



## UT3N03V

Preliminary

Power MOSFET

### 3.0A, 30V N-CHANNEL POWER MOSFET

#### DESCRIPTION

The UTC **UT3N03V** is a N-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed and a minimum onstate resistance, and it can also withstand high energy in the avalanche.

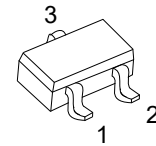
This UTC **UT3N03V** is suitable for motor drivers, high-side switch and 12V board net, etc.

#### FEATURES

\*  $R_{DS(ON)} \leq 75 \text{ m}\Omega$  @  $V_{GS}=4.5\text{V}$ ,  $I_D=3.0\text{A}$

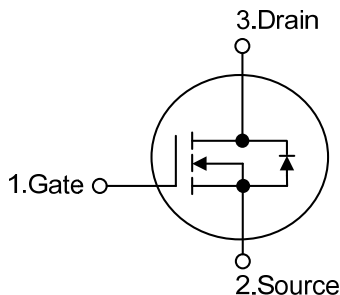
$R_{DS(ON)} \leq 109 \text{ m}\Omega$  @  $V_{GS}=2.5\text{V}$ ,  $I_D=1.5\text{A}$

\* Low on – resistance



SOT-23  
(EIAJ SC-59)

#### SYMBOL



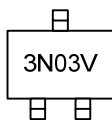
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT3N03VL-AE3-R	UT3N03VG-AE3-R	SOT23	G	S	D	Tape Reel

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

<b>UT3N03VG-AE3-R</b>		
(1)Packing Type	(1) R: Tape Reel	
(2)Package Type	(2) AE3: SOT-23	
(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free	

#### MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		$V_{DS}$	30	V
Gate-Source Voltage		$V_{GS}$	$\pm 12$	V
Continuous Drain Current	Continuous	$I_D$	3	A
	Pulsed	$I_{DM}$	6	A
Single Pulsed Avalanche Energy (Note 3)		$E_{AS}$	0.5	mJ
Peak Diode Recovery $dv/dt$ (Note 4)		$dv/dt$	1.4	V/ns
Power Dissipation		$P_D$	0.3	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.  $L = 0.1\text{mH}$ ,  $I_{AS} = 3.2\text{A}$ ,  $V_{DD} = 50\text{V}$ ,  $R_G = 25\Omega$ , Starting  $T_J = 25^{\circ}\text{C}$

4.  $I_{SD} \leq 3.0\text{A}$ ,  $di/dt \leq 200\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DS}$ , Starting  $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	$\theta_{JA}$	416	$^{\circ}\text{C}/\text{W}$

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

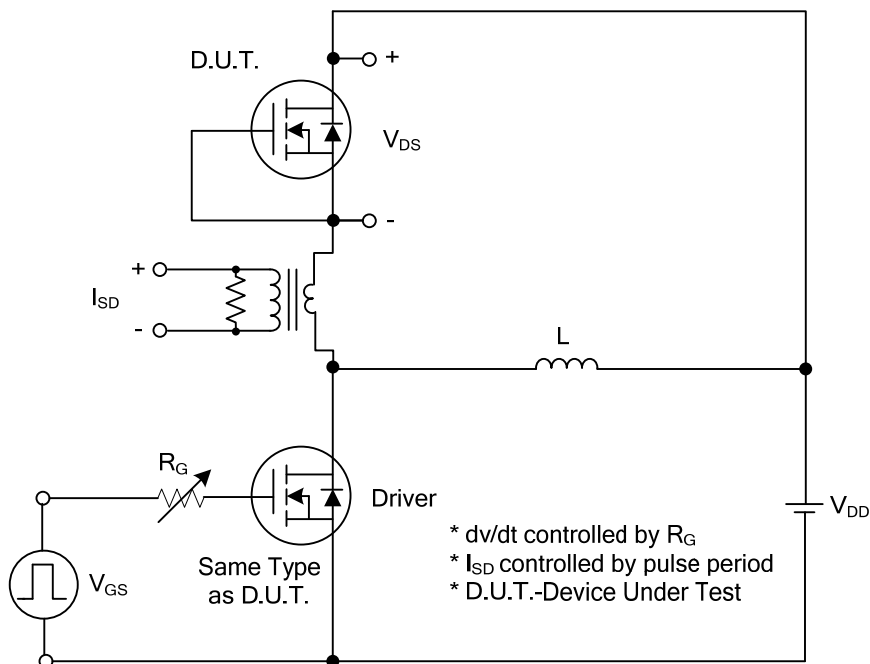
■ ELECTRICAL CHARACTERISTICS ( $T_J=25^{\circ}\text{C}$ , unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	30			V
Drain-Source Leakage Current		I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V			1	μA
Gate-Source Leakage Current	Forward	I <sub>GSS</sub>	V <sub>GS</sub> =+12V, V <sub>DS</sub> =0V			+100	nA
	Reverse		V <sub>GS</sub> =-12V, V <sub>DS</sub> =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.5		1.5	V
Static Drain-Source On-State Resistance		R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =3.0A			75	mΩ
			V <sub>GS</sub> =2.5V, I <sub>D</sub> =1.5A			109	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, f=1.0MHz		153		pF
Output Capacitance		C <sub>OSS</sub>			26		pF
Reverse Transfer Capacitance		C <sub>RSS</sub>			20		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q <sub>G</sub>	V <sub>DS</sub> =24V, V <sub>GS</sub> =10V, I <sub>D</sub> =3.0A (Note 1, 2)		11		nC
Gate to Source Charge		Q <sub>GS</sub>			1		nC
Gate to Drain Charge		Q <sub>GD</sub>			2		nC
Turn-ON Delay Time		t <sub>D(ON)</sub>	V <sub>DD</sub> =15V, V <sub>GS</sub> =10V, I <sub>D</sub> =3.0A, R <sub>G</sub> =3Ω (Note 1, 2)		1		ns
Rise Time		t <sub>R</sub>			15		ns
Turn-OFF Delay Time		t <sub>D(OFF)</sub>			15		ns
Fall-Time		t <sub>F</sub>			20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I <sub>S</sub>				3	A
Maximum Body-Diode Pulsed Current		I <sub>SM</sub>				6	A
Drain-Source Diode Forward Voltage		V <sub>SD</sub>	I <sub>S</sub> =3.0A, V <sub>GS</sub> =0V			1.4	V
Body Diode Reverse Recovery Time		t <sub>rr</sub>	I <sub>S</sub> =3.0A, V <sub>GS</sub> =0V,		76		ns
Reverse Recovery Charge		Q <sub>rr</sub>	dI <sub>F</sub> /dt=100A/μs (Note 1)		58		nC

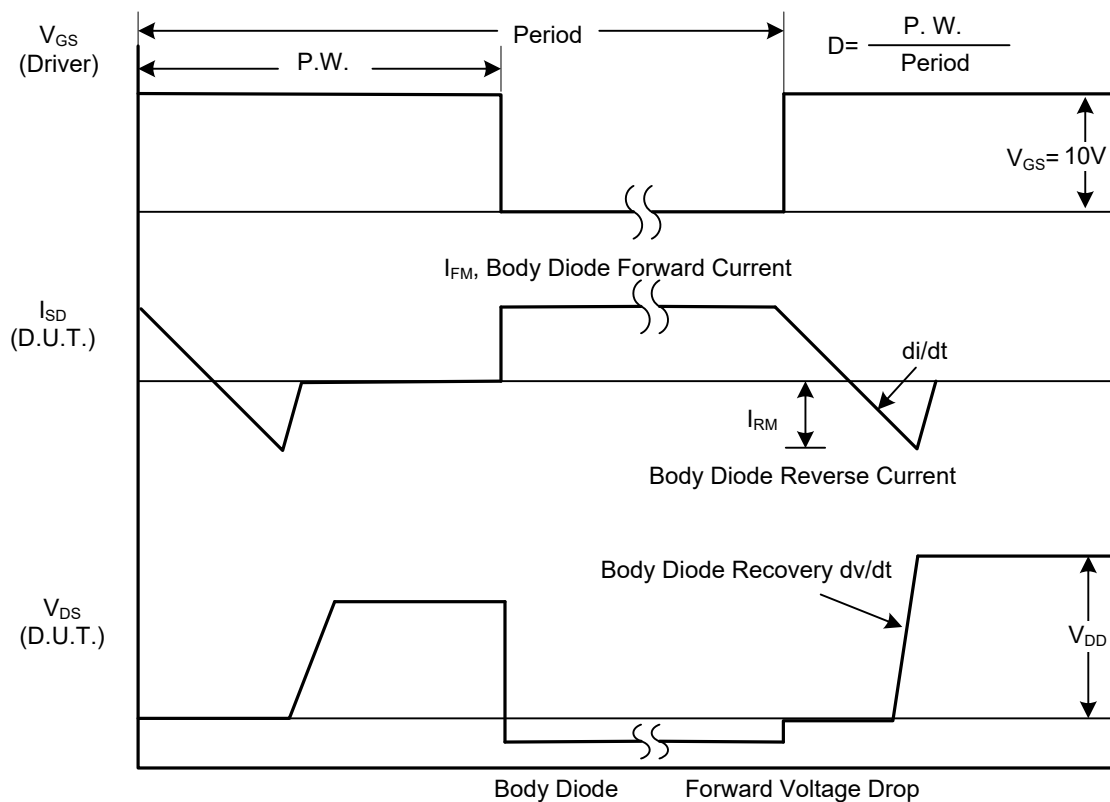
Notes: 1. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$ .

2. Essentially independent of operating temperature.

### ■ TEST CIRCUITS AND WAVEFORMS

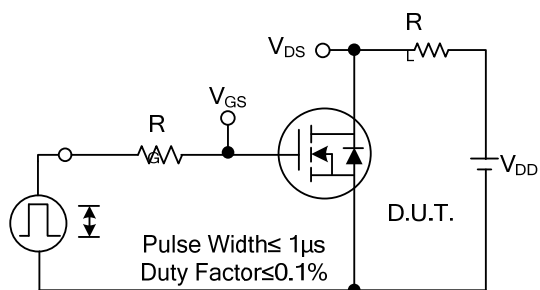


**Peak Diode Recovery dv/dt Test Circuit**

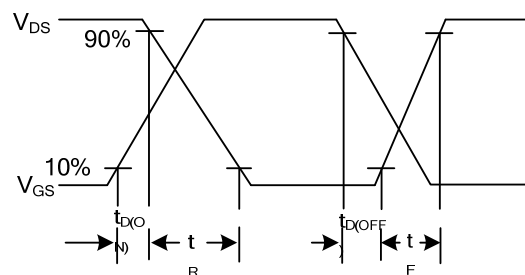


**Peak Diode Recovery dv/dt Waveforms**

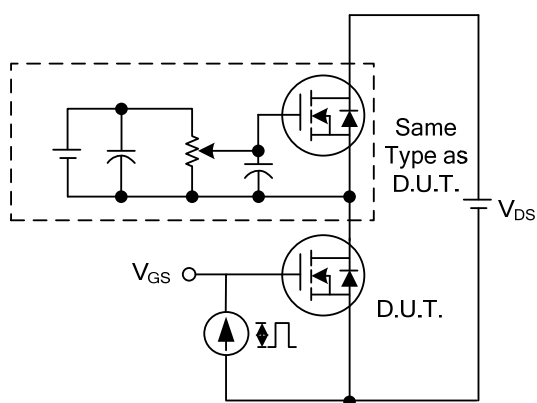
### ■ TEST CIRCUITS AND WAVEFORMS



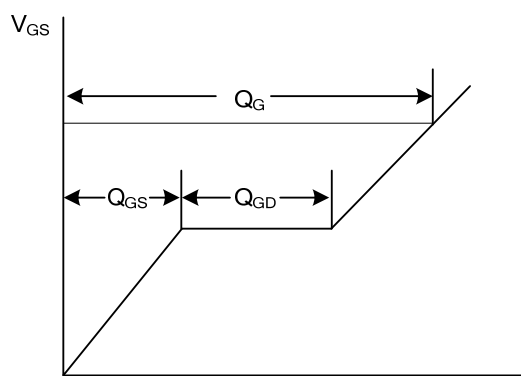
Switching Test Circuit



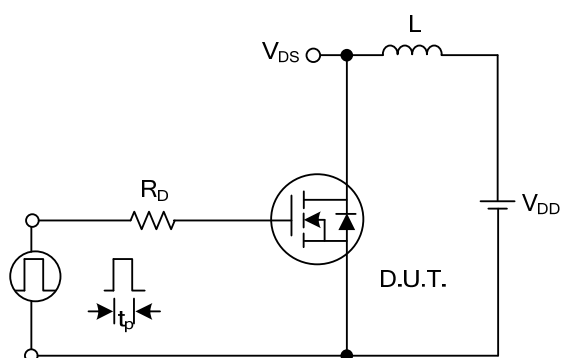
Switching Waveforms



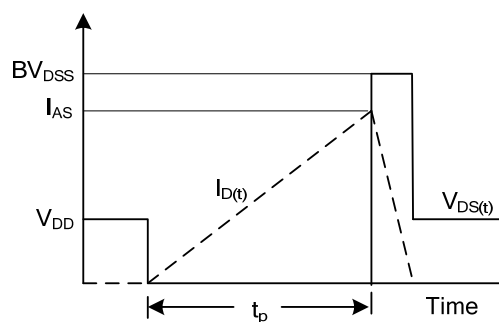
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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