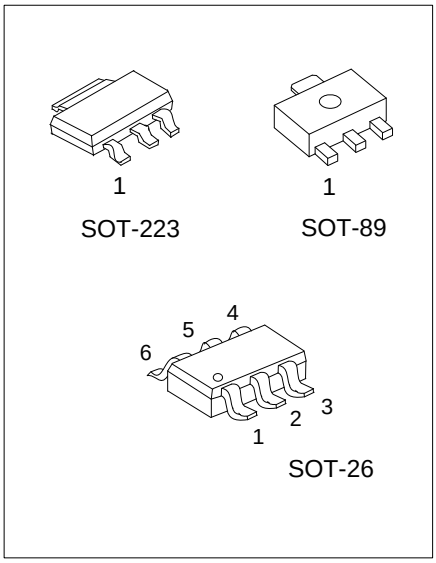
0.5A, 250V N-CHANNEL POWER MOSFET



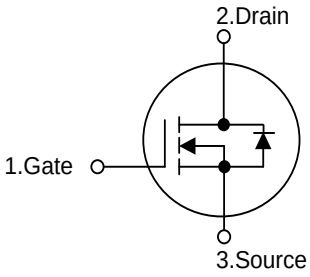
■ DESCRIPTION

The UTC **UF05N25** is a high voltage power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient AC to DC converters and bridge circuits.

■ FEATURES

* $R_{DS(ON)} \leq 3.5\Omega$ @ V_{GS}=10V, I_D=0.25A
* High switching speed
* 100% avalanche tested

■ SYMBOL



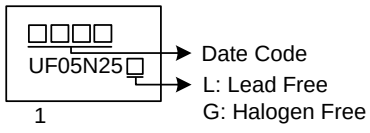
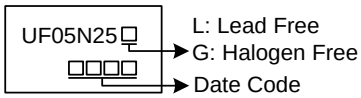
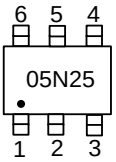
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment						Packing
Lead Free	Halogen-Free		1	2	3	4	5	6	
UF05N25L-AA3-R	UF05N25G-AA3-R	SOT-223	G	D	S				Tape Reel
UF05N25L-AB3-R	UF05N25G-AB3-R	SOT-89	G	D	S	-	-	-	Tape Reel
UF05N25L-AG6-R	UF05N25G-AG6-R	SOT-26	D	D	G	S	D	D	Tape Reel

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

UF05N25G-AA3-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AA3: SOT-223, AB3: SOT-89, AG6: SOT-26 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

SOT-89	SOT-223	SOT-26
		

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	250	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	Continuous	I_D	0.5	A
	Pulsed	I_{DM}	2.0	A
Avalanche Current (Note 2)		I_{AR}	0.75	A
Avalanche Energy		E_{AS}	15.47	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.4	V/ns
Power Dissipation	SOT-223	P_D	2.5	W
	SOT-89		1.6	W
	SOT-26		0.6	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=55mH, I_{AS}=0.75A, V_{DD}=50V, R_G=25 Ω, Starting T_J = 25°C
4. I_{SD} ≤ 0.5A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA (NOTE)

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	50	°C/W
	SOT-89		78	°C/W
	SOT-26		208	°C/W
Junction to Case	SOT-223	θ_{JC}	12.5	°C/W
	SOT-89		15	°C/W
	SOT-26		110	°C/W

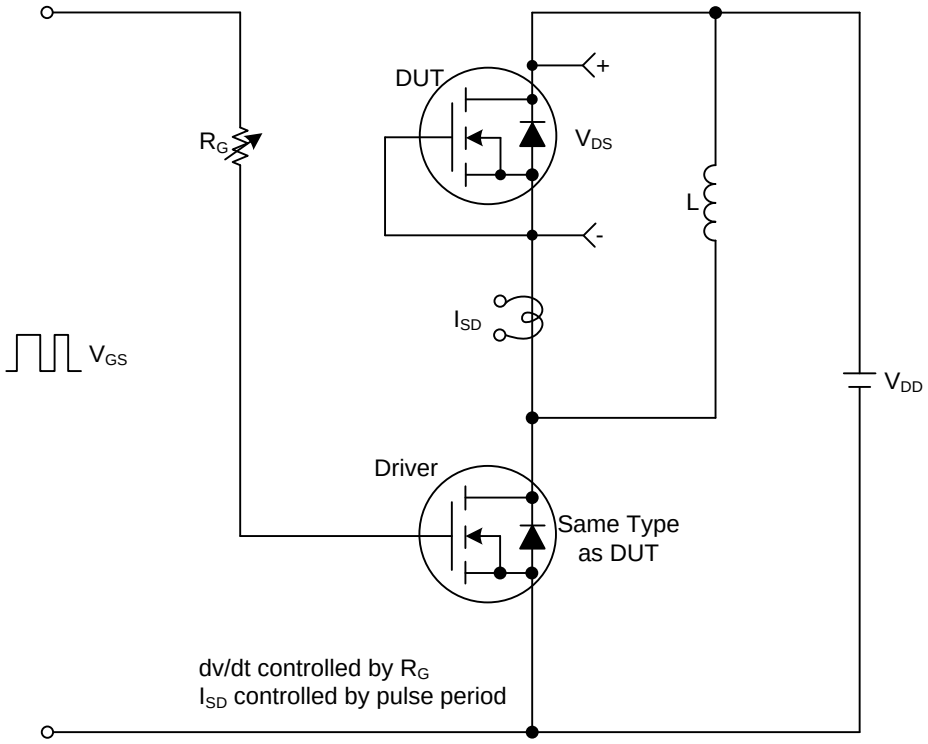
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

