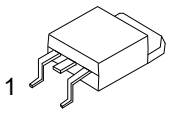
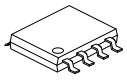
UT4404

Power MOSFET

N-CHANNEL ENHANCEMENT MODE



TO-252



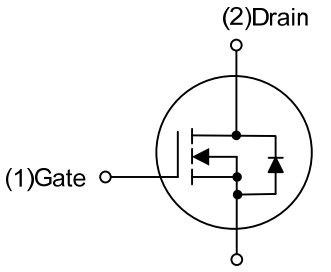
SOP-8

DFN2020-6B

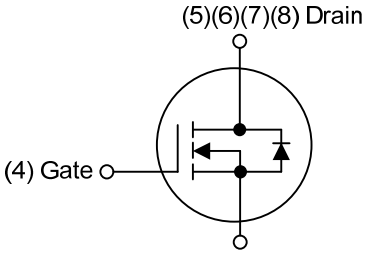
■ DESCRIPTION

The UTC **UT4404** provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V by using advanced trench technology. The UTC **UT4404** is suitable for use in PWM applications and as a load switch. Separating the source leads is to allow a Kelvin connection to the source to bypass the source inductance.

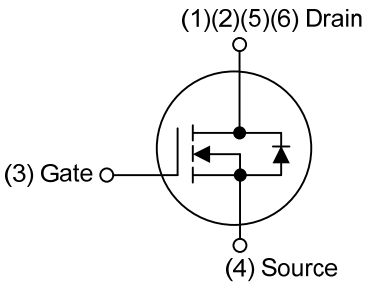
■ SYMBOL



TO-252



SOP-8

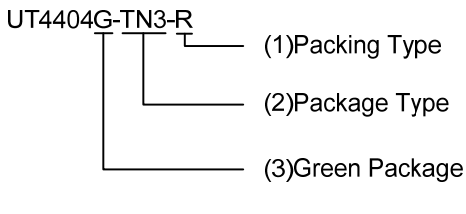


DFN2020-6B

■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT4404L-TN3-R	UT4404G-TN3-R	TO-252	G	D	S	-	-	-	-	-	Tape Reel
UT4404L-S08-R	UT4404G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel
UT4404L-K06B-2020-R	UT4404G-K06B-2020-R	DFN2020-6B	D	D	G	S	D	D	-	-	Tape Reel

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

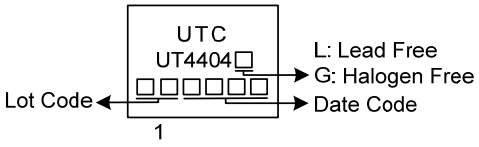
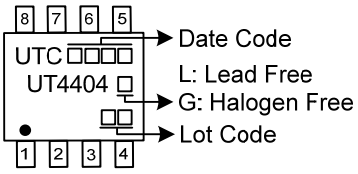


(1) R: Tape Reel

(2) TN3: TO-252, S08: SOP-8
K06B-2020: DFN2020-6B

(3) G: Halogen Free and Lead Free L: Lead Free

■ MARKING

TO-252	SOP-8
	
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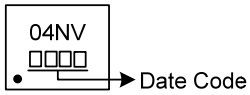
	-

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current (Note 2)		I_D	8.5	A
Pulsed Drain Current (Note 2)		I_{DM}	17	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	7	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.5	V/ns
Power Dissipation	TO-252	P_D	3.125	W
	SOP-8		1	W
	DFN2020-6B		1.8	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} = 12.2A, V_{DD} = 20V, R_G = 25Ω, Starting T_J = 25°C.
4. I_{SD} ≤ 8.5A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-252	θ_{JA}	40 (Note)	°C/W
	SOP-8		125	°C/W
	DFN2020-6B		69 (Note)	°C/W

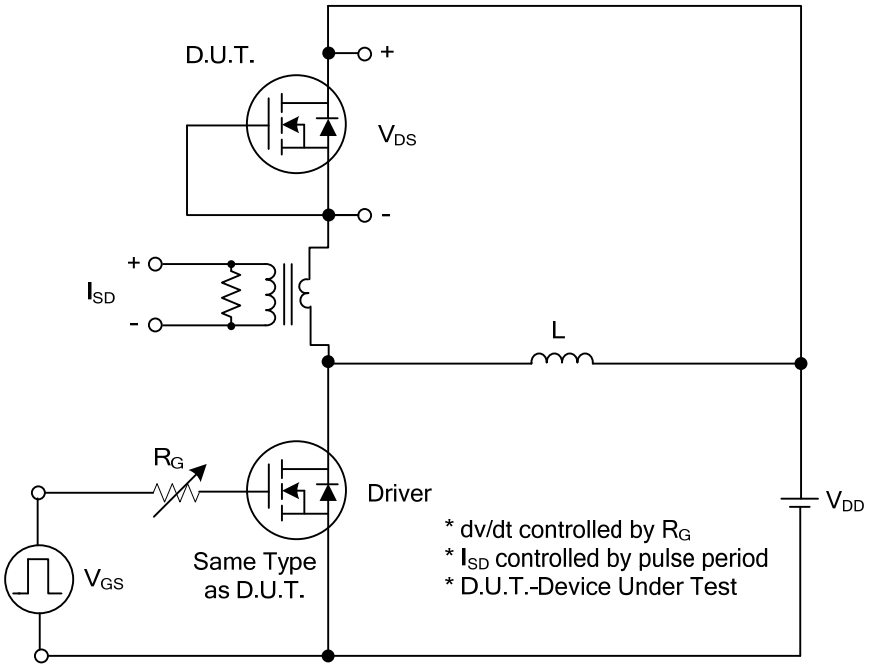
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

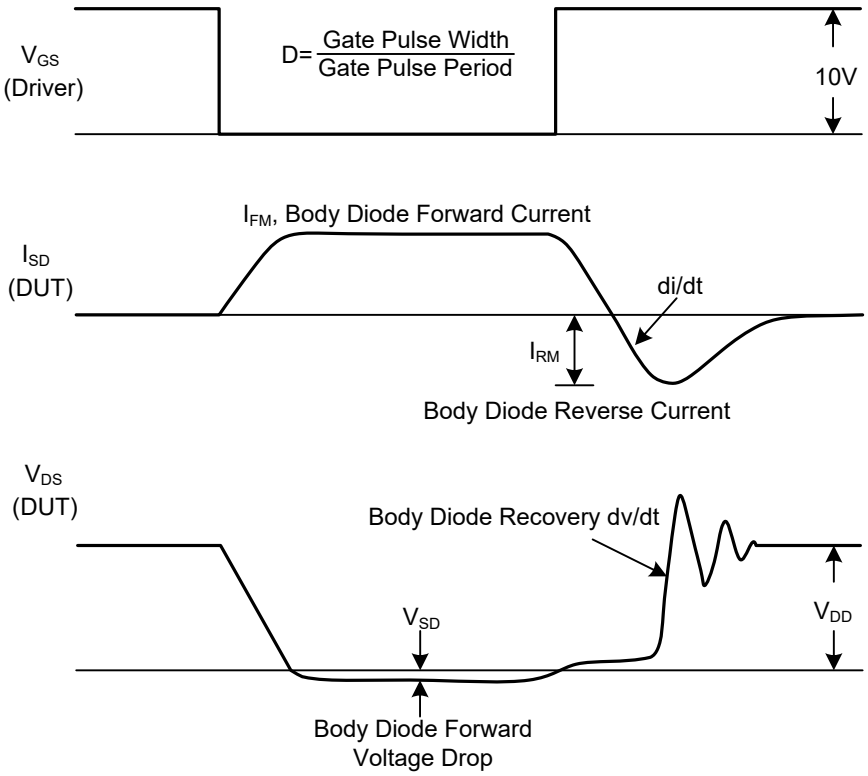
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±12V			±100	nA
ON CHARACTERISTICS						
Gate-Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	0.5		1.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=8.5A			24	mΩ
		V_{GS}=4.5V, I_D=8.5A			30	mΩ
		V_{GS}=2.5V, I_D=5.0A			48	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS} =15V, V_{GS}=0V, f=1MHz		725		pF
Output Capacitance	C_{OSS}			96		pF
Reverse Transfer Capacitance	C_{RSS}			85		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{DS} =15V, V_{GS} =4.5V, I_D =8.5A		22		nC
Gate-Source Charge	Q_{GS}			3.8		nC
Gate-Drain Charge	Q_{GD}			5.6		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{GS}=10V, V_{DS}=15V R_L=1.8Ω, R_G=6Ω		4		ns
Turn-ON Rise Time	t_R			18		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			25		ns
Turn-OFF Fall-Time	t_F			19		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				8.5	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				17	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=1.0A			1	V
Body Diode Reverse Recovery Time	t_{rr}	I_F=5.0A, dI/dt =100A/μs		124		ns
Body Diode Reverse Recovery Charge	Q_{rr}			140		nC

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating ambient temperature.

■ TEST CIRCUITS AND WAVEFORMS

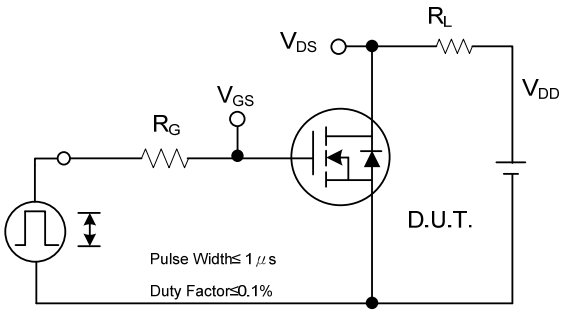


Peak Diode Recovery dv/dt Test Circuit

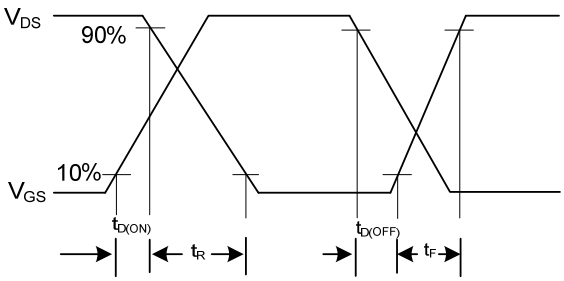


Peak Diode Recovery dv/dt Waveforms

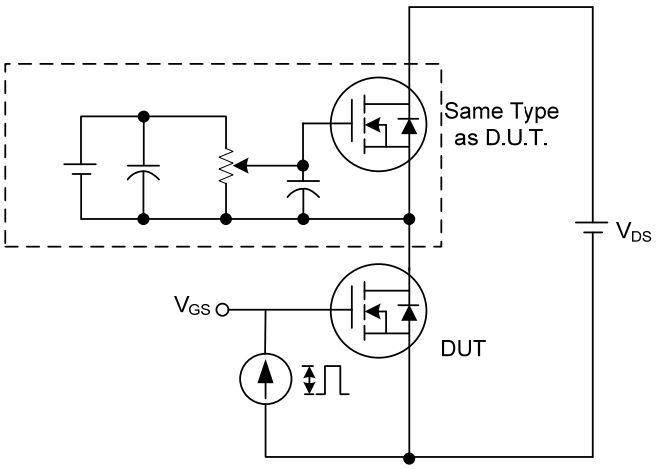
■ TEST CIRCUITS AND WAVEFORMS



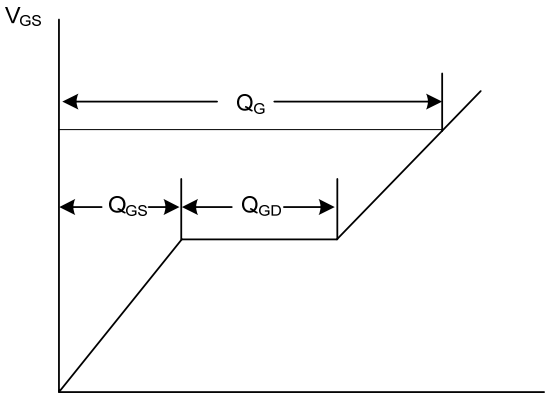
Switching Test Circuit



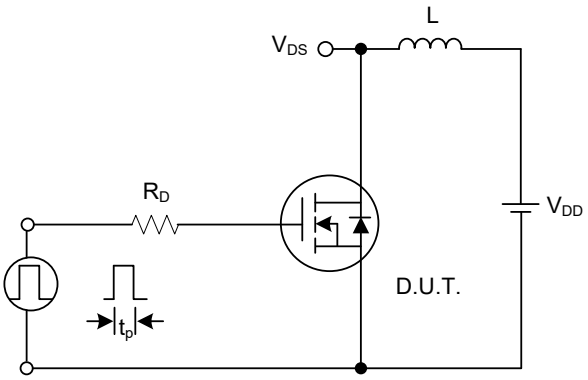
Switching Waveforms



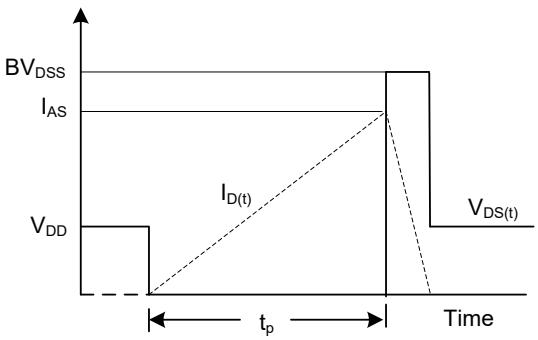
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms