

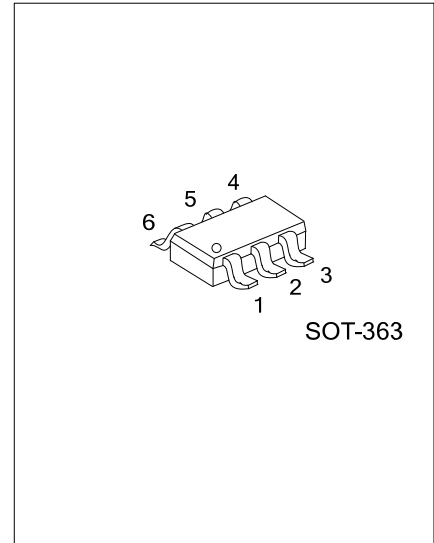


## UT03NN03Z

Preliminary

Power MOSFET

### 300mA, 30V DUAL N-CHANNEL ENHANCEMENT MODE POWER MOSFET



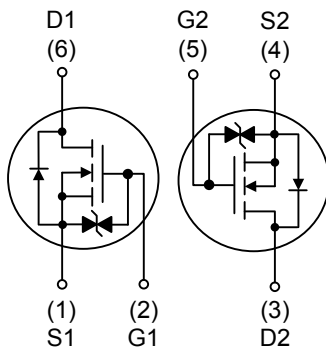
#### DESCRIPTION

The UTC **UT03NN03Z** is a dual N-Channel enhancement mode power MOSFET, minimize the on-state resistance ( $R_{DS(ON)}$ ) yet maintain superior switching performance, making it ideal for high efficiency power management applications, provides designer with fast switching speed, ruggedized device design, low on-resistance and cost-effectiveness.

#### FEATURES

- \*  $R_{DS(ON)} \leq 1.2 \Omega @ V_{GS}=4.5V, I_D=300mA$
- $R_{DS(ON)} \leq 1.6 \Omega @ V_{GS}=2.5V, I_D=200mA$
- $R_{DS(ON)} \leq 3.0 \Omega @ V_{GS}=1.8V, I_D=100mA$
- $R_{DS(ON)} \leq 5.0 \Omega @ V_{GS}=1.5V, I_D=50mA$
- \* Fast Switching Speed
- \* Simple Drive Requirement
- \* Specially Designed for Relay Driver, Speed Line Drive, etc.
- \* Advanced Trench Process Technology

#### SYMBOL



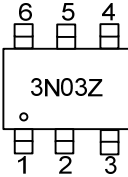
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment						Packing
Lead Free	Halogen Free		1	2	3	4	5	6	
UT03NN03ZL-AL6-R	UT03NN03ZG-AL6-R	SOT-363	S1	G1	D2	S2	G2	D1	Tape Reel

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

<p>UT03NN03ZG-AL6-R</p> <ul style="list-style-type: none"> <li>(1)Packing Type</li> <li>(2)Package Type</li> <li>(3)Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) AL6: SOT-363</li> <li>(3) G: Halogen Free and Lead Free, L: Lead Free</li> </ul>
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■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DSS}$	30	V
Gate-Source Voltage		$V_{GSS}$	$\pm 10$	V
Drain Current	Continuous	$I_D$	300	mA
	Pulsed(Note 2)	$I_{DM}$	600	mA
Power Dissipation		$P_D$	0.35	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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	357	$^{\circ}\text{C/W}$