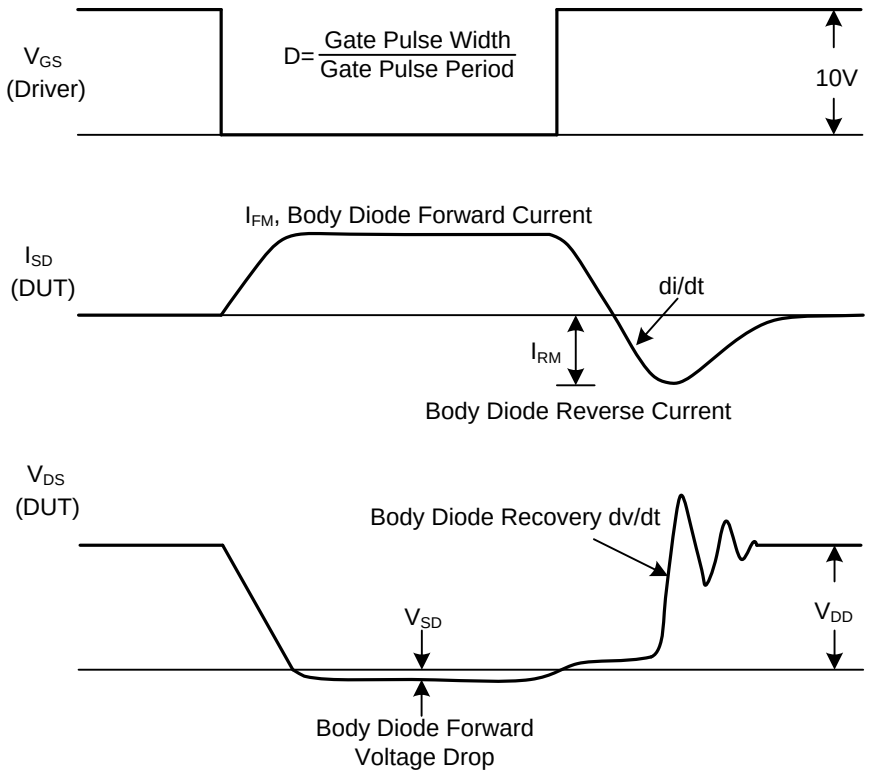
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	250			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=250V			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			10	μA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-10	μA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	I_D=250μA	1.0		3.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=0.25A			3.5	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1MHz		120		pF
Output Capacitance		C_{OSS}			24.3		pF
Reverse Transfer Capacitance		C_{RSS}			10		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q_G	V_{GS}=10V, V_{DS}=50V, I_D=1.3A I_G=100μA (Note 1, 2)		8		nC
Gate to Source Charge		Q_{GS}			0.3		nC
Gate to Drain Charge		Q_{GD}			1.2		nC
Turn-ON Delay Time (Note 1)		$t_{D(ON)}$	V_{GS}=10V, V_{DD}=30V, R_G=25Ω, I_D=0.5A (Note 1, 2)		17		ns
Rise Time		t_R			24		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			76		ns
Fall-Time		t_F			45		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				0.5	A
Maximum Body-Diode Pulsed Current		I_{SM}				2.0	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=0.5A			1.3	V
Body Diode Reverse Recovery Time (Note 1)		t_{rr}	I_S=0.5A, V_{GS}=0V, dI_F/dt = 100A/μs		95		ns
Body Diode Reverse Recovery Charge		Q_{rr}			110		nC

