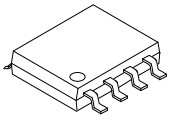
5A, 120V N-CHANNEL POWER MOSFET



SOP-8

■ DESCRIPTION

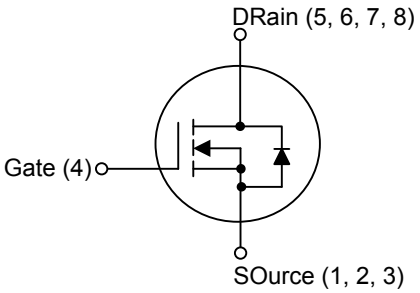
The UTC **UT5N12** is an N-channel power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance and superior switching performance.

The UTC **UT5N12** is generally applied in low power switching mode power appliances and electronic ballast.

■ FEATURES

* $R_{DS(ON)}$ ≤ 140 mΩ @ V_{GS}=10V, I_D=2.5A
  $R_{DS(ON)}$ ≤ 150 mΩ @ V_{GS}=4.5V, I_D=1.0A
* High Switching Speed
* 100% Avalanche Tested

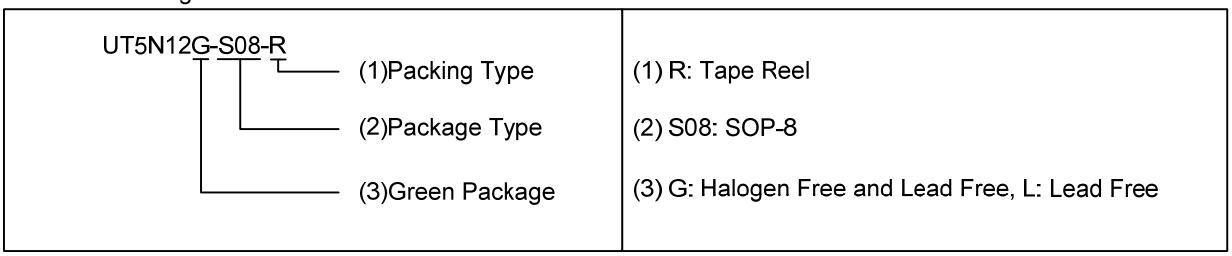
■ SYMBOL



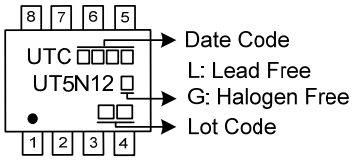
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT5N12L-S08-R	UT5N12G-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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



■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	120	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	5	A
	Pulsed (Note 2)	I_{DM}	10	A
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.15	V/ns
Power Dissipation (T_C=25°C)		P_D	1.6	W
Junction Temperature		T_J	+150	°C
Storage Temperature		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. I_{SD} ≤ 5.0A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA (NOTE)

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	125	°C/W
Junction to Case	θ_{JC}	78	°C/W

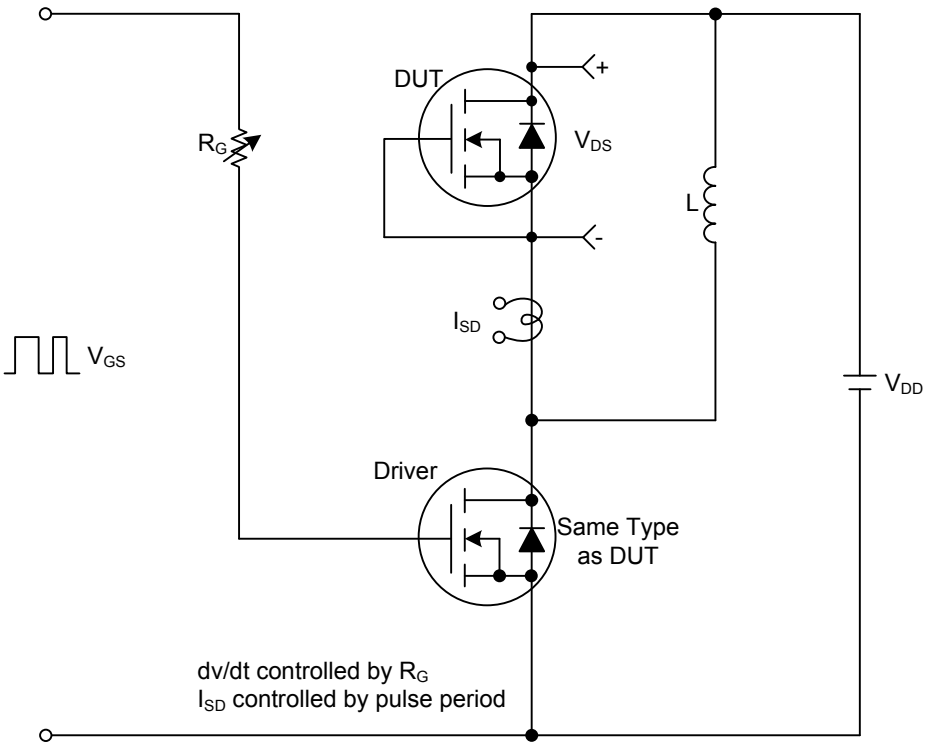
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise noted)

