



1NK150Z

Preliminary

POWER MOSFET

1.0A, 1500V N-CHANNEL POWER MOSFET

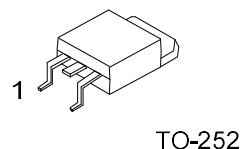
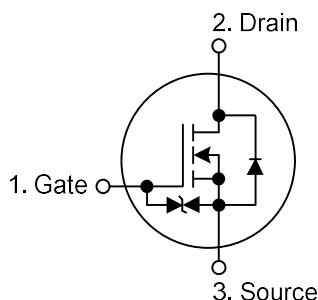
DESCRIPTION

The UTC **1NK150Z** is a silicon N-channel MOSFET, it uses UTC's advanced technology to provide the customers with a minimum on state resistance, high switching speed and low gate charge.

FEATURES

- * $R_{DS(ON)} \leq 16 \Omega$ @ $V_{GS} = 10V$, $I_D = 0.5A$
- * High switching speed
- * Low input capacitance
- * With ESD protection
- * Green Product

SYMBOL



TO-252

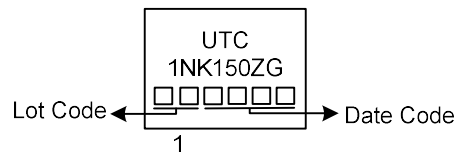
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
1NK150ZL-TN3-R	1NK150ZG-TN3-R	TO-252	G	D	S	Tape Reel

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

1NK150ZG-TN3-R	(1) Packing Type	(1) R: Tape Reel
	(2) Package Type	(2) TN3: TO-252
	(3) Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V _{DSS}	1500	V
Gate-Source Voltage		V _{GSS}	±20	V
Drain Current	DC	I _D	1	A
	Pulsed (Note 2)	I _{DM}	3	A
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	85	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	6	V/ns
Power Dissipation		P _D	47	W
Junction Temperature		T _J	+150	°C
Storage Temperature Range		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 = 100mH, I_{AS} = 1.3A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C.

4. I_{SD} ≤ 1.0A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J=25°C.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ _{JA}	110	°C/W
Junction to Case	θ _{JC}	2.65 (Note)	°C/W

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

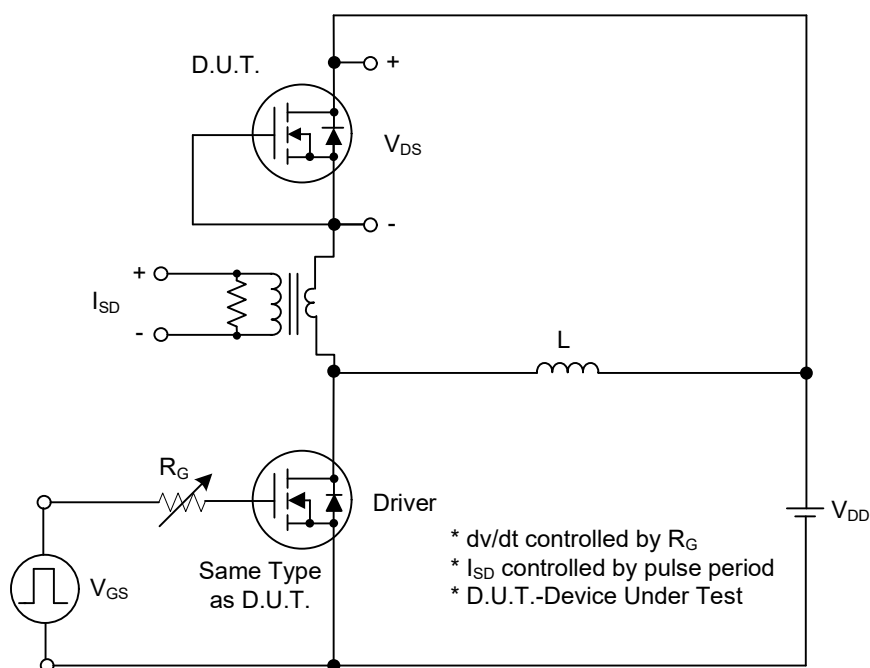
■ **ELECTRICAL CHARACTERISTICS** ($T_A=25^\circ\text{C}$ unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V, I _D =250μA	1500			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =1500V, V _{GS} =0V			10	μA
Gate-Source Leakage Current	Forward	I _{GSS}	V _{GS} =+20V, V _{DS} =0V			+10	μA
	Reverse		V _{GS} =-20V, V _{DS} =0V			-10	μA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	3.0		5.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =0.5A			16	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		681		pF
Output Capacitance		C _{OSS}			50		pF
Reverse Transfer Capacitance		C _{RSS}			3		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =1200V, V _{GS} =10V, I _D =1.0A (Note 1, 2)		19		nC
Gate to Source Charge		Q _{GS}			7		nC
Gate to Drain Charge		Q _{GD}			4		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =1.0A, R _G =25Ω (Note 1, 2)		14		ns
Rise Time		t _R			20		ns
Turn-OFF Delay Time		t _{D(OFF)}			44		ns
Fall-Time		t _F			67		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}				3	A
Diode Forward Voltage		V _{SD}	I _F =1.0A, V _{GS} =0V			1.4	V
Reverse Recovery Time		t _{rr}	I _S =1.0A, V _{GS} =0V,		655		ns
Reverse Recovery Charge (Note 1)		Q _{rr}	dl _F /dt = 100 A/μs		2.71		uC

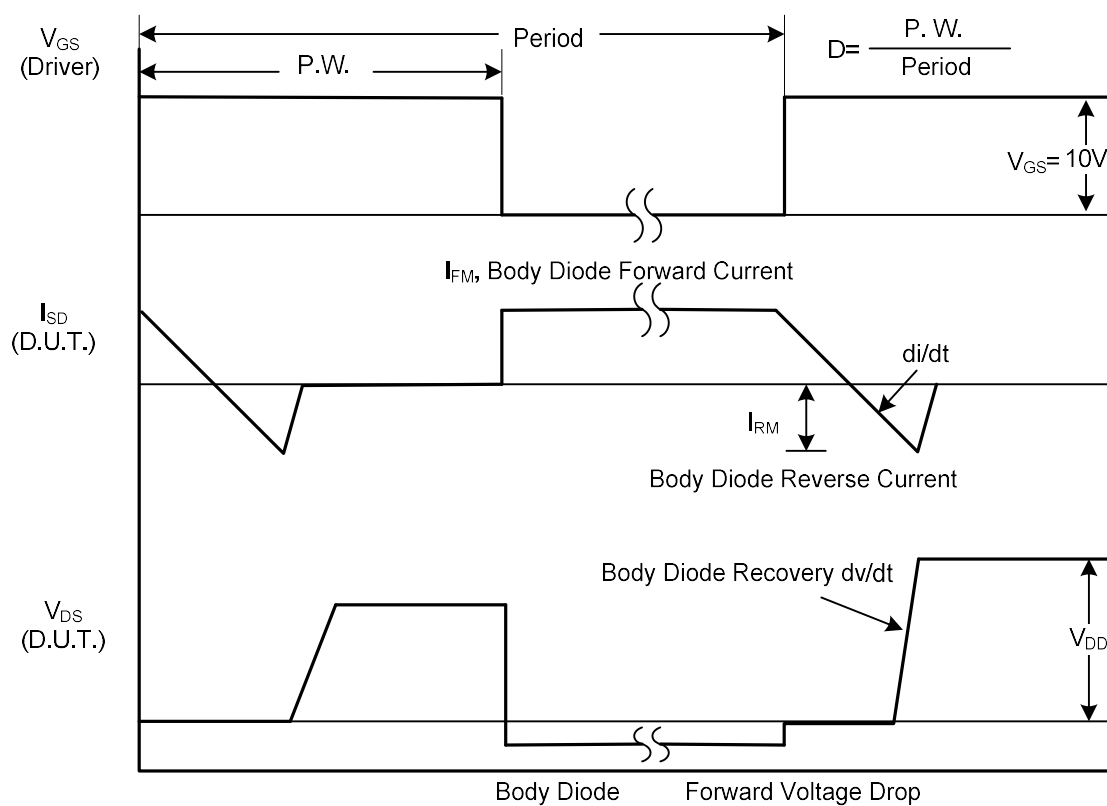
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

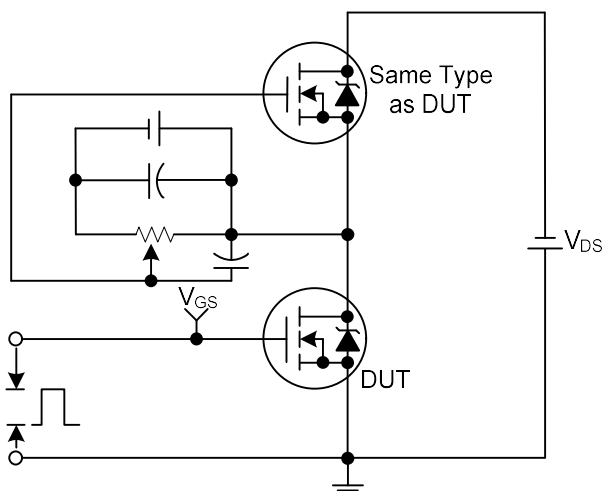


Peak Diode Recovery dv/dt Test Circuit

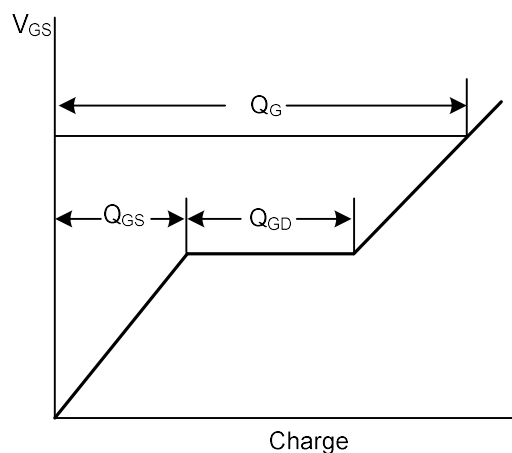


Peak Diode Recovery dv/dt Waveforms

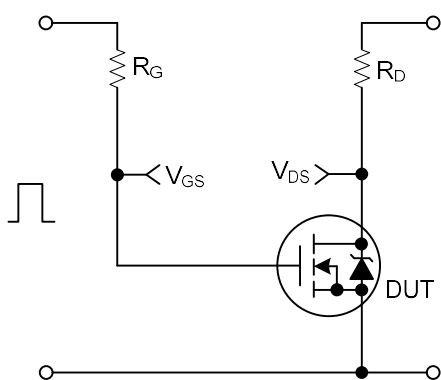
■ TEST CIRCUITS AND WAVEFORMS



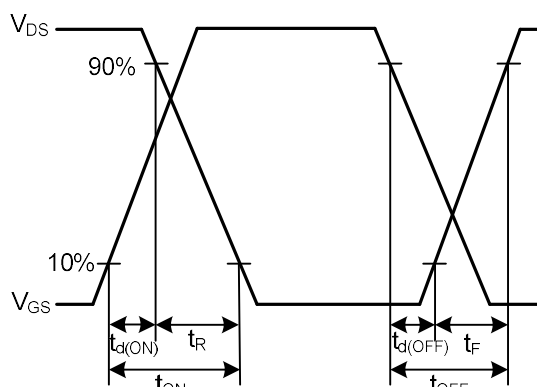
Gate Charge Test Circuit



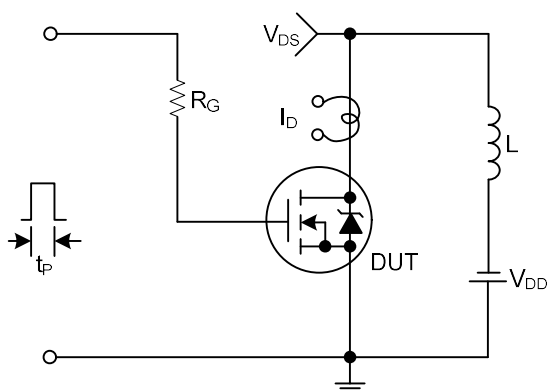
Gate Charge Waveforms



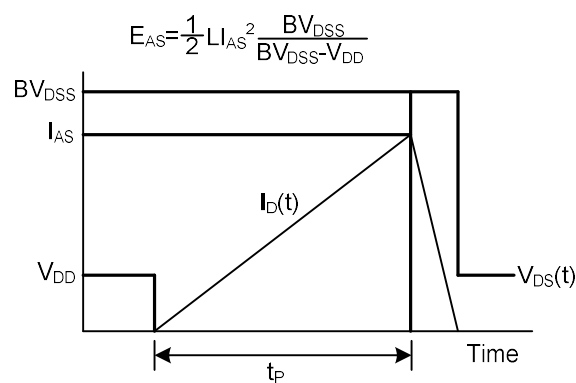
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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