



UT05P03VZ

Preliminary

Power MOSFET

-0.5A, -30V P-CHANNEL LOGIC LEVEL ENHANCEMENT MODE

DESCRIPTION

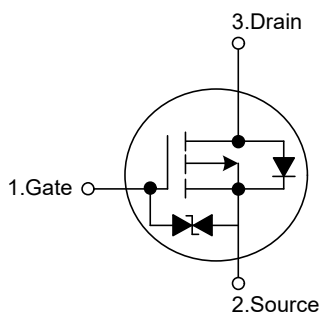
The **UT05P03VZ** employs advanced MOSFET technology and features low gate charge while maintaining low on-resistance.

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

FEATURES

- * $R_{DS(ON)} \leq 0.7 \Omega$ @ $V_{GS} = -4.5V$, $I_D = -100mA$
- * $R_{DS(ON)} \leq 1.2 \Omega$ @ $V_{GS} = -2.5V$, $I_D = -50mA$
- * Low Capacitance
- * Low Gate Charge
- * With ESD protection

SYMBOL

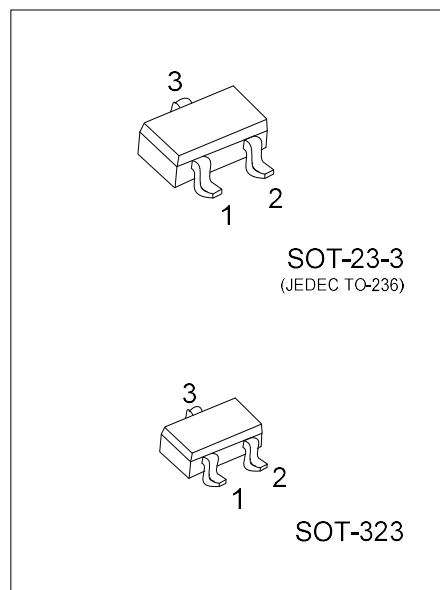


ORDERING INFORMATION

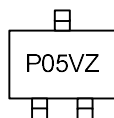
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT05P03VZL-AE2-R	UT05P03VZG-AE2-R	SOT-23-3	G	S	D	Tape Reel
UT05P03VZL-AL3-R	UT05P03VZG-AL3-R	SOT-323	G	S	D	Tape Reel

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

UT05P03VZG-AE2-R	(1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AE2: SOT-23-3, AL3: SOT-323 (3) G: Halogen Free and Lead Free, L: Lead Free
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■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	-30	V
Gate-Source Voltage		V_{GSS}	± 8	V
Continuous Drain Current	Continuous	I_D	-0.5	A
Pulsed Drain Current	Pulsed (Note 2)	I_{DM}	-1.5	A
Avalanche Energy	Repetitive(Note 3)	E_{AS}	1.05	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.8	V/ns
Power Dissipation	SOT-23-3	P_D	0.3	W
	SOT-323		0.2	W
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature		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. $L = 1\text{mH}$, $I_{AS} = -1.45\text{A}$, $V_{DD} = -50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$.

4. $I_{SD} \leq -0.5\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	SOT-23-3	θ_{JA}	312	$^{\circ}\text{C}/\text{W}$
	SOT-323		625	$^{\circ}\text{C}/\text{W}$

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

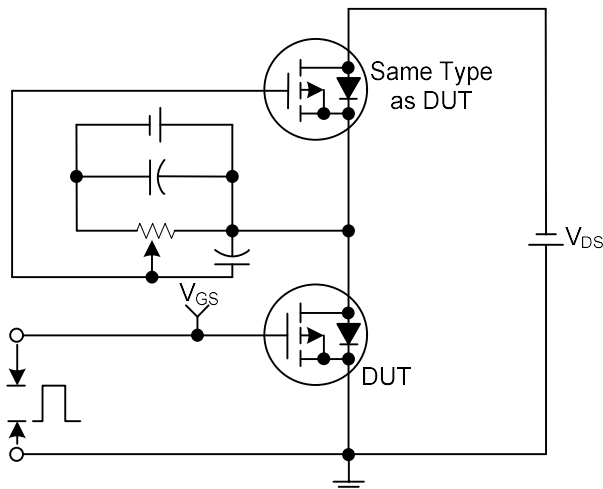
■ **ELECTRICAL CHARACTERISTICS** ($T_A=25^\circ\text{C}$ unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0 V, I _D =-250μA	-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} =+8V			10	μA
	Reverse		V _{DS} =0V, V _{GS} =-8V			-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} =-4.5V, I _D =-100mA			0.7	Ω
			V _{GS} =-2.5V, I _D =-50mA			1.2	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =-15V, f=1.0MHz		50		nF
Output Capacitance		C _{OSS}			18		nF
Reverse Transfer Capacitance		C _{RSS}			10		nF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =-24V, V _{GS} =-8V, I _D =-0.5A (Note 1, 2)		8		nC
Gate to Source Charge		Q _{GS}			1		nC
Gate to Drain Charge		Q _{GD}			1.5		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DS} =-15V, V _{GS} =-8V, I _D =-0.5A, R _G =3Ω (Note 1, 2)		6		ns
Rise Time		t _R			19		ns
Turn-OFF Delay Time		t _{D(OFF)}			132		ns
Fall-Time		t _F			66		ns
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS2							
Maximum Continuous Drain-Source Diode Forward Current		I _S				-0.5	A
Diode Forward Voltage		V _{SD}	I _S =-0.5A, V _{GS} =0V			-1.2	V
Body Diode Reverse Recovery Time		t _{rr}	I _S =-0.5A, V _{GS} =0V,		100		ns
Body Diode Reverse Recovery Charge		Q _{rr}	dl _F /dt=100A/μs		126		nC

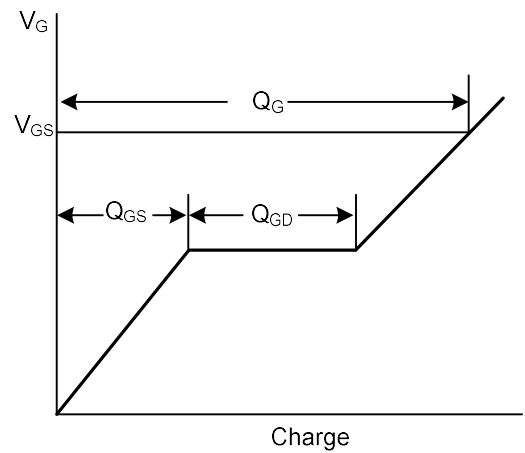
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

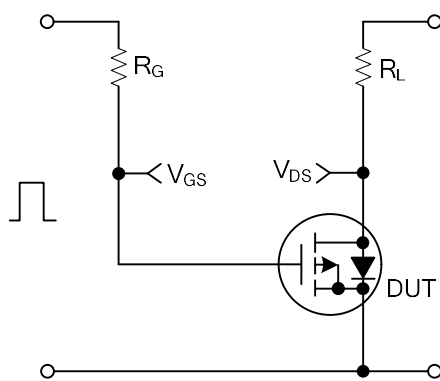
■ TEST CIRCUITS AND WAVEFORMS



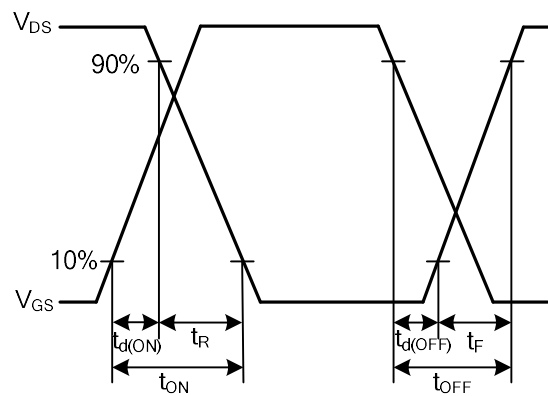
Gate Charge Test Circuit



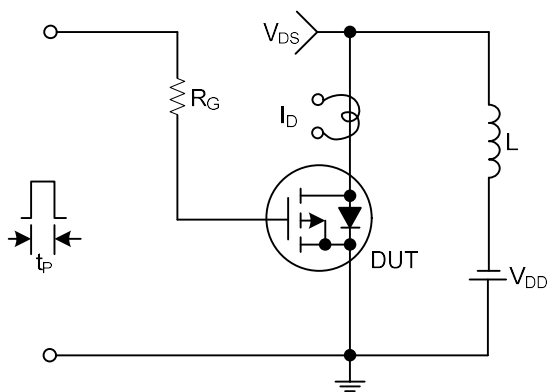
Gate Charge Waveforms



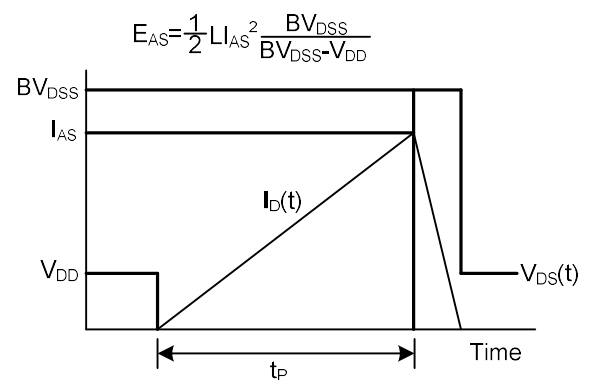
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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