



UT50N03V

Preliminary

Power MOSFET

50A, 30V N-CHANNEL ENHANCEMENT MODE POWER MOSFET TRANSISTOR

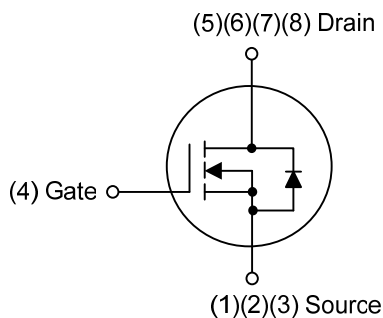
DESCRIPTION

The UTC **UT50N03V** is an N-channel enhancement power MOSFET using UTC's advanced technology in the various components of gate charge and capacitance have been optimized to reduce switching losses. Low gate resistance and very low Miller charge enable excellent performance with both adaptive and fixed dead time gate drive circuits. Very low $R_{DS(ON)}$ has been maintained to provide a sub logic-level device, designed to minimize losses in power conversion applications.

FEATURES

- * $R_{DS(ON)} \leq 4.5 \text{ m}\Omega$ @ $V_{GS}=10\text{V}$, $I_D=20\text{A}$
 $R_{DS(ON)} \leq 5.3 \text{ m}\Omega$ @ $V_{GS}=4.5\text{V}$, $I_D=15\text{A}$
 $R_{DS(ON)} \leq 8 \text{ m}\Omega$ @ $V_{GS}=2.5\text{V}$, $I_D=12\text{A}$
- * High Switching Speed
- * High Current Capacity

SYMBOL

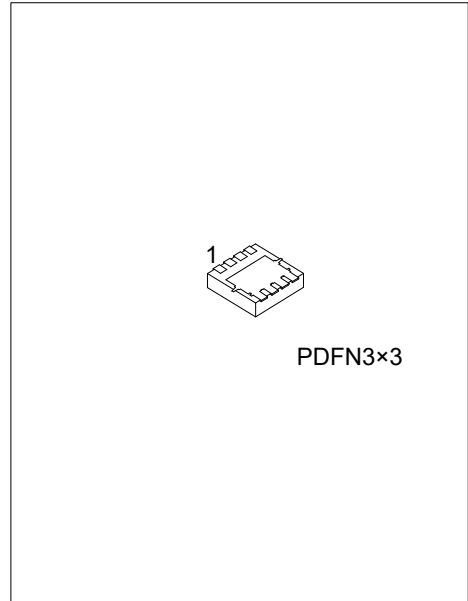


ORDERING INFORMATION

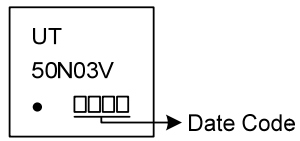
Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT50N03VL-P3030-R	UT50N03VG-P3030-R	PDFN3×3	S	S	S	G	D	D	D	D	Tape Reel

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

UT50N03VG-P3030-R		(1)Packing Type	(1) R: Tape Reel
		(2)Package Type	(2) P3030: PDFN3×3
		(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}	± 12	V
Drain Current	Continuous	I_D	50	A
	Pulsed	I_{DM}	100	A
Avalanche Energy (Note 3)	Single Pulsed	E_{AS}	51	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	1.5	V/ns
Power Dissipation		P_D	34	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. $L=0.1\text{mH}$, $I_{AS}=32\text{A}$, $V_{DD}=20\text{V}$, $R_G=25\Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq 30\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DS}$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	75	$^{\circ}\text{C}/\text{W}$
Junction to Case	θ_{JC}	3.67	$^{\circ}\text{C}/\text{W}$

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

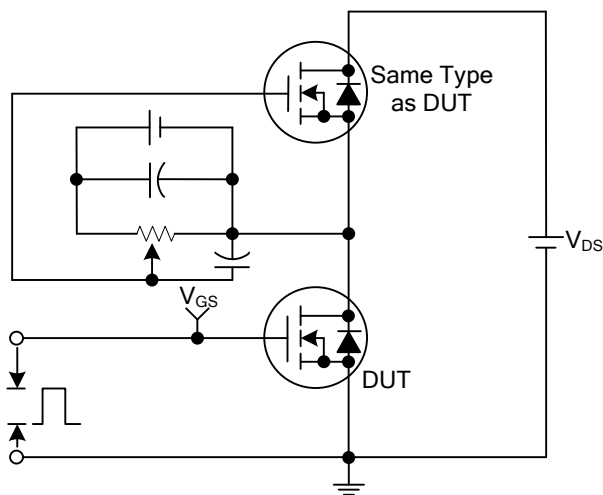
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

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} =+12V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-12V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	0.5		1.5	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =20A			4.5	mΩ
			V _{GS} =4.5V, I _D =15A			5.3	mΩ
			V _{GS} =2.5V, I _D =12A			8.0	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		3330		pF
Output Capacitance		C _{OSS}			330		pF
Reverse Transfer Capacitance		C _{RSS}			300		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =24V, V _{GS} =4.5V, I _D =50A (Note1, 2)		65		nC
Gate to Source Charge		Q _{GS}			8.5		nC
Gate to Drain Charge		Q _{GD}			24		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DS} =15V, V _{GS} =10V, I _D =50A, R _G =3.3Ω (Note1, 2)		9		ns
Rise Time		t _R			20		ns
Turn-OFF Delay Time		t _{D(OFF)}			80		ns
Fall-Time		t _F			28		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				50	A
Maximum Body-Diode Pulsed Current		I _{SM}				100	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =50A, V _{GS} =0V			1.5	V
Reverse Recovery Time (Note 1)		t _{rr}	I _S =30A, V _{GS} =0V,		90		ns
Reverse Recovery Charge		Q _{rr}	dI/dt=100A/μs		80		nC

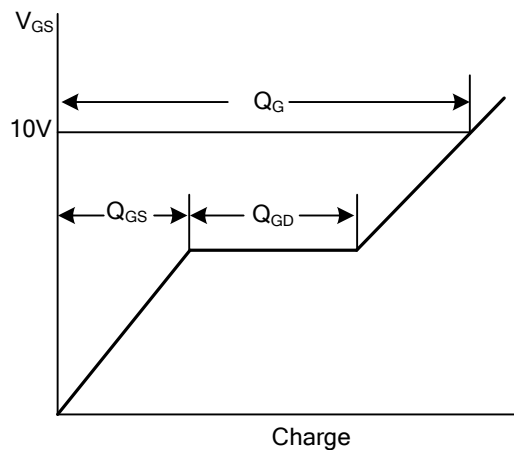
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

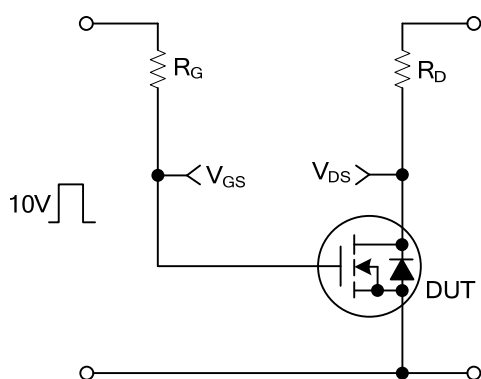
■ TEST CIRCUITS AND WAVEFORMS



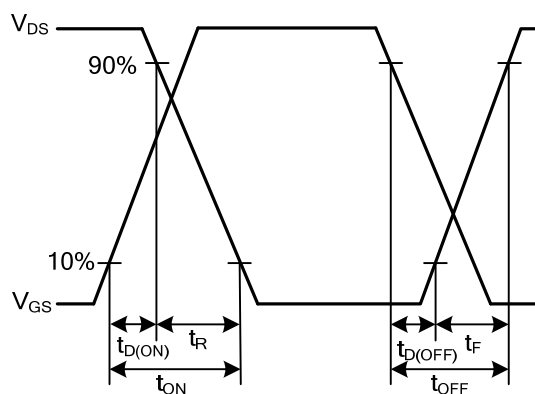
Gate Charge Test Circuit



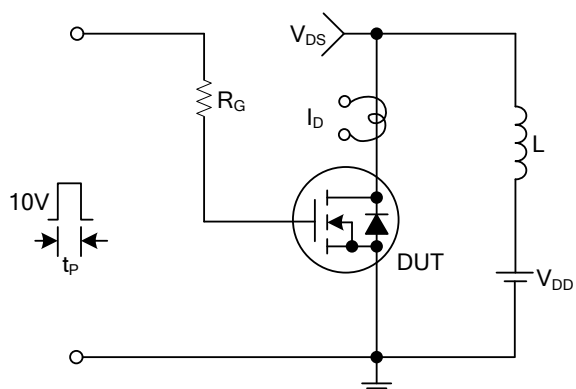
Gate Charge Waveforms



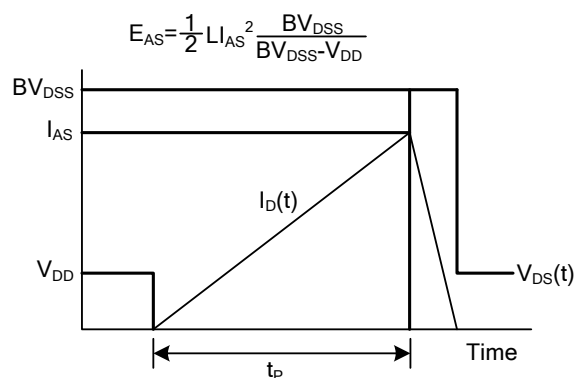
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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