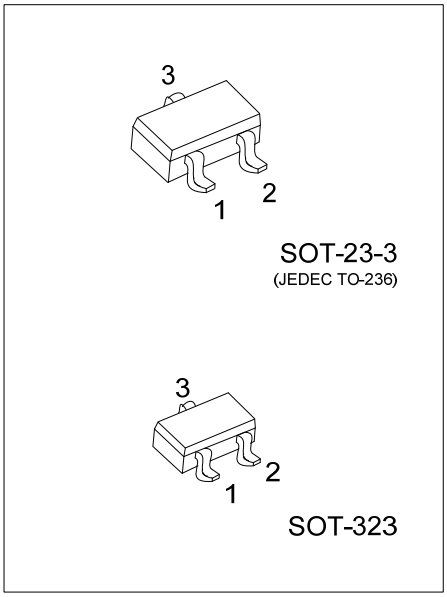
0.2A, 30V N-CHANNEL POWER MOSFET



■ DESCRIPTION

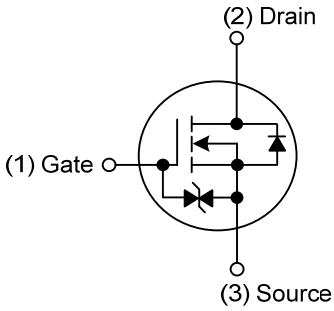
The UTC **UT02N03VZ** employs advanced MOSFET technology and features low gate charge while maintaining low on-resistance.

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

■ FEATURES

* $R_{DS(on)} \leq 1.5\ \Omega$ @ V_{GS}=10V, I_D=100mA
  $R_{DS(on)} \leq 2.0\ \Omega$ @ V_{GS}=4.5V, I_D=100mA
  $R_{DS(on)} \leq 4.0\ \Omega$ @ V_{GS}=2.5V, I_D=10mA
* Low Capacitance
* Low Gate Charge
* Fast Switching Capability
* With ESD protection

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT02N03VZL-AE2-R	UT02N03VZG-AE2-R	SOT-23-3	G	S	D	Tape Reel
UT02N03VZL-AL3-R	UT02N03VZG-AL3-R	SOT-323	G	S	D	Tape Reel

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

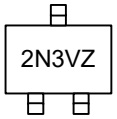
UT02N03VZG-AE2-R

(1)Packing Type — (1) R: Tape Reel

(2)Package Type — (2) AE2: SOT-23-3, AL3: SOT-323

(3)Green Package — (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}	30	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	Continuous	I_D	0.2	A
	Pulsed (Note 2)	I_{DM}	0.4	A
Power Dissipation (T_A=25°C)	SOT-23-3	P_D	0.3	W
	SOT-323		0.2	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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	SOT-23-3	θ_{JA}	416	°C/W
	SOT-323		625	°C/W

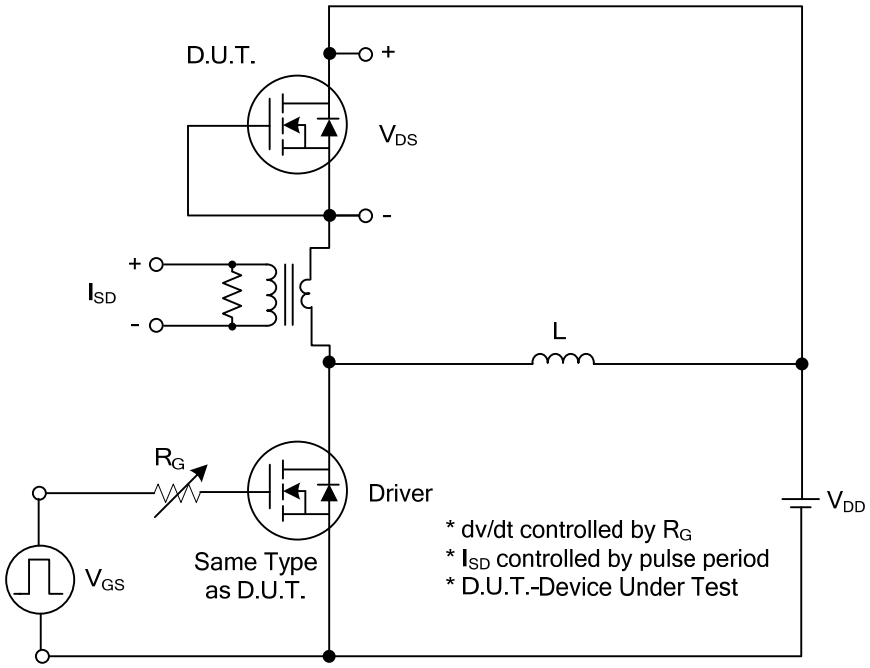
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

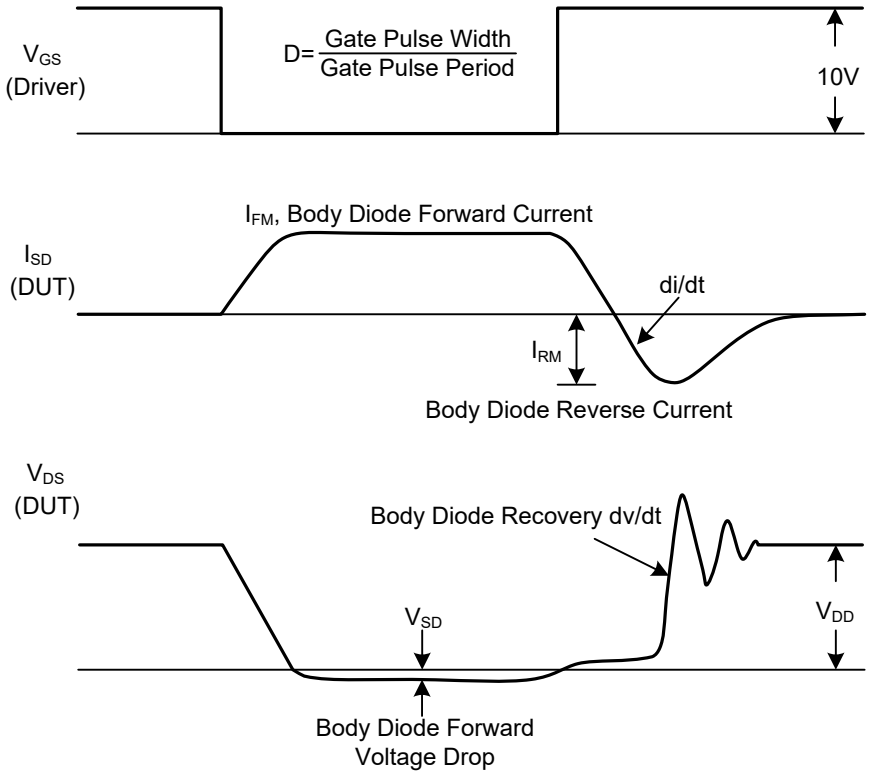
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{DS}=0V	30			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{DS}=0V, V_{GS}=+20V			10	μA
	Reverse		V_{DS}=0V, V_{GS}=-20V			-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=100mA			1.5	Ω
			V_{GS}=4.5V, I_D=100mA			2.0	Ω
			V_{GS}=2.5V, I_D=10mA			4.0	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=15V, f=1MHz		14		pF
Output Capacitance		C_{OSS}			9		pF
Reverse Transfer Capacitance		C_{RSS}			4		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q_G	V_{DD}=24V, V_{GS}=10V, I_D=0.2A (Note 1, 2)		7		nC
Gate to Source Charge		Q_{GS}			1		nC
Gate to Drain Charge		Q_{GD}			0.6		nC
Turn-ON Delay Time (Note 1)		$t_{D(ON)}$	V_{DD}=15V, V_{GS}=10V, I_D=0.2A, R_G=3Ω (Note 1, 2)		0.2		ns
Rise Time		t_R			18		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			6.4		ns
Fall-Time		t_F			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Continuous Drain-Source Diode Forward Current		I_S				0.2	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=0.2A, V_{GS}=0V			1.4	V

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

■ TEST CIRCUITS AND WAVEFORMS

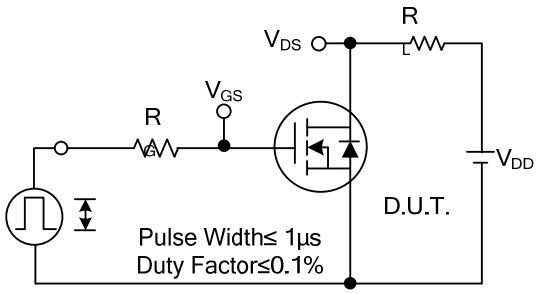


Peak Diode Recovery dv/dt Test Circuit

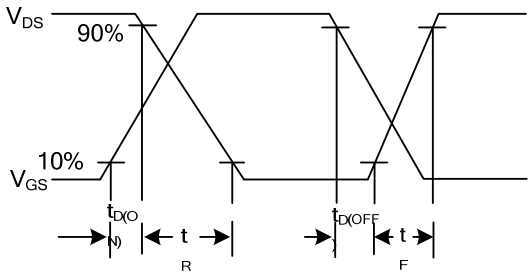


Peak Diode Recovery dv/dt Waveforms

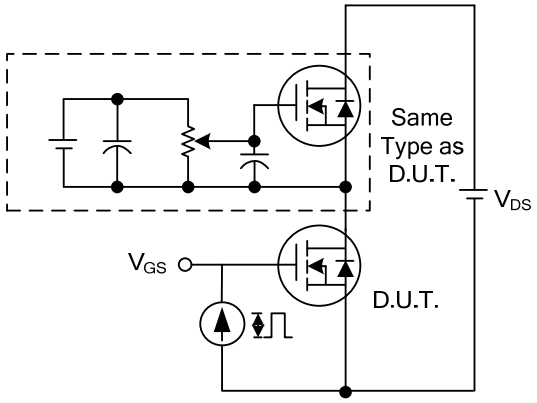
■ TEST CIRCUITS AND WAVEFORMS



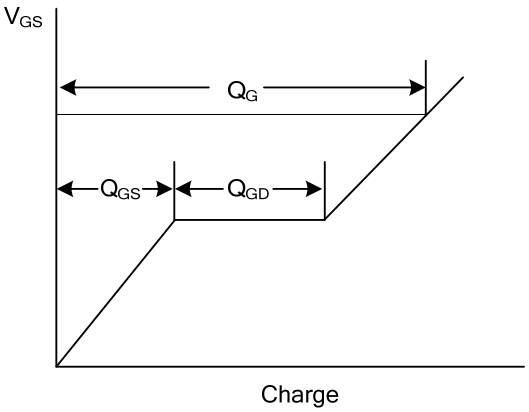
Switching Test Circuit



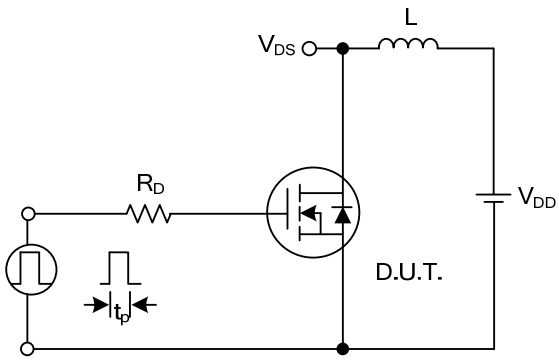
Switching Waveforms



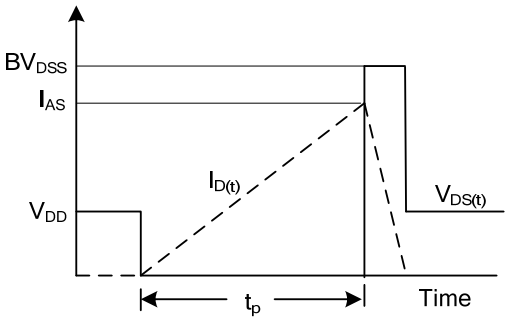
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms