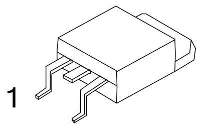
UNISONIC TECHNOLOGIES CO., LTD

7A, 100V N-CHANNEL POWER MOSFET



TO-252

■ DESCRIPTION

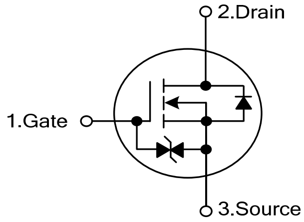
The UTC **7N10Z** is an N-Channel enhancement mode power MOSFET providing customers with excellent switching performance and minimum on-state resistance. The UTC **7N10Z** uses planar stripe and DMOS technology to provide perfect quality. This device can also withstand high energy pulse in the avalanche and the commutation mode.

The UTC **7N10Z** is generally applied in low voltage applications, such as DC motor controls, audio amplifiers and high efficiency switching DC/DC converters.

■ FEATURES

* Low Gate Charge: 5.8nC (TYP.)
* Low $C_{RSS:}$ 10 pF (TYP.)
* $R_{DS(ON)}$ = 0.35Ω @V_{GS} = 10 V
* Fast Switching
* Improved dv/dt Capability

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
7N10ZL-TN3-R	7N10ZG-TN3-R	TO-252	G	D	S	Tape Reel
7N10ZL-TN3-T	7N10ZG-TN3-T	TO-252	G	D	S	Tube

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

7N10ZL-AA3-R (1)Packing Type (2)Package Type (3)Lead Free	(1) R: Tape Reel, T: Tube (2) TN3: TO-252 (3) G: Halogen Free, L:Lead Free

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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain -Source Voltage	V_{DSS}	100	V
Gate-Source Voltage	V_{GSS}	±25	V
Continuous Drain Current T_C =25°C	I_D	7	A
Pulsed Drain Current (Note 2)	I_{DM}	28	A
Single Pulsed Avalanche Energy (Note 3)	E_{AS}	50	mJ
Power Dissipation	P_D	2.5	W
Derate above 25°C		0.02	W/°C
Operating Junction Temperature	T_J	-55 ~ +150	°C
Storage Temperature	T_{STG}	-55 ~ +150	°C

Note: 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 =26mH, I_{AS} =7A, V_{DD} =25V, R_G =25Ω Starting T_J =25°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	50	°C/W

Note: When mounted on the minimum pad size recommended (PCB Mount)

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

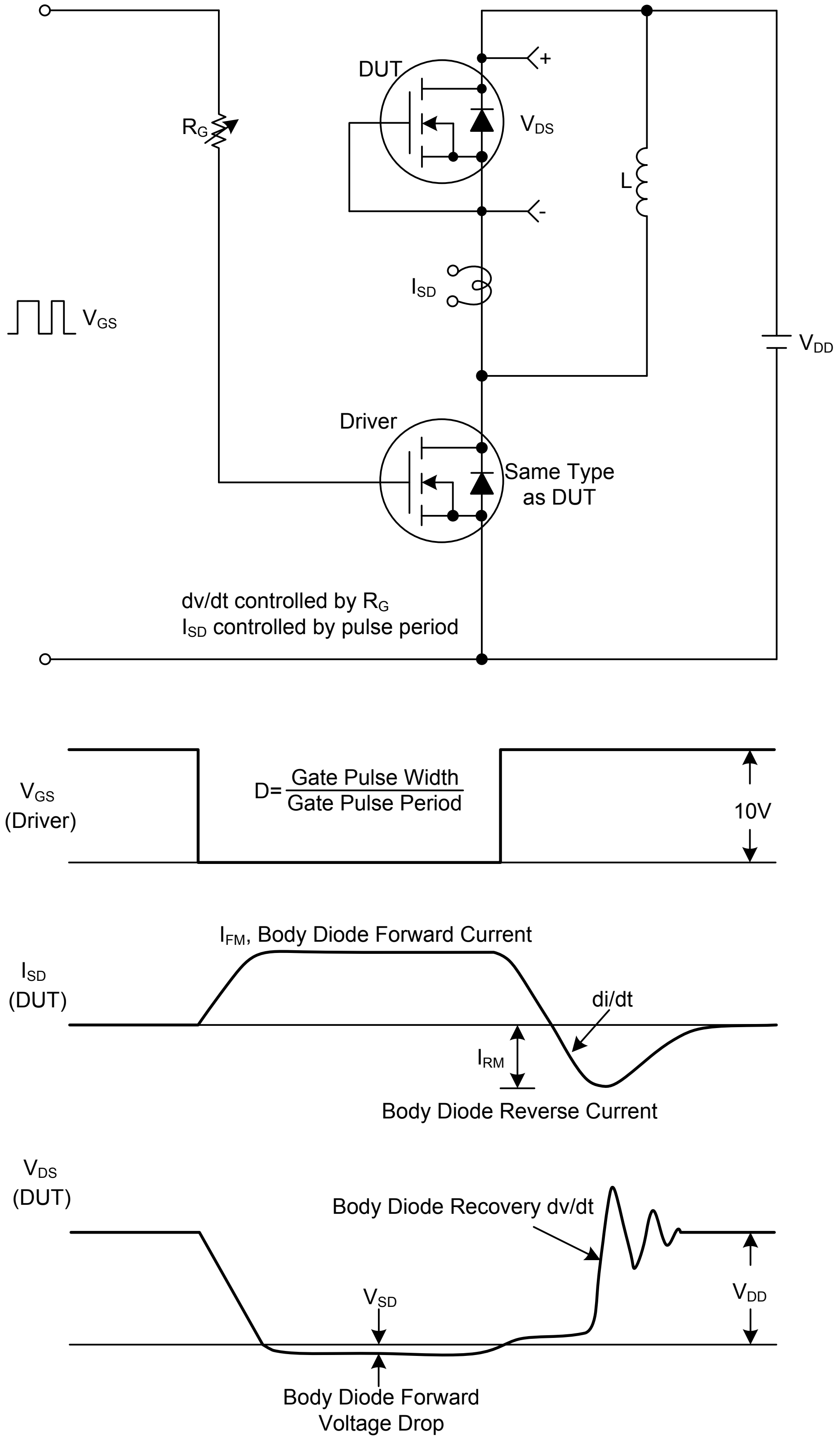
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D =250μA	100			V
Drain-Source Leakage Current	I_{DSS}	V_{DS} =100V, V_{GS} =0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS} =±25V, V_{DS} =0V			±10	μA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS} = V_{GS}, I_D =250μA	2.0		4.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} =10V, I_D =3.5A		0.28	0.35	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS} =25V, V_{GS}=0V, f=1.0MHz		190	250	pF
Output Capacitance	C_{OSS}			60	75	pF
Reverse Transfer Capacitance	C_{RSS}			10	13	pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	V_{GS}=10V, V_{DS}=80V, I_D=7A (Note 1,2)		5.8	7.5	nC
Gate Source Charge	Q_{GS}			1.4		nC
Gate Drain Charge	Q_{GD}			2.5		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=50V, I_D=7A, R_G=25Ω (Note 1,2)		7	25	ns
Turn-ON Rise Time	t_R			24	60	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			13	35	ns
Turn-OFF Fall-Time	t_F			19	50	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				7	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				28	A
Drain-Source Diode Forward Voltage	V_{SD}	I_S =7A, V_{GS} =0V			1.5	V

Notes: 1. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%

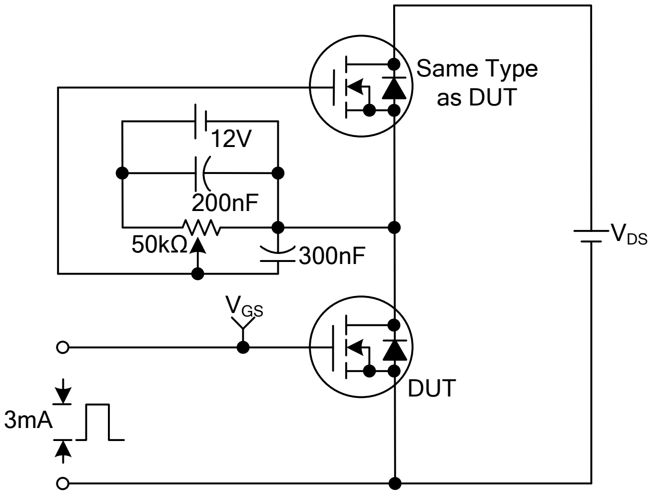
2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

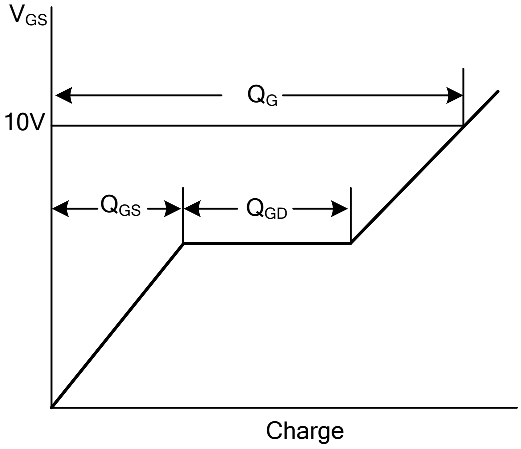
Peak Diode Recovery dv/dt Test Circuit & Waveforms



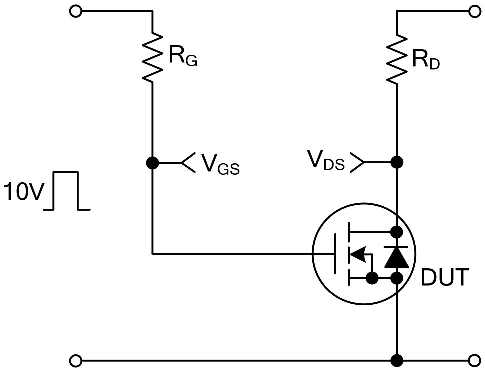
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



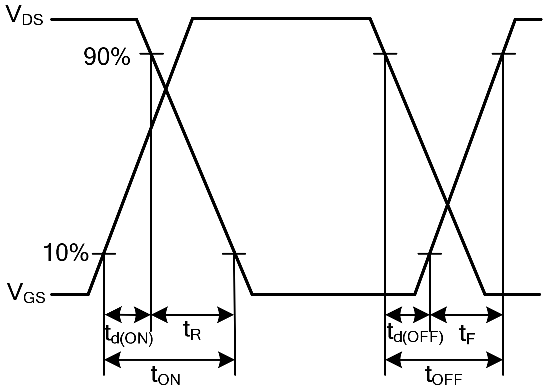
Gate Charge Test Circuit



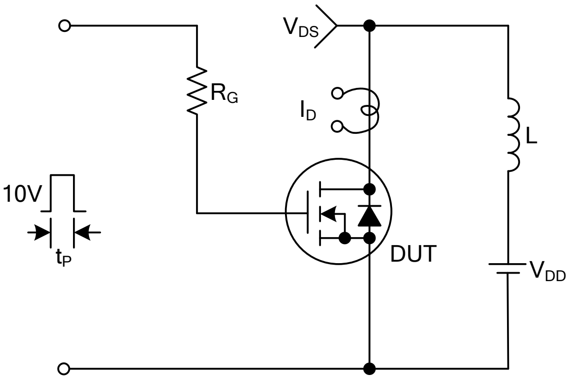
Gate Charge Waveforms



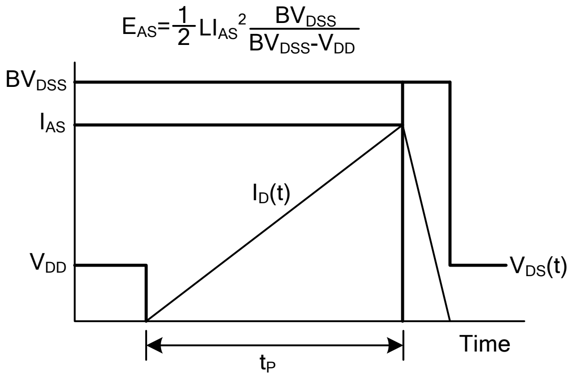
Resistive Switching Test Circuit



Resistive Switching Waveforms



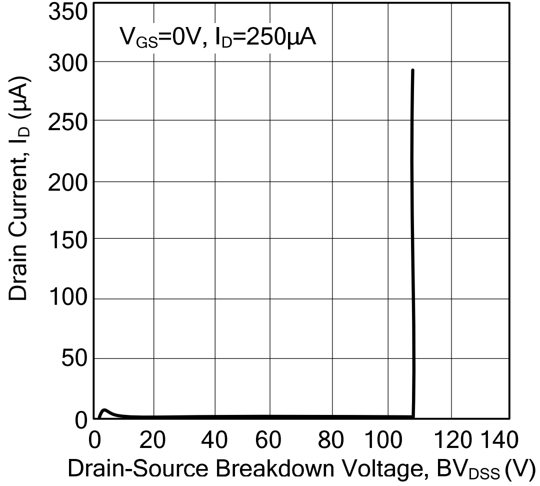
Unclamped Inductive Switching Test Circuit



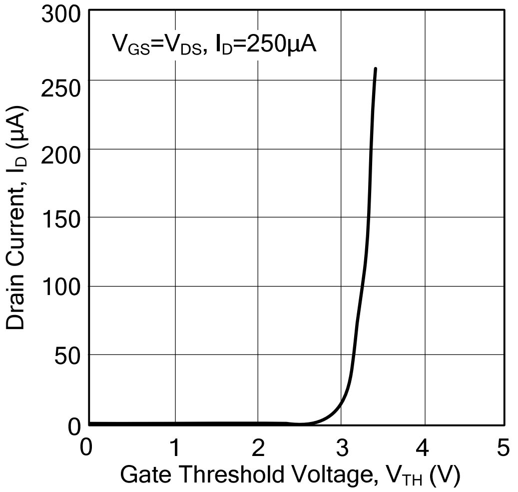
Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS

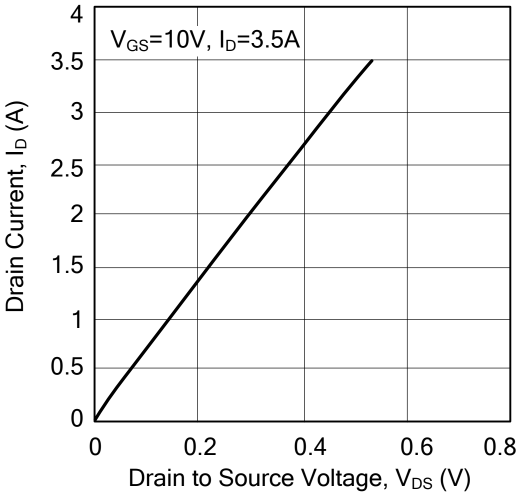
Drain Current vs. Drain-Source Breakdown Voltage



Drain Current vs. Gate Threshold Voltage



Drain-Source On-State Resistance Characteristics



Maximum Safe Operation Area