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

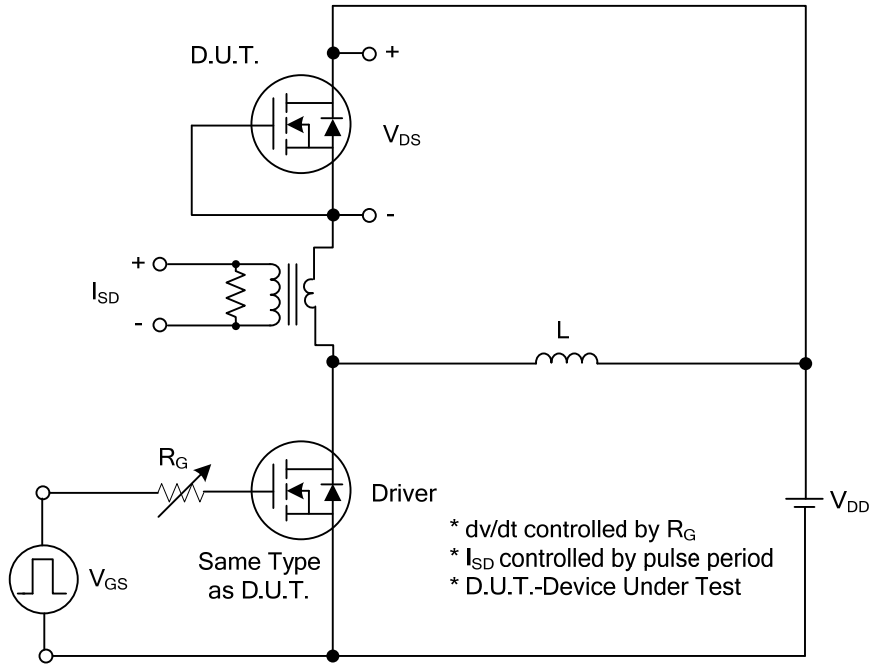
■ ELECTRICAL CHARACTERISTICS ( $T_J=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	30			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=30\text{V}, V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate-Source Leakage Current	Forward	$I_{GSS}$			10	$\mu\text{A}$
	Reverse				$V_{DS}=0\text{V}, V_{GS}=-8.0\text{V}$	-10
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	0.4		1.0	V
Drain-Source On-State Resistance (Note 1)	$R_{DS(ON)}$	$V_{GS}=4.5\text{V}, I_D=300\text{mA}$			1.2	$\Omega$
		$V_{GS}=2.5\text{V}, I_D=200\text{mA}$			1.6	$\Omega$
		$V_{GS}=1.8\text{V}, I_D=100\text{mA}$			3	$\Omega$
		$V_{GS}=1.5\text{V}, I_D=50\text{mA}$			5	$\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=10\text{V}, V_{GS}=0\text{V}, f=1.0\text{MHz}$		20		pF
Output Capacitance	$C_{OSS}$			9		pF
Reverse Transfer Capacitance	$C_{RSS}$			5		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge (Note 1)	$Q_G$	$V_{DS}=24\text{V}, V_{GS}=4.5\text{V}, I_D=300\text{mA}$ (Note 1, 2)		3.5		nC
Gate-Source Charge	$Q_{GS}$			0.8		nC
Gate-Drain Charge	$Q_{GD}$			0.4		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	$V_{DS}=15\text{V}, V_{GS}=4\text{V}, I_D=300\text{mA}, R_G=10\Omega$ (Note 1, 2)		2		ns
Turn-ON Rise Time	$t_R$			16		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			9		ns
Turn-OFF Fall Time	$t_F$			18		ns
<b>SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$				0.3	A
Drain-Source Diode Forward Voltage (Note 1)	$V_{SD}$	$I_S=300\text{mA}, V_{GS}=0\text{V}$			1.3	V

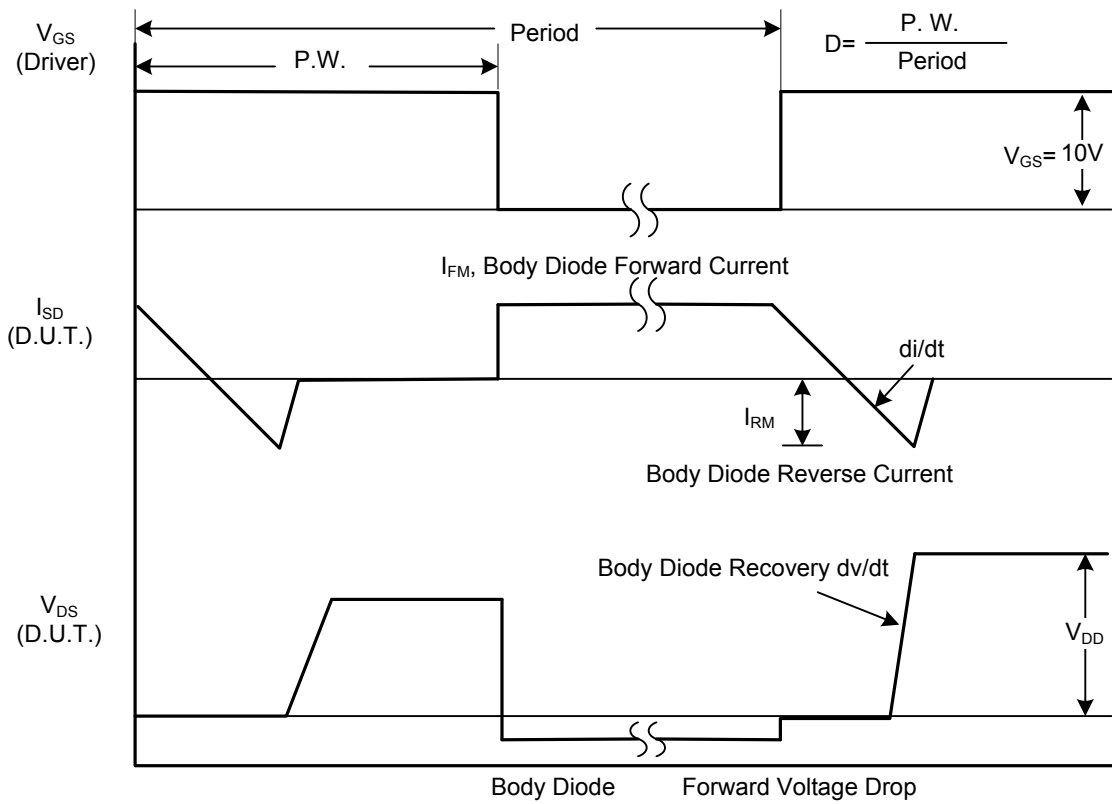
Notes: 1. Pulse Test : Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

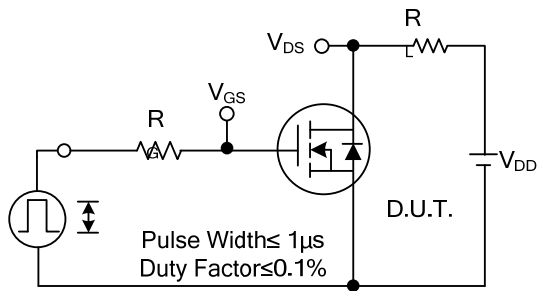


Peak Diode Recovery dv/dt Test Circuit

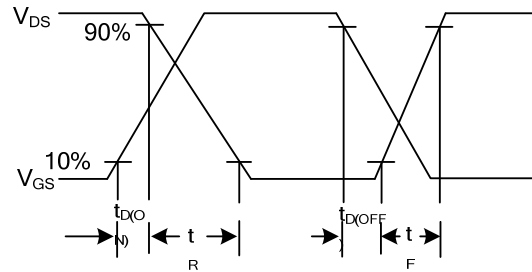


Peak Diode Recovery dv/dt Waveforms

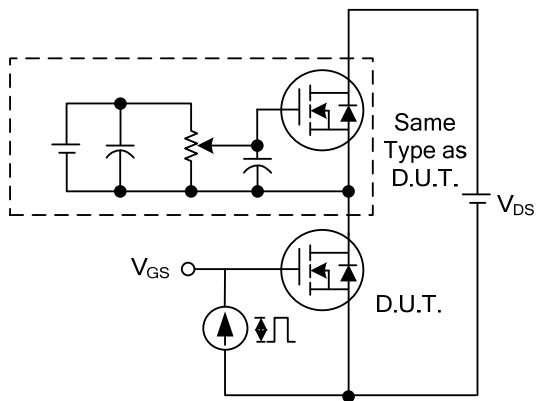
■ TEST CIRCUITS AND WAVEFORMS



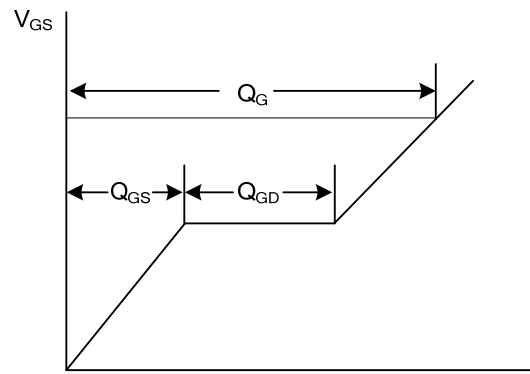
Switching Test Circuit



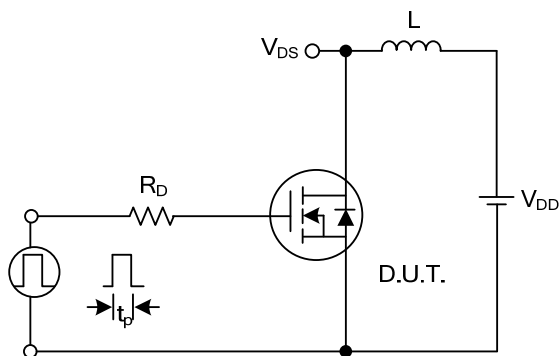
Switching Waveforms



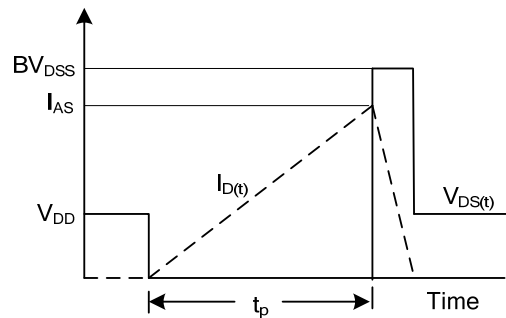
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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