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

■ TEST CIRCUITS AND WAVEFORMS

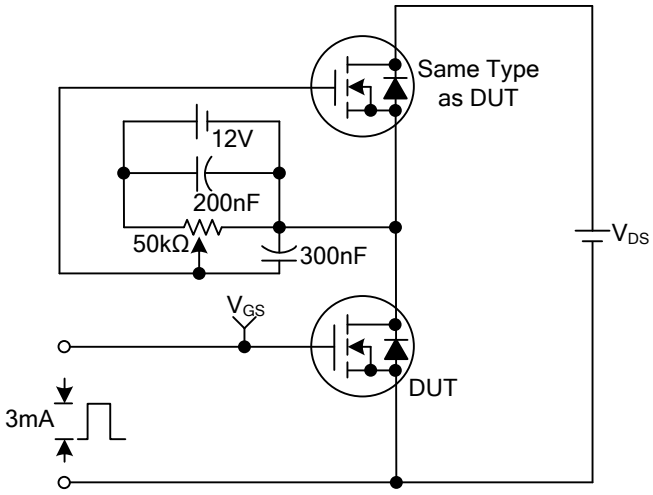


Peak Diode Recovery dv/dt Test Circuit

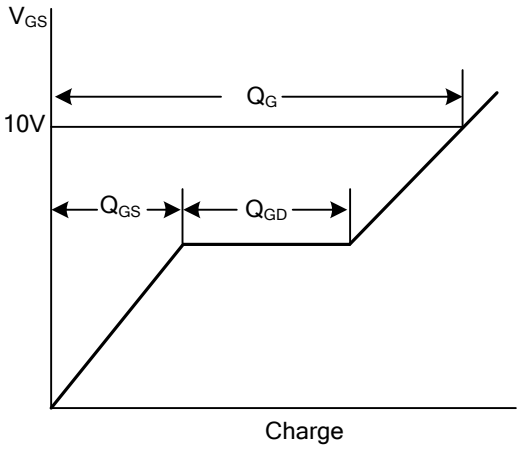


Peak Diode Recovery dv/dt Waveforms

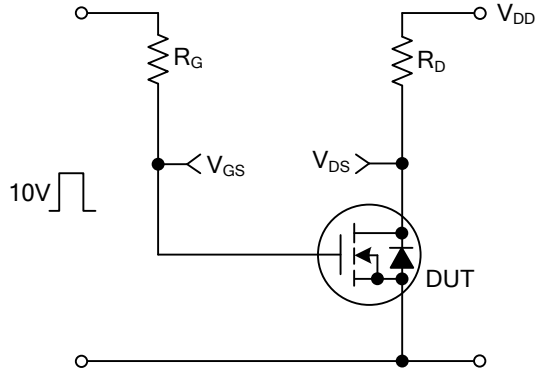
■ TEST CIRCUITS AND WAVEFORMS



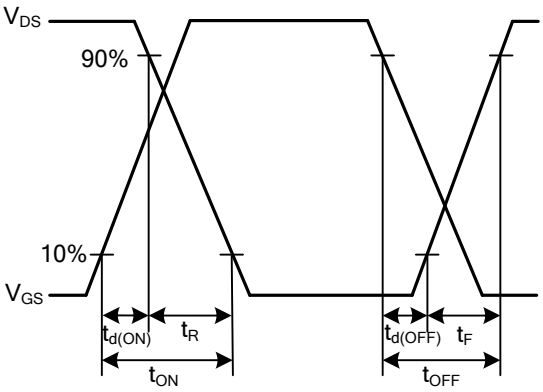
Gate Charge Test Circuit



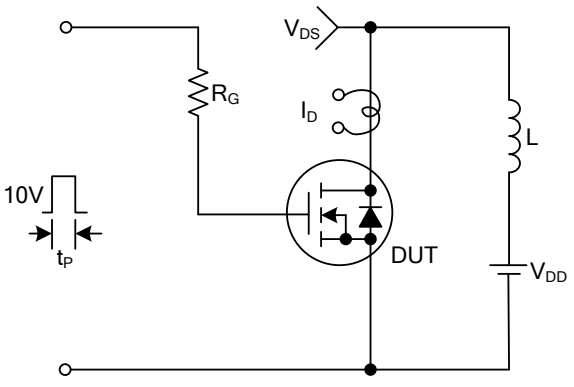
Gate Charge Waveforms



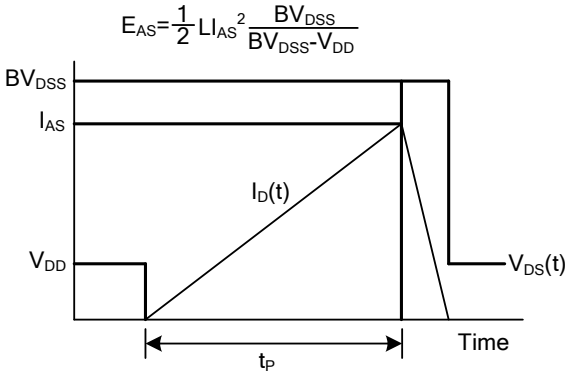
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms