

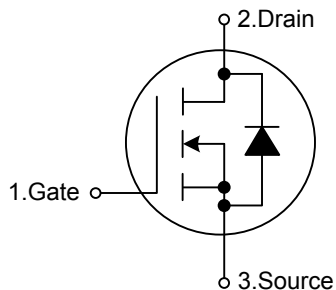
**7N10****Power MOSFET****7A, 100V N-CHANNEL POWER MOSFET****DESCRIPTION**

The UTC **7N10** is an N-Channel enhancement mode power MOSFET, providing customers with excellent switching performance and minimum on-state resistance. The UTC **7N10** 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 **7N10** is generally applied in low voltage applications, such as DC motor controls, audio amplifiers and high efficiency switching DC/DC converters,.

FEATURES

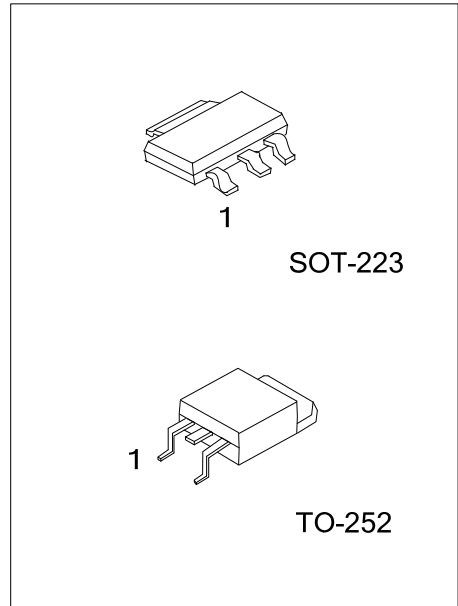
- * Low Gate Charge: 5.8nC (TYP.)
- * Low C_{RSS} : 10 pF (TYP.)
- * $R_{DS(ON)} = 0.35\Omega @ V_{GS} = 10 V$
- * Fast Switching
- * Improved dv/dt Capability

SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
7N10L-AA3-R	7N10G-AA3-R	SOT-223	G	D	S	Tape Reel
7N10L-TN3-R	7N10G-TN3-R	TO-252	G	D	S	Tape Reel
7N10L-TN3-T	7N10G-TN3-T	TO-252	G	D	S	Tube

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

7N10L-AA3-R (1)Packing Type (2)Package Type (3)Lead Free	(1) R: Tape Reel, T: Tube (2) AA3: SOT-223, TN3: TO-252 (3) G: Halogen Free, L:Lead Free
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■ ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain -Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	± 25	V
Continuous Drain Current	$T_C=25^\circ\text{C}$	I_D	7	A
	$T_C=70^\circ\text{C}$	I_D	6.8	A
Pulsed Drain Current (Note 2)		I_{DM}	16	A
Avalanche Current (Note 2)		I_{AR}	7	A
Repetitive Avalanche Energy (Note 2)		E_{AR}	0.2	mJ
Single Pulsed Avalanche Energy (Note 3)		E_{AS}	50	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	6.0	V/ns
Power Dissipation	SOT-223	P_D	2.0	W
	TO-252		2.5	
Derate above 25°C	SOT-223		0.016	$\text{W}/^\circ\text{C}$
	TO-252		0.02	
Operating Junction Temperature		T_J	$-55 \sim +150$	$^\circ\text{C}$
Storage Temperature		T_{STG}	$-55 \sim +150$	$^\circ\text{C}$

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. $L=26\text{mH}$, $I_{AS}=1.7\text{A}$, $V_{DD}=25\text{V}$, $R_G=25\Omega$ Starting $T_J=25^\circ\text{C}$

4. $I_{SD} \leq 7.3\text{A}$, $di/dt \leq 300\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-252		50	

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

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

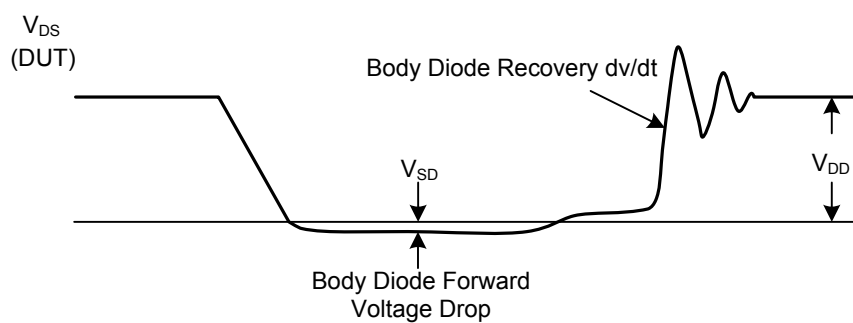
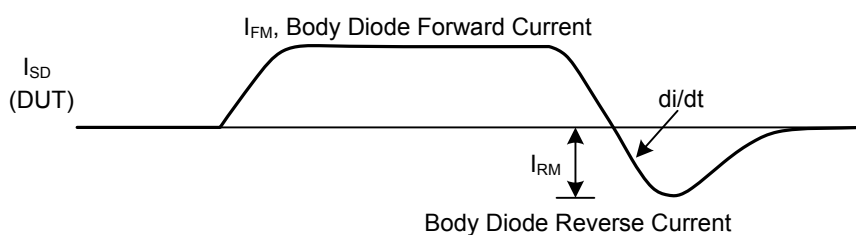
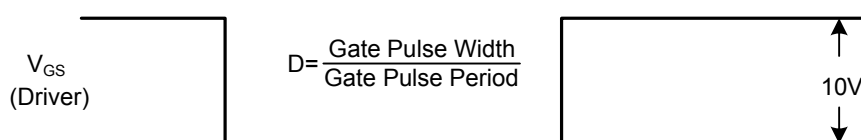
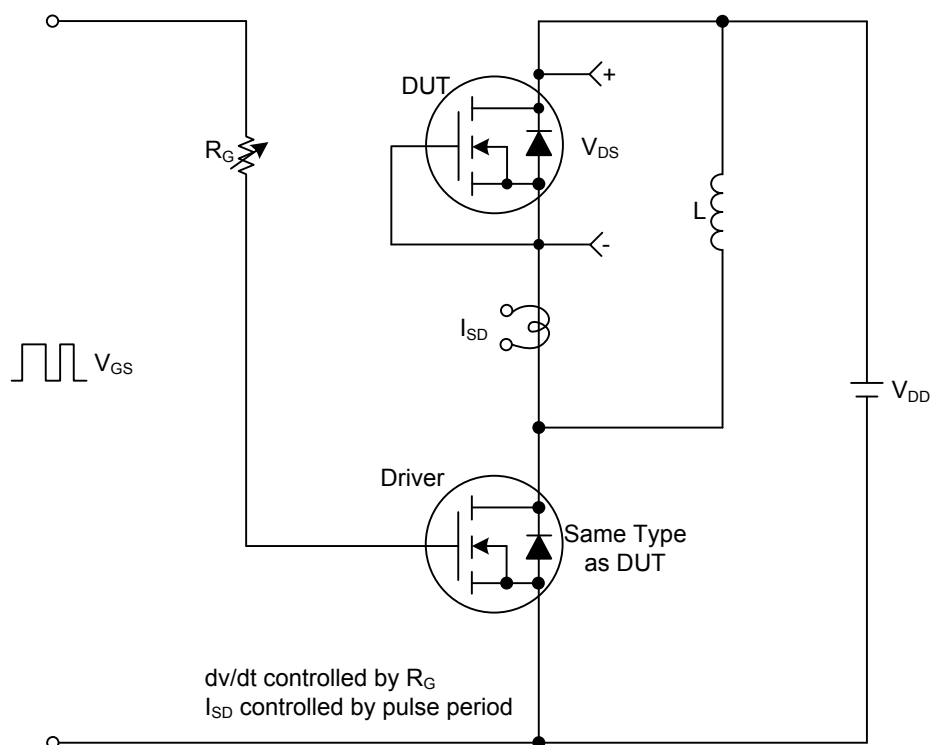
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$	100			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=250\mu\text{A}$		0.1		$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=100\text{V}$, $V_{GS}=0\text{V}$			1	μA
		$V_{DS}=80\text{V}$, $T_C=125^\circ\text{C}$			10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 25\text{V}$, $V_{DS}=0\text{V}$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=3.5\text{A}$		0.28	0.35	Ω
Forward Transconductance	g_{FS}	$V_{DS}=40\text{V}$, $I_D=0.85\text{A}$ (Note 1)		1.85		S
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1.0\text{MHz}$		190	250	pF
Output Capacitance	C_{OSS}			60	75	pF
Reverse Transfer Capacitance	C_{RSS}			10	13	pF

■ ELECTRICAL CHARACTERISTICS (Cont.)

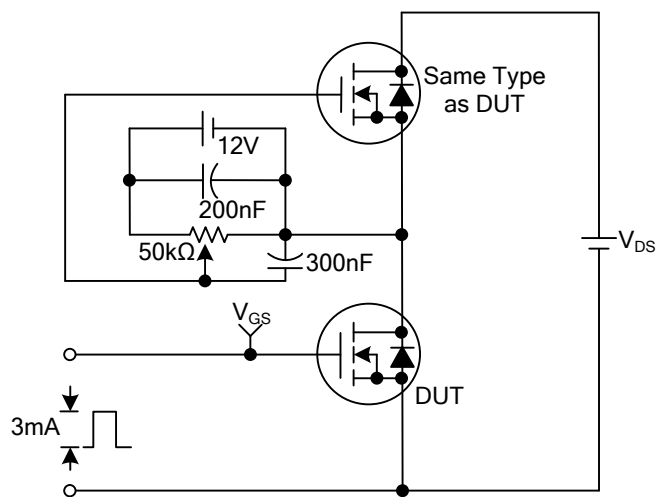
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SWITCHING PARAMETERS						
Total Gate Charge	Q _G	V _{GS} =10V, V _{DS} =80V, I _D =7.3A (Note 1,2)		5.8	7.5	nC
Gate Source Charge	Q _{GS}			1.4		nC
Gate Drain Charge	Q _{GD}			2.5		nC
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =50V, I _D =7.3A, R _G =25Ω (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}				16	A
Drain-Source Diode Forward Voltage	V _{SD}	I _S =7A, V _{GS} =0V			1.5	V
Reverse Recovery Time	t _{rr}	V _{GS} =0V, I _S =7.3A,		70		ns
Reverse Recovery Charge	Q _{RR}	di _F /dt=100A/μs		150		nC

Notes: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
 2. Essentially independent of operating temperature

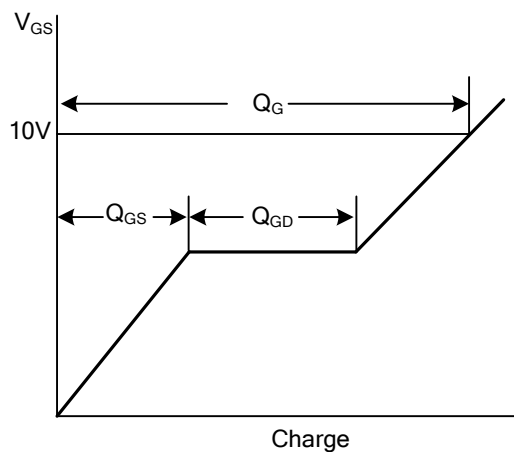
■ TEST CIRCUITS AND WAVEFORMS

Peak Diode Recovery dv/dt Test Circuit & Waveforms

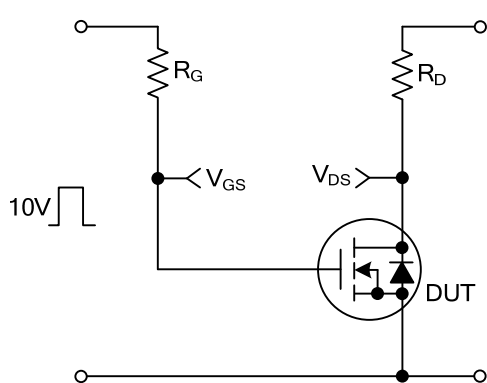
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



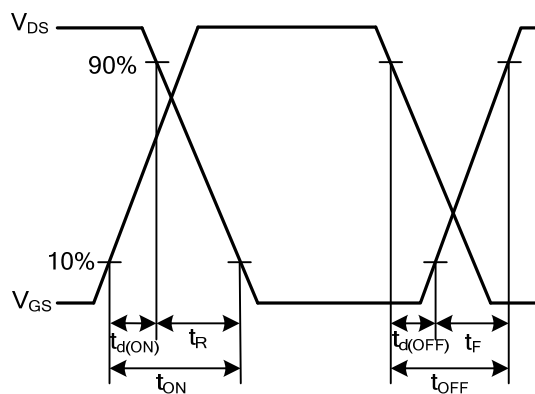
Gate Charge Test Circuit



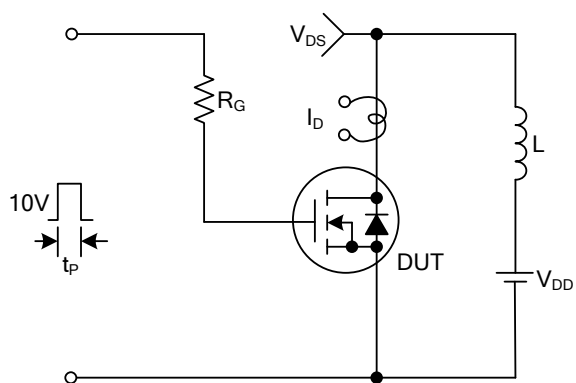
Gate Charge Waveforms



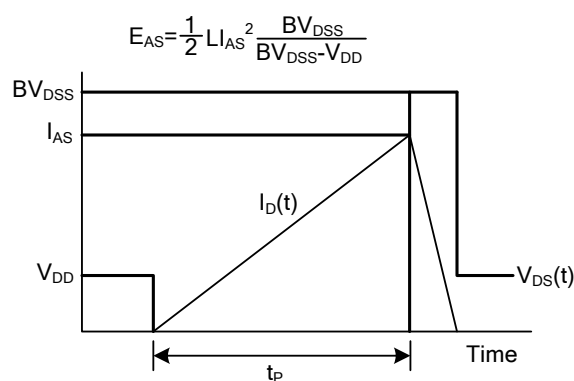
Resistive Switching Test Circuit



Resistive Switching Waveforms

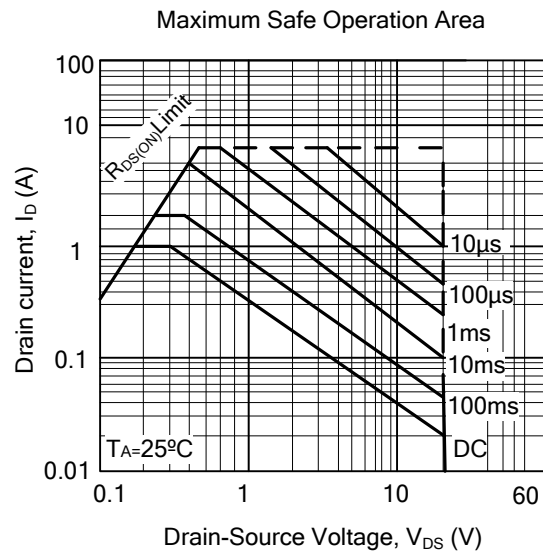
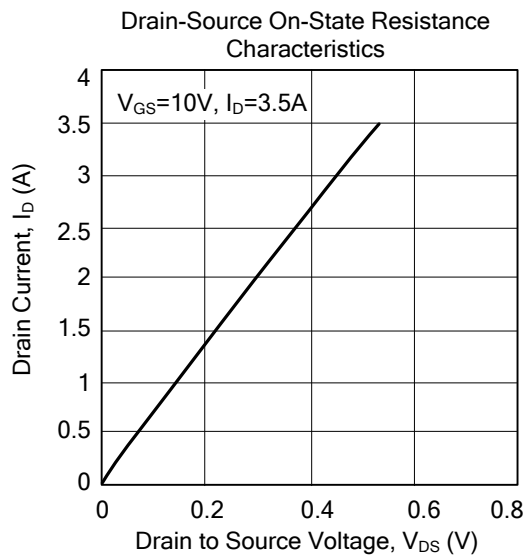
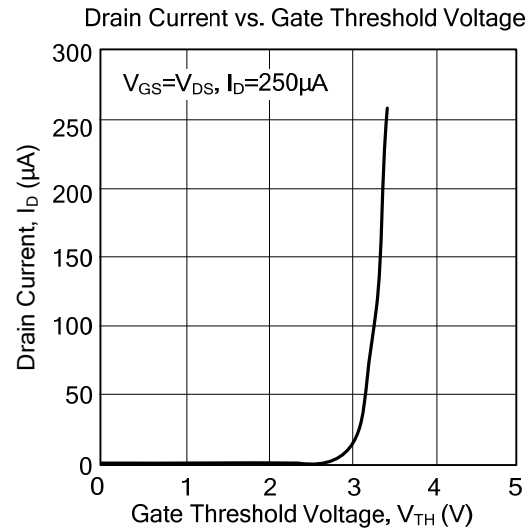
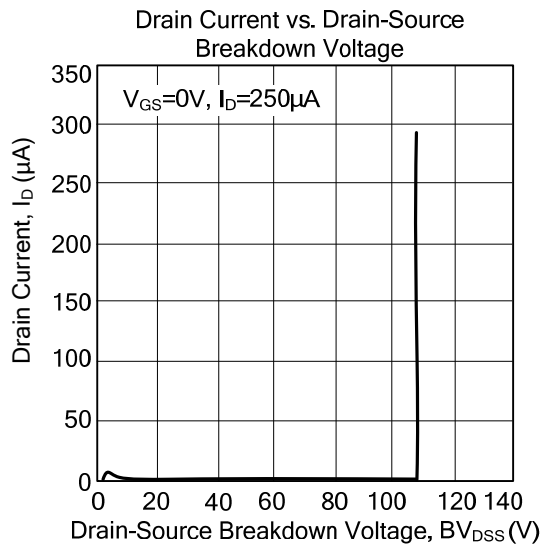


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



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