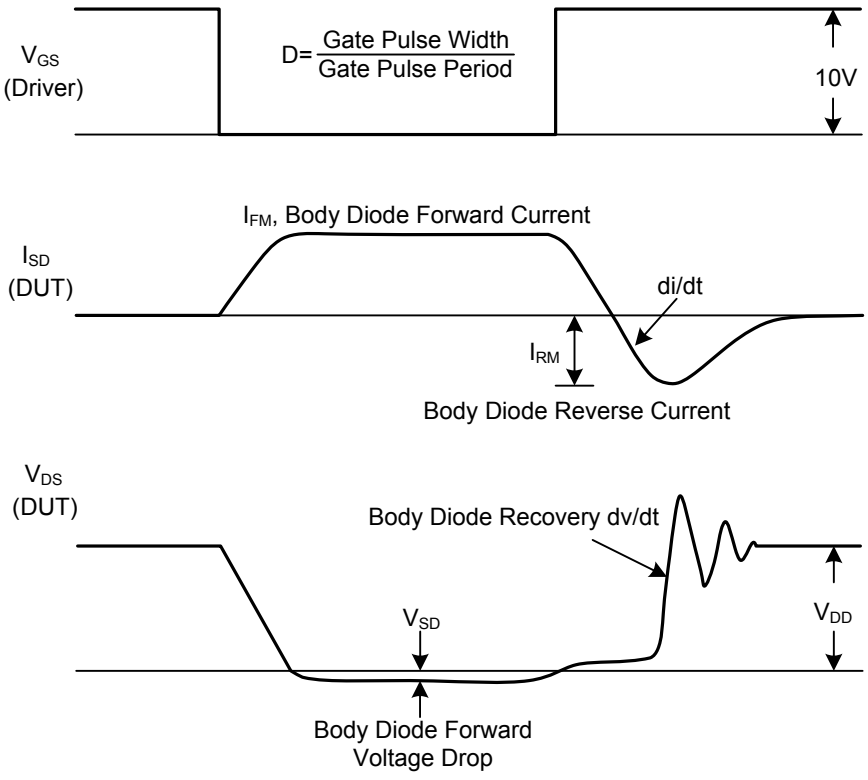
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	120			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=120V, V_{GS}=0V			10	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1.0		3.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=2.5A			140	mΩ
			V_{GS}=4.5V, I_D=1.0A			150	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		578		pF
Output Capacitance		C_{OSS}			42		pF
Reverse Transfer Capacitance		C_{RSS}			30		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=50V, V_{GS}=10V, I_D=1.6A , I_G=1mA (Note 1, 2)		23		nC
Gate to Source Charge		Q_{GS}			2.8		nC
Gate to Drain Charge		Q_{GD}			3.8		nC
Turn-ON Delay Time (Note 1)		$t_{D(ON)}$	V_{DD}=50V, V_{GS}=10V, I_D=1.6A, R_G=25Ω (Note 1, 2)		3.6		ns
Rise Time		t_R			17.3		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			84		ns
Fall-Time		t_F			41		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				5	A
Maximum Body-Diode Pulsed Current (Note 1)		I_{SM}				10	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=5.0A, V_{GS}=0V			1.4	V
Reverse Recovery Time		t_{rr}	I_S=5.0A, V_{GS}=0V		36		ns
Reverse Recovery Charge		Q_{rr}	dI_F/dt=100A/μs (Note 1)		7.5		nC

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

■ TEST CIRCUITS AND WAVEFORMS

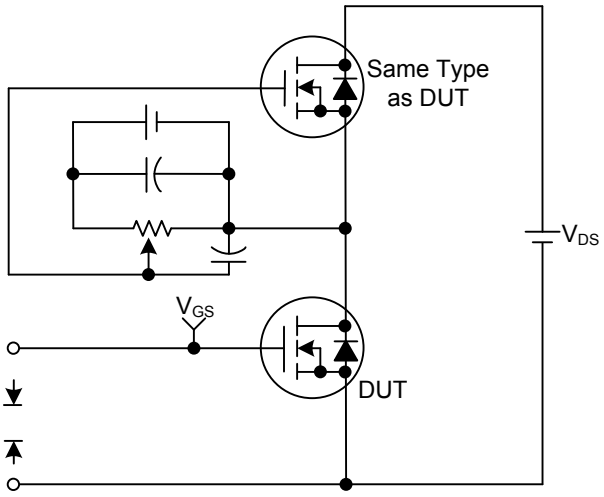


Peak Diode Recovery dv/dt Test Circuit & Waveforms

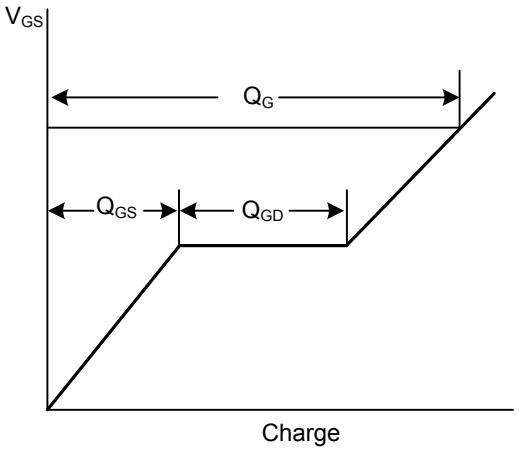


Peak Diode Recovery dv/dt Waveforms

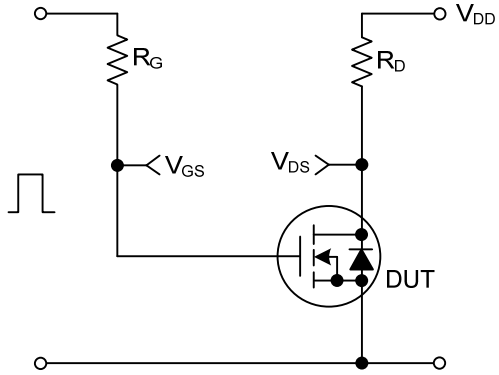
■ TEST CIRCUITS AND WAVEFORMS



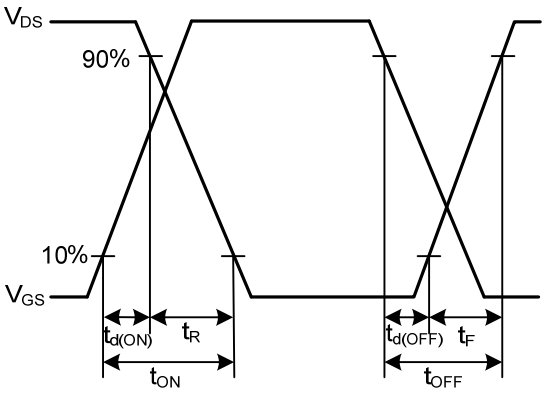
Gate Charge Test Circuit



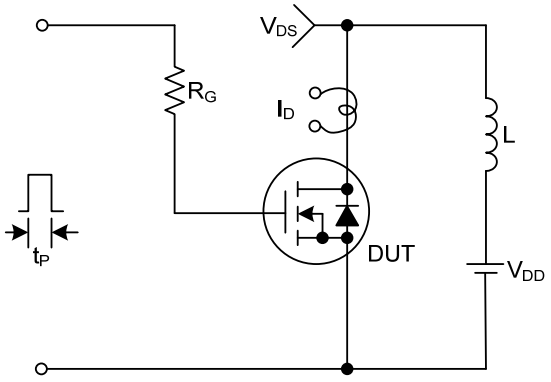
Gate Charge Waveforms



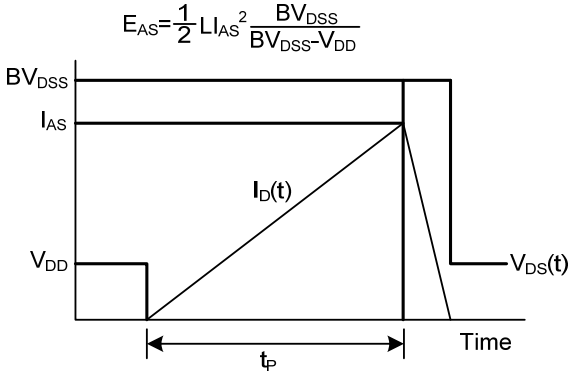
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms