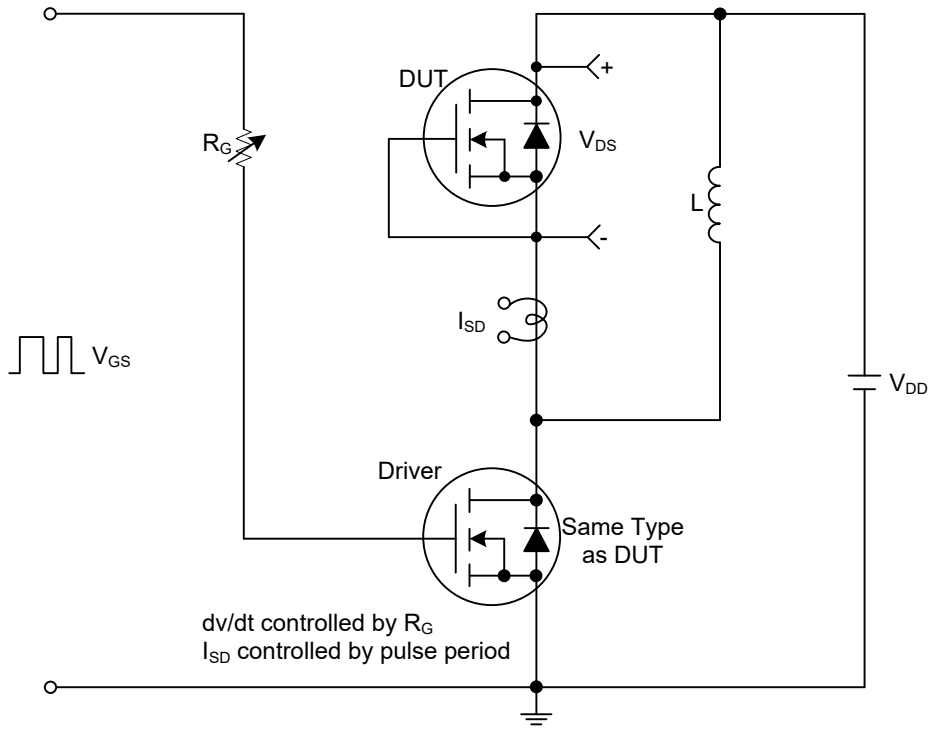
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D =250μA, V _{GS} =0V	60			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =60V, 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
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	1.0		2.5	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =2.0A			75	mΩ
		V _{GS} =4.5V, I _D =2.0A			105	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		238		pF
Output Capacitance	C _{OSS}			40		pF
Reverse Transfer Capacitance	C _{RSS}			30		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q _G	V _{DS} =48V, V _{GS} =10V, I _D =4.0A I _G =1mA (Note 1, 2)		12		nC
Gate to Source Charge	Q _{GS}			2		nC
Gate to Drain Charge	Q _{GD}			2.5		nC
Turn-on Delay Time (Note 1)	t _{D(ON)}	V _{DD} =30V, V _{GS} =10V, I _D =4.0A, R _G =3Ω (Note 1, 2)		5		ns
Rise Time	t _R			18		ns
Turn-off Delay Time	t _{D(OFF)}			10		ns
Fall-Time	t _F			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I _S				4.0	A
Maximum Body-Diode Pulsed Current	I _{SM}				8.0	A
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	I _S =4.0A, V _{GS} =0V			1.2	V
Reverse Recovery Time	t _{rr}	I _S =4.0A, V _{GS} =0V, dI _F /dI _r =100A/μs		30		ns
Reverse Recovery Charge	Q _{rr}				25	

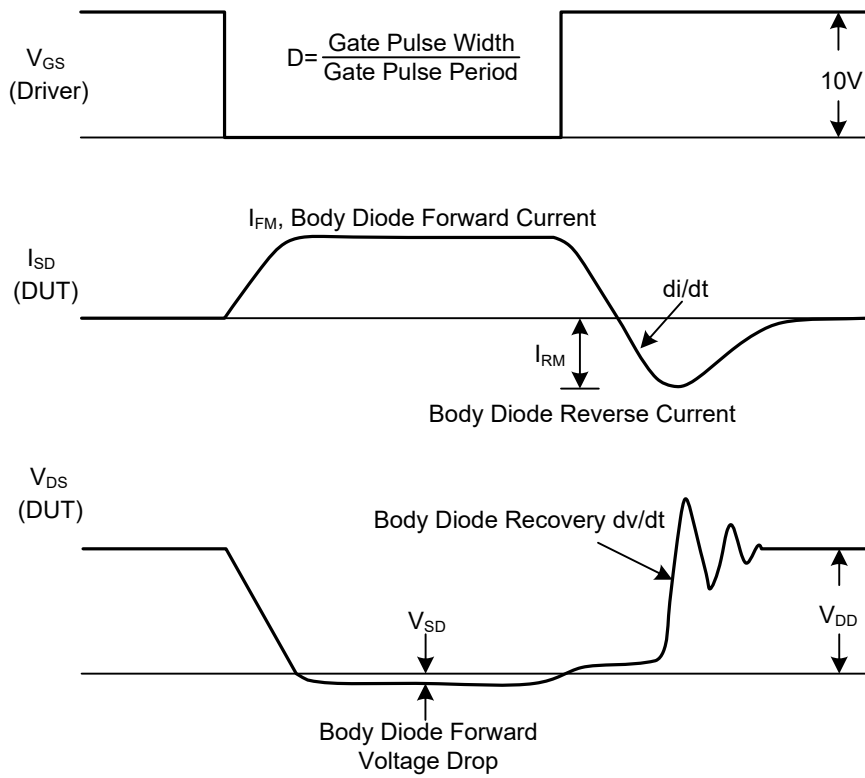
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



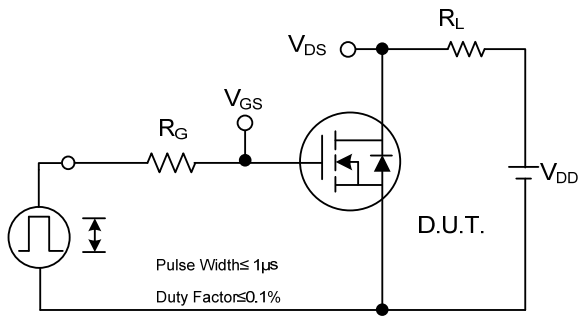
Peak Diode Recovery dv/dt Test Circuit



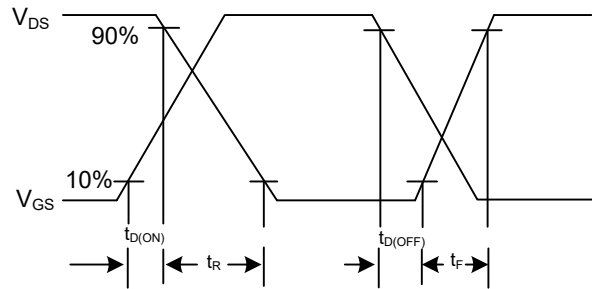
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

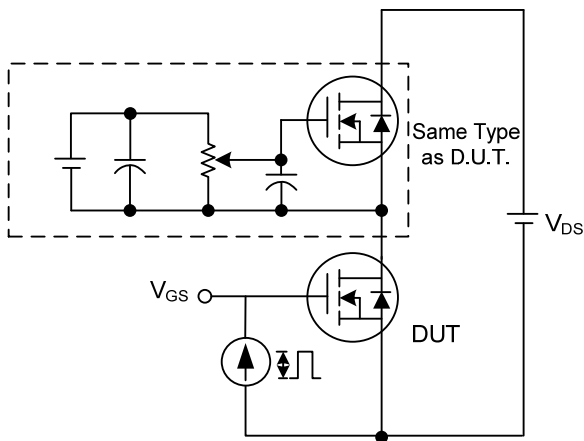
TEST CIRCUITS AND WAVEFORMS



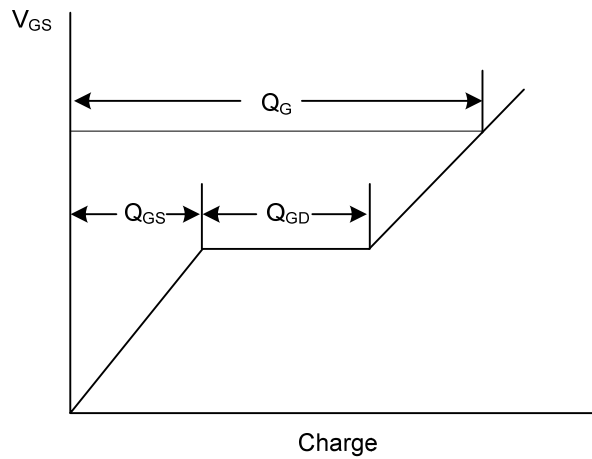
Switching Test Circuit



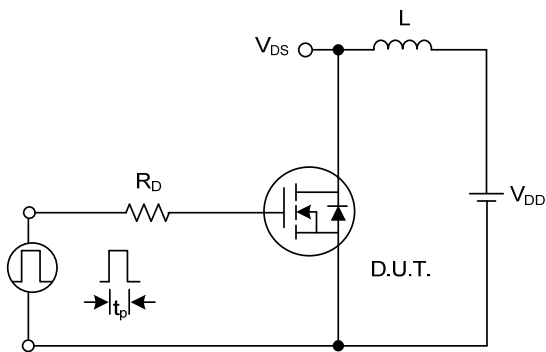
Switching Waveforms



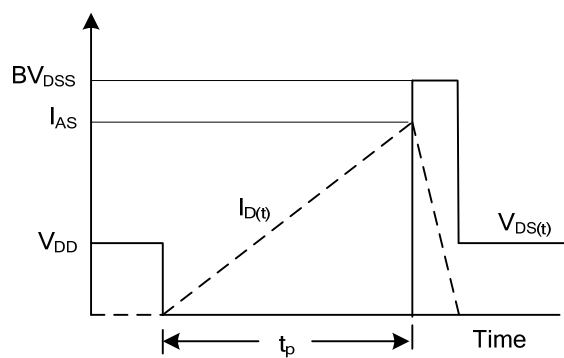
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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