



UT9435Q

Preliminary

Power MOSFET

-30V, -5.3A P-CHANNEL ENHANCEMENT MODE POWER MOSFET

DESCRIPTION

The **UT9435Q** is P-channel enhancement mode Power MOSFET, designed with high density cell with fast switching speed, ultra low on-resistance, and excellent thermal and electrical capabilities.

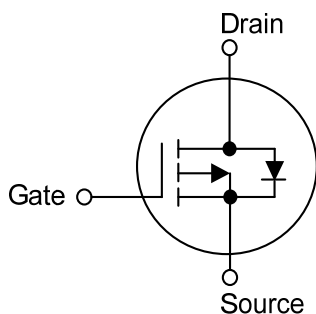
Used in commercial and industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

FEATURES

* $R_{DS(on)} \leq 50 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=4.0\text{A}$

$R_{DS(on)} \leq 90 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=2.0\text{A}$

SYMBOL

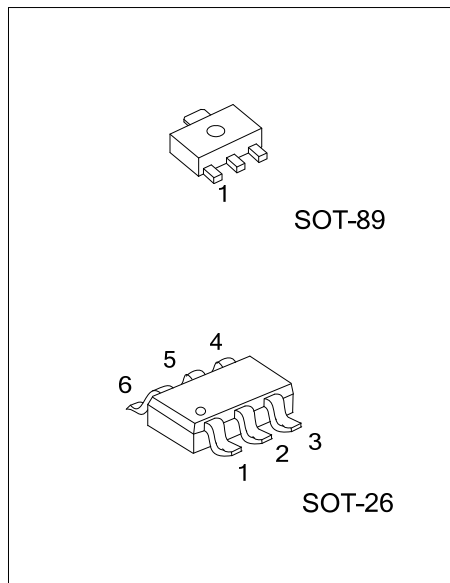


ORDERING INFORMATION

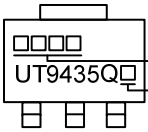
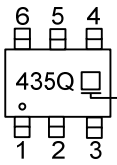
Ordering Number		Package	Pin Assignment						Packing
Lead Free	Halogen Free		1	2	3	4	5	6	
UT9435QL-AB3-R	UT9435QG-AB3-R	SOT-89	G	D	S	-	-	-	Tape Reel
UT9435QL-AG6-R	UT9435QG-AG6-R	SOT-26	D	D	G	S	D	D	Tape Reel

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

UT9435QG-AB3-R		(1)Packing Type	(1) R: Tape Reel
		(2)Package Type	(2) AB3: SOT-89, AG6: SOT-26
		(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free



■ MARKING

SOT-89	SOT-26
 UT9435Q□ □□□□ → Date Code □ → L: Lead Free □ → G: Halogen Free	 435Q□ □ → L: Lead Free □ → G: Halogen Free

■ ABSOLUTE MAXIMUM RATINGS ($T_c=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	-30	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	Continuous	I_D	-5.3	A
	Pulsed (Note 2)	I_{DM}	-20	A
Avalanche Energy	Repetitive (Note 3)	E_{AS}	21	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.3	V/ns
Power Dissipation($T_A=25^{\circ}\text{C}$)	SOT-89	P_D	1.2	W
	SOT-26		0.5	W
Junction Temperature		T_J	+150	$^{\circ}\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

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. $L = 0.1\text{mH}$, $I_{AS} = -20.5\text{A}$, $V_{DD} = -25\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq -5.3\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	MAX	UNIT
Junction-to-Ambient	SOT-89	θ_{JA}	104	$^{\circ}\text{C}/\text{W}$
	SOT-26		240	$^{\circ}\text{C}/\text{W}$
Junction-to-Case	SOT-89	θ_{JC}	89.3	$^{\circ}\text{C}/\text{W}$
	SOT-26		110	$^{\circ}\text{C}/\text{W}$

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

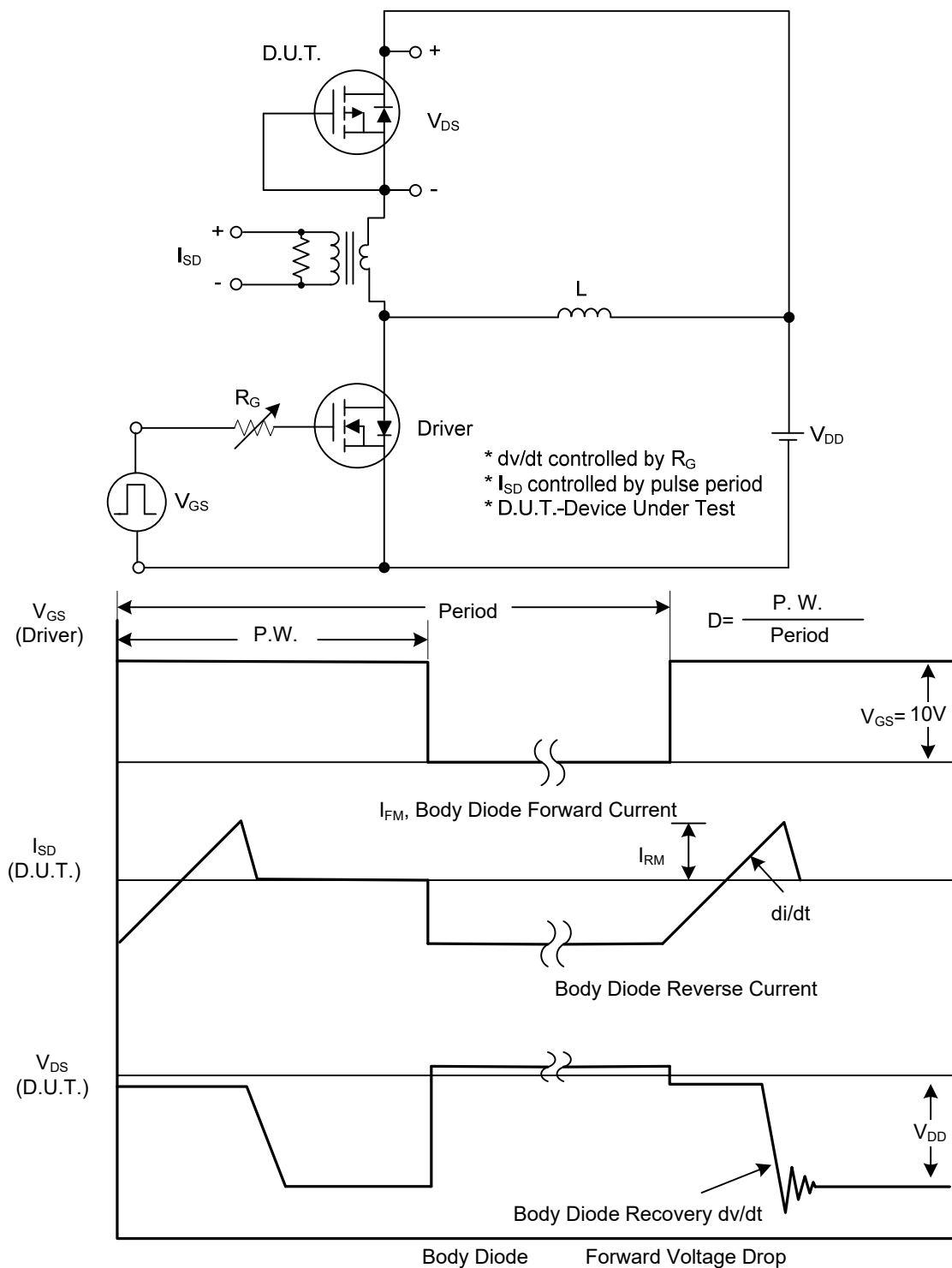
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =-250μA, V _{GS} =0V	-30			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =-30V, V _{GS} =0V			-1	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		-2.5	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =-10V, I _D =-4.0A			50	mΩ
			V _{GS} =-4.5V, I _D =-2.0A			90	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{DS} =-25V, V _{GS} =0V, f=1MHz		676		pF
Output Capacitance		C _{OSS}			96		pF
Reverse Transfer Capacitance		C _{RSS}			76		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =-24V, V _{GS} =-10V, I _D =-4.0A		18		nC
Gate to Source Charge		Q _{GS}			3		nC
Gate to Drain Charge		Q _{GD}			5		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =-15 V _{GS} =-10V, I _D =-4.0A, R _G =3Ω (Note 1, 2)		5		ns
Rise Time		t _R			15		ns
Turn-OFF Delay Time		t _{D(OFF)}			26		ns
Fall-Time		t _F			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				-5.3	A
Maximum Body-Diode Pulsed Current (Note 1)		I _{SM}				-20	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =-1.0A, V _{GS} =0V (Note 2)			-1.3	V
Body Diode Reverse Recovery Time (Note 1)		t _{rr}	I _S =-4.0A, V _{GS} =0V,		111		ns
Body Diode Reverse Recovery Charge		Q _{rr}	dI _F /dt=100A/μs		127		nC

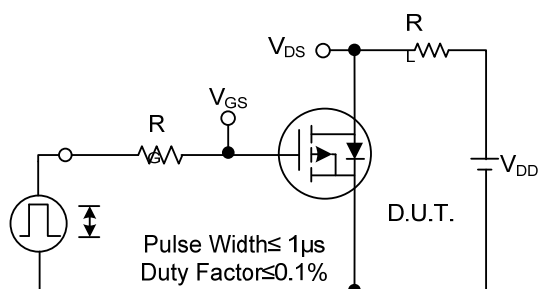
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating ambient temperature.

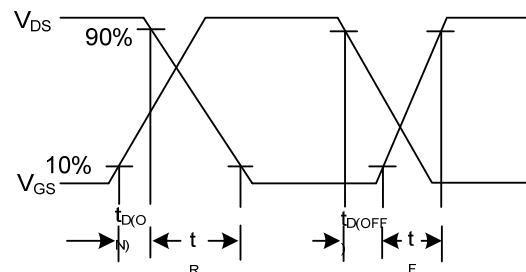
■ TEST CIRCUITS AND WAVEFORMS



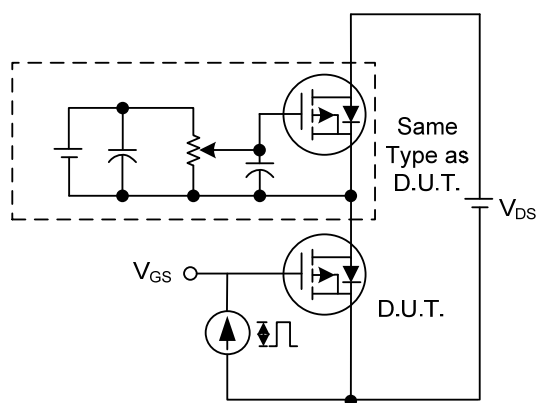
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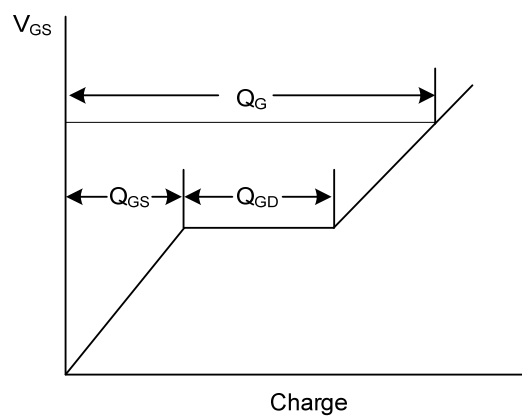
Switching Test Circuit



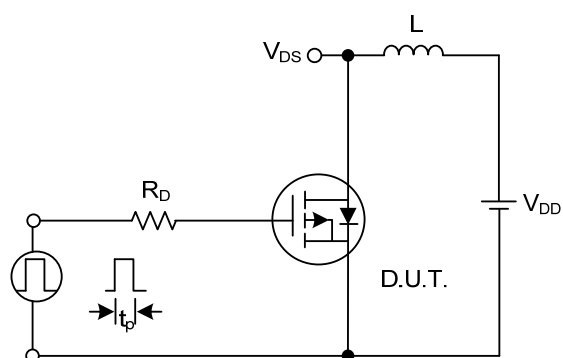
Switching Waveforms



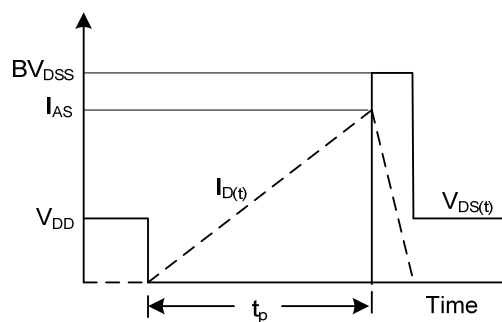
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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