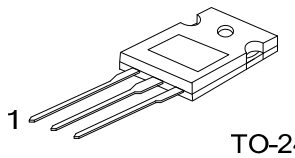
9N100 **Preliminary** ***Power MOSFET***

9A, 1000V N-CHANNEL POWER MOSFET



TO-247

■ DESCRIPTION

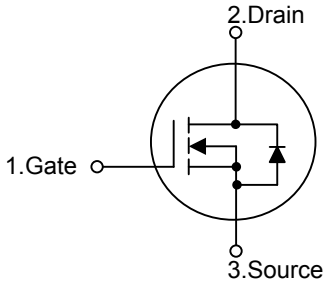
The UTC **9N100** is an N-channel mode power MOSFET using UTC's advanced technology to provide costumers with planar stripe and DMOS technology. This technology allows a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The UTC **9N100** is generally applied in high efficiency switch mode power supplies.

■ FEATURES

* $R_{DS(ON)}$=1.7Ω @ V_{GS}=10V
* Fast Switching Speed
* 100% Avalanche Tested
* Improved dv/dt Capability

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
9N100L-T47-T	9N100G-T47-T	TO-247	G	D	S	Tube

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

9N100L-T47-T (1)Packing Type (2)Package Type (3)Lead Free	(1) T: Tube (2) T47: TO-247 (3) G: Halogen Free, L: Lead Free

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Drain to Source Voltage	V_{DSS}	1000	V
Gate to Source Voltage	V_{GSS}	±30	V
Continuous Drain Current (T_C=25°C)	I_D	9	A
Pulsed Drain Current (Note 1)	I_{DM}	36	A
Avalanche Current (Note 1)	I_{AR}	9	A
Single Pulsed Avalanche Energy (Note 2)	E_{AS}	850	mJ
Peak Diode Recovery dv/dt (Note 3)	dv/dt	4.0	V/ns
Power Dissipation (T_C=25°C)	P_D	160	W
Linear Derating Factor above T_C=25°C		1.28	W/°C
Junction Temperature	T_J	+150	°C
Storage Temperature	T_{STG}	-55~+150	°C

Note: 1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L=27mH, I_{AS}=9A, V_{DD}= 50V, R_G=25Ω, Starting T_J=25°C
3. I_{SD} ≤9A, di/dt ≤200A/μs, V_{DD} ≤BV_{DSS}, Starting T_J=25°C
4. 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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	50	°C/W
Junction to Case	θ_{JC}	0.78	°C/W

■ 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	1000			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, Referenced to 25°C		1.4		V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=1000V, V_{GS}=0V			10	μA
		V_{DS}=800V, T_C=125°C			100	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V ,V_{GS}=±30V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	3.0		5.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=4A		1200	1700	mΩ
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz		2475	3220	pF
Output Capacitance	C_{OSS}			195	255	pF
Reverse Transfer Capacitance	C_{RSS}			16	24	pF

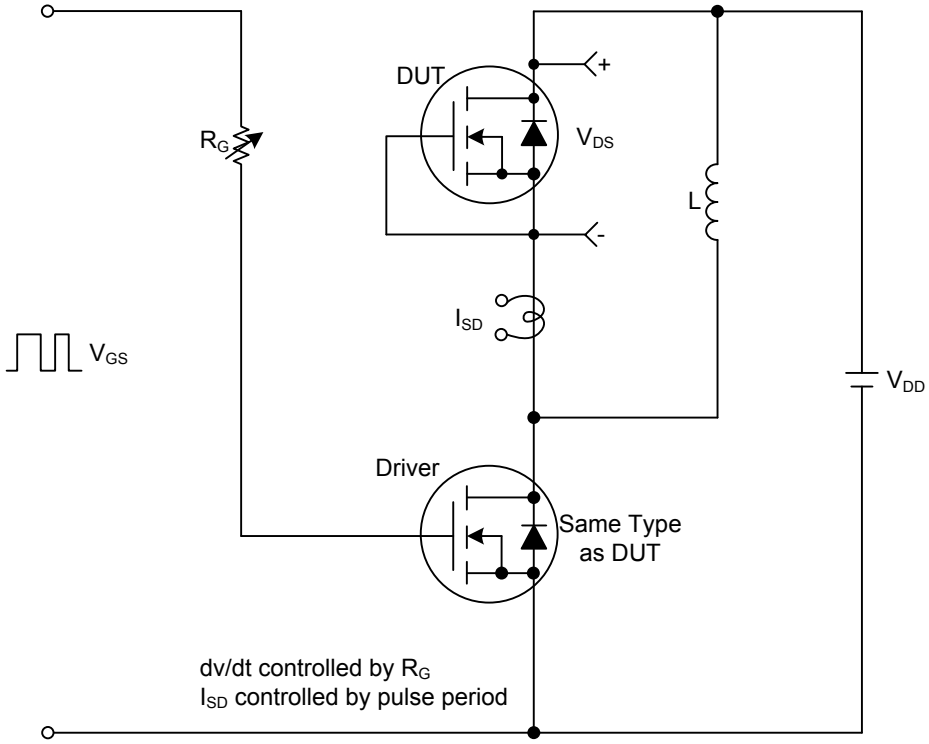
■ ELECTRICAL CHARACTERISTICS(Cont.)

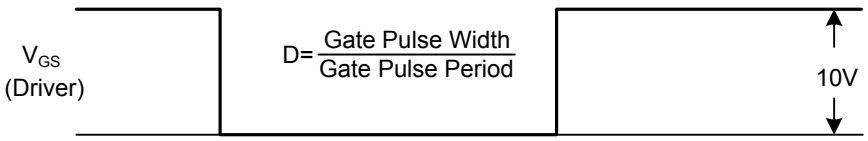
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SWITCHING PARAMETERS (Note 1, Note 2)						
Total Gate Charge	Q_G	V_{DS}=800V, V_{GS}=10V, I_D=8A		53	70	nC
Gate-Source Charge	Q_{GS}			13		nC
Gate-Drain Charge	Q_{GD}			23		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=500V, I_D=8A, R_G=25Ω		50	110	ns
Turn-ON Rise Time	t_R			95	200	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			122	254	ns
Turn-OFF Fall Time	t_F			80	170	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				9	A
Maximum Body-Diode Pulsed Current	I_{SM}				36	A
Drain-Source Diode Forward Voltage	V_{SD}	I_S =9A, V_{GS}=0V			1.4	V

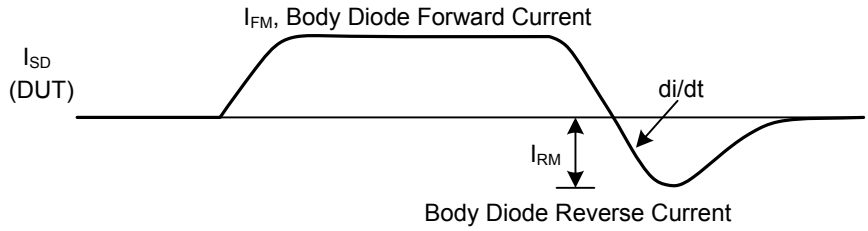
Note: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%
2. Essentially independent of operating temperature

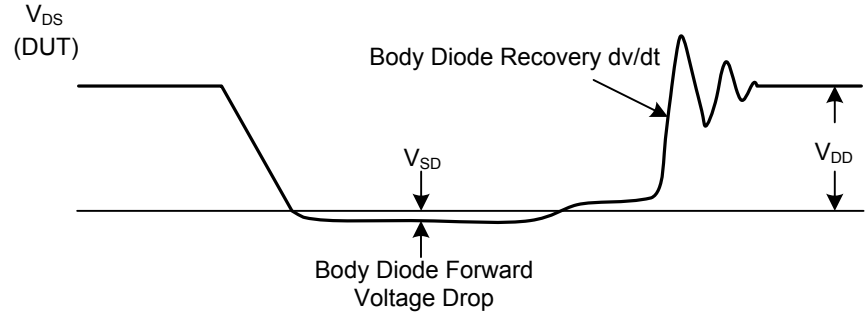
■ TEST CIRCUITS AND WAVEFORMS

Peak Diode Recovery dv/dt Test Circuit & Waveforms

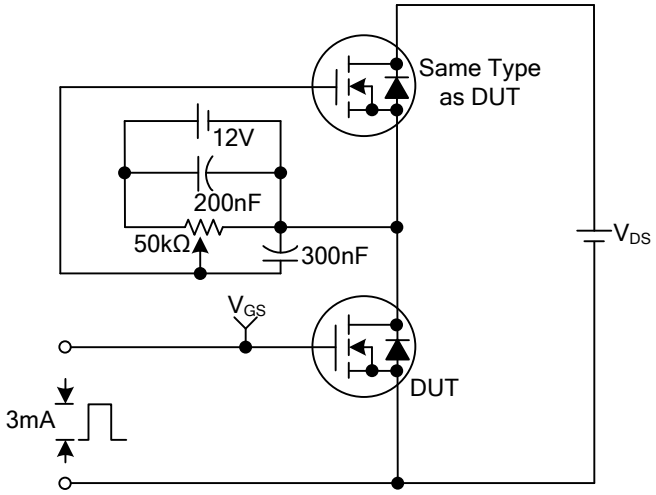




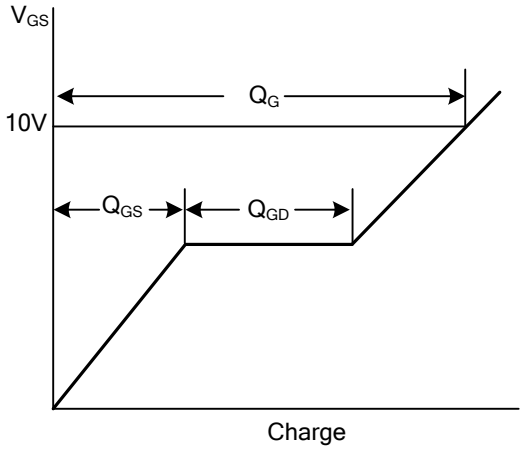




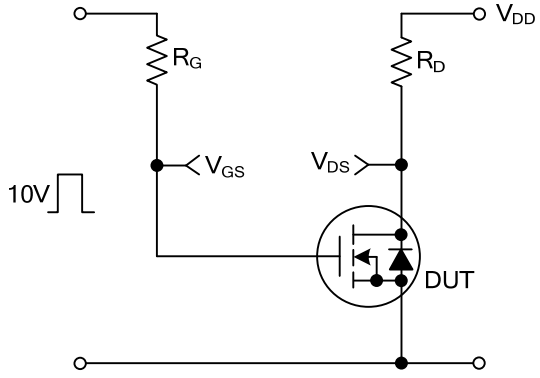
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



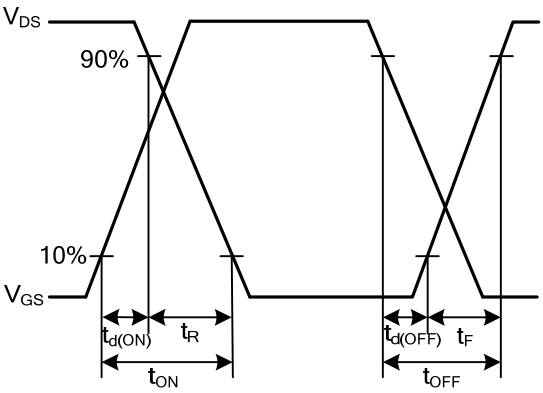
Gate Charge Test Circuit



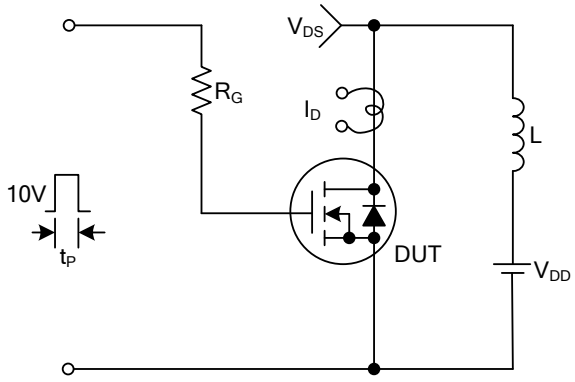
Gate Charge Waveforms



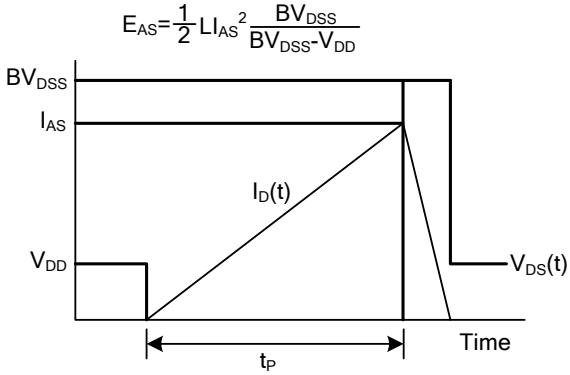
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms