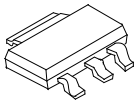
1.0A, 40V N-CHANNEL LOGIC LEVEL ENHANCEMENT MODE



1

SOT-223

■ DESCRIPTION

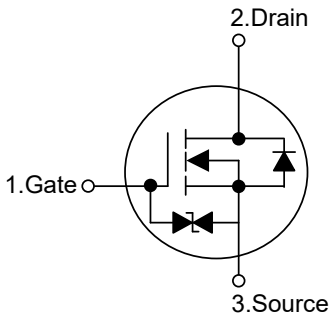
The UTC **UT1N04VZ** employs advanced MOSFET technology and features low gate charge while maintaining low on-resistance.

Optimized for switching applications, this device improves the overall efficiency of DC/DC converters and allows operation to higher switching frequencies.

■ FEATURES

* $R_{DS(ON)} \leq 230\ m\Omega$ @ V_{GS}=10V, I_D=1.0A
  $R_{DS(ON)} \leq 250\ m\Omega$ @ V_{GS} = 4.5V, I_D = 0.5A
  $R_{DS(ON)} \leq 350\ m\Omega$ @ V_{GS} = 2.5V, I_D = 0.3A
* Low Capacitance
* Low Gate Charge

■ SYMBOL



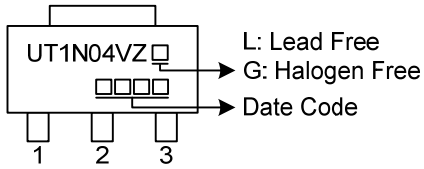
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT1N04VZL-AA3-R	UT1N04VZG-AA3-R	SOT-223	G	D	S	Tape Reel

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

UT1N04VZG-AA3-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AA3: SOT-223 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	40	V
Gate-Source Voltage		V_{GSS}	±10	V
Continuous Drain Current		I_D	1	A
Pulsed Drain Current (Note 2)		I_{DM}	2	A
Avalanche Energy	Single Pulsed	E_{AS}	0.87	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.65	V/ns
Power Dissipation		P_D	1.1	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} = 4.2A, V_{DD} = 25V, R_G = 25Ω Starting T_J = 25°C
4. I_{SD} ≤ 1.0A, di/dt ≤ 400A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	125	°C/W
Junction to Case	θ_{JC}	114	°C/W

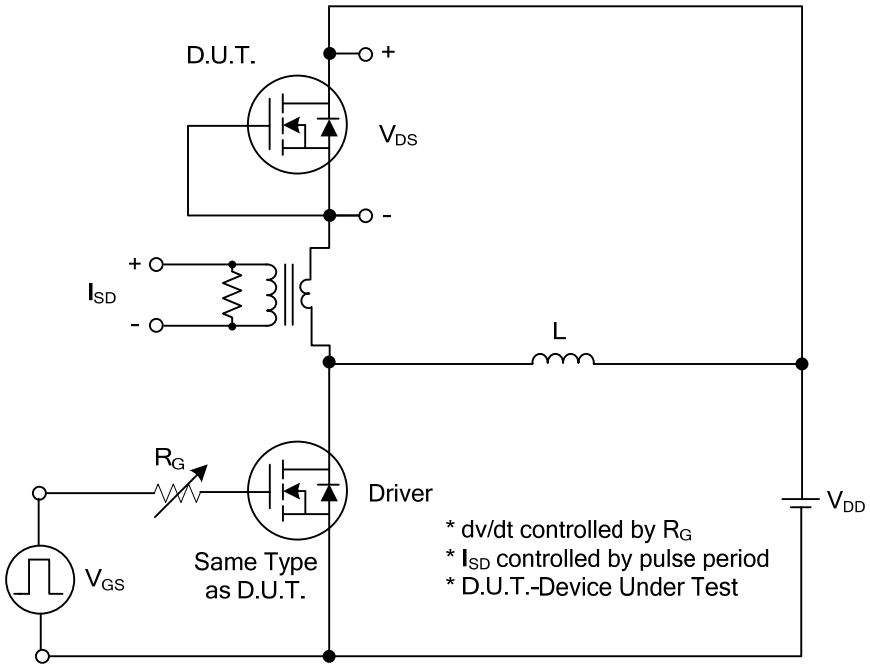
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

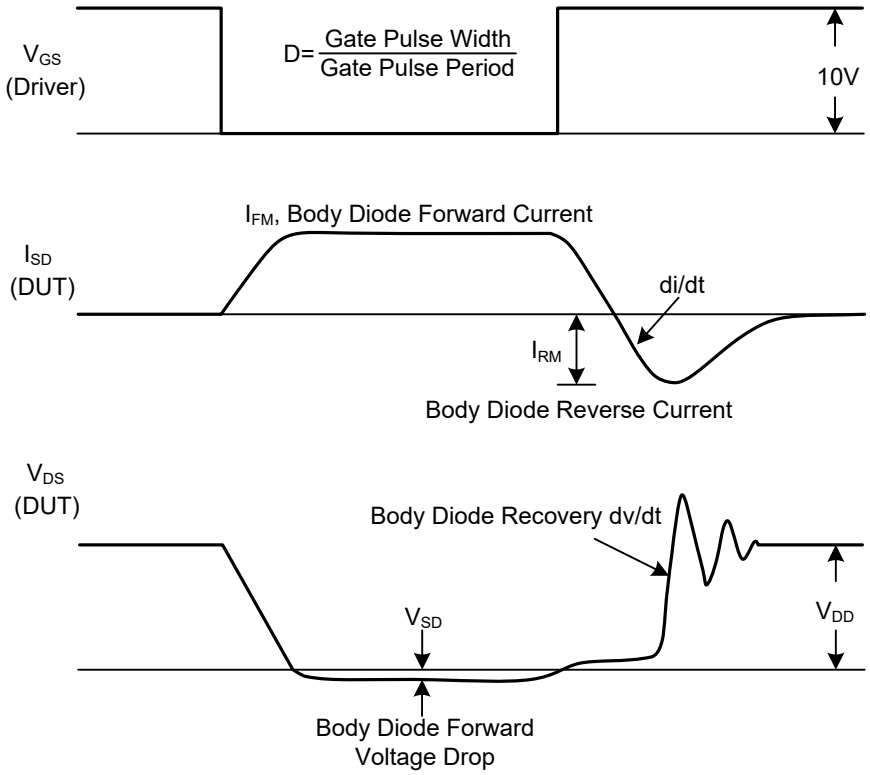
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	40			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=40V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+10V, V_{DS}=0V			10	μA
	Reverse		V_{GS}=-10V, V_{DS}=0V			-10	μA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}= V_{GS}, I_D=250μA	0.5		1.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=1.0A			230	mΩ
			V_{GS}=4.5V, I_D=0.5A			250	mΩ
			V_{GS}=2.5V, I_D=0.3A			350	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1MHz		87		pF
Output Capacitance		C_{OSS}			16		pF
Reverse Transfer Capacitance		C_{RSS}			10		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DD}=32V, V_{GS}=10V, I_D=1.0A (Note 1, 2)		11		nC
Gate to Source Charge		Q_{GS}			1.9		nC
Gate to Drain Charge		Q_{GD}			1.8		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=20V, V_{GS}=10V, I_D=1.0A, R_G=3.3Ω (Note 1, 2)		8		ns
Rise Time		t_R			21		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			191		ns
Fall-Time		t_F			75		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I_S				1	A
Maximum Pulsed Drain-Source Diode Forward Current		I_{SM}				2	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=1.0A, V_{GS}=0V			1	V
Body Diode Reverse Recovery Time		t_{rr}	I_S=1.0A, V_{GS}=0V, dI_F/dt=100A/μs		65		nS
Body Diode Reverse Recovery Charge		Q_{rr}			84		nC

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

■ TEST CIRCUITS AND WAVEFORMS

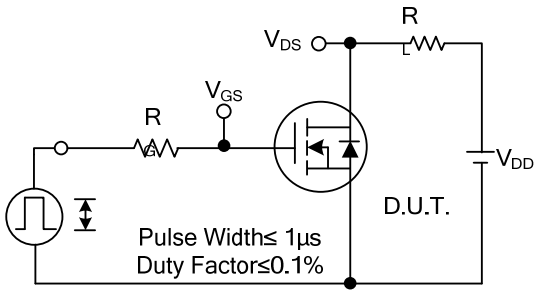


Peak Diode Recovery dv/dt Test Circuit

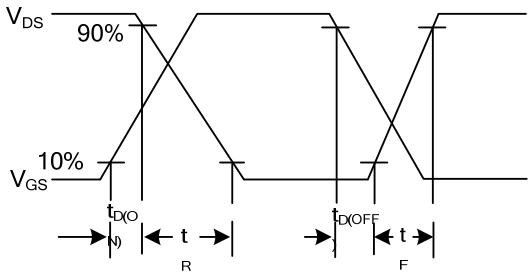


Peak Diode Recovery dv/dt Waveforms

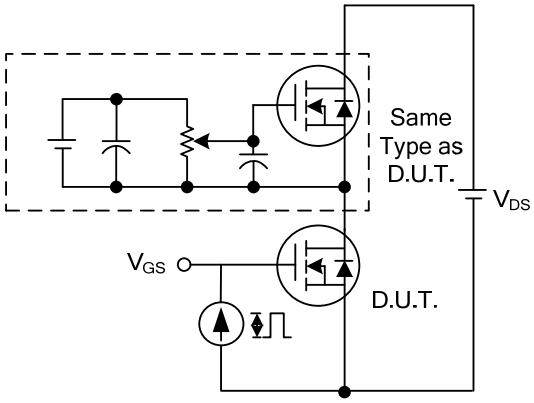
■ TEST CIRCUITS AND WAVEFORMS



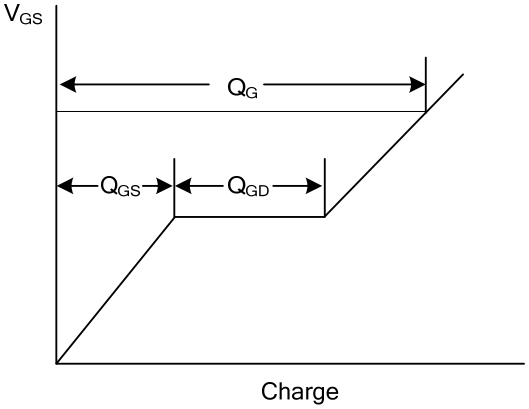
Switching Test Circuit



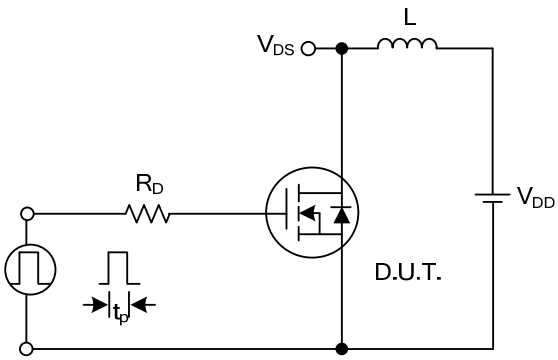
Switching Waveforms



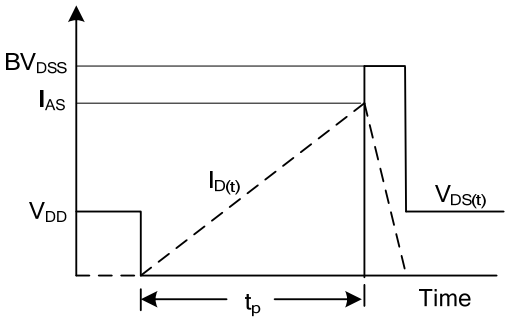
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms