



2N65-TC2

Power MOSFET

2A, 650V N-CHANNEL POWER MOSFET

DESCRIPTION

The UTC **2N65-TC2** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with planar stripe and DMOS technology. This technology allows a minimum on-state resistance and superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

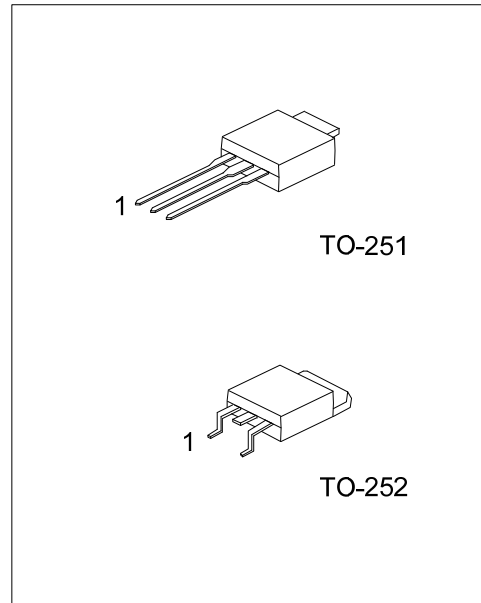
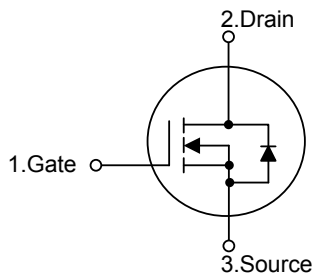
The UTC **2N65-TC2** is generally applied in high efficiency switch mode power supplies.

FEATURES

* $R_{DS(ON)} < 6.0 \Omega @ V_{GS} = 10V, I_D = 1.0A$

* High Switching Speed

SYMBOL



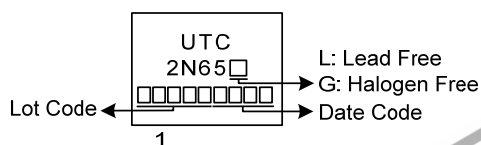
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
2N65L-TM3-T	2N65G-TM3-T	TO-251	G	D	S	Tube
2N65L-TN3-R	2N65G-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>2N65G-TM3-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TM3: TO-251, TN3: TO-252</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	650	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous	I_D	2	A
	Pulsed (Note 2)	I_{DM}	4	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	30	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	5	V/ns
Power Dissipation		P_D	44	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. $L = 10\text{mH}$, $I_{AS} = 2.5\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$ Starting $T_J = 25^\circ\text{C}$
 4. $I_{SD} \leq 2.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

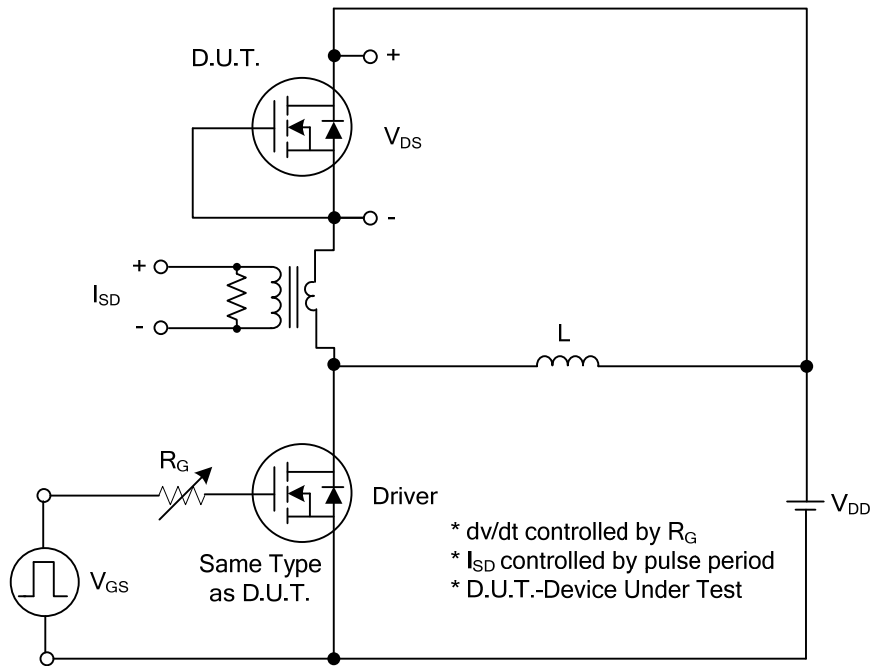
PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ_{JA}	110	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	2.87	$^\circ\text{C}/\text{W}$

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

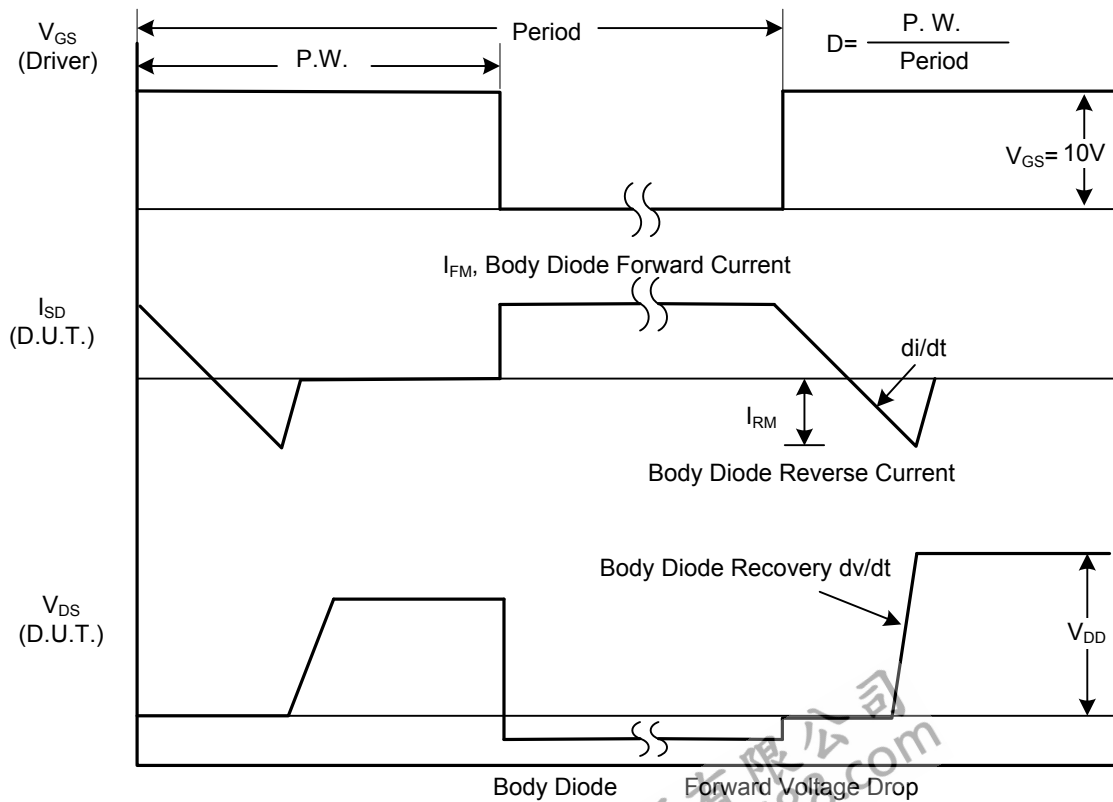
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	$V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$	650			V
Drain-Source Leakage Current		I_{DSS}	$V_{DS}=650\text{V}$, $V_{GS}=0\text{V}$			1	μA
Gate-Source Leakage Current	Forward	I_{GSS}	$V_{GS}=30\text{V}$, $V_{DS}=0\text{V}$			100	nA
	Reverse		$V_{GS}=-30\text{V}$, $V_{DS}=0\text{V}$			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	2.0		4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=1.0\text{A}$			6.0	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$		247		pF
Output Capacitance		C_{OSS}			32		pF
Reverse Transfer Capacitance		C_{RSS}			2.2		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge (Note 1)		Q_G	$V_{DS}=150\text{V}$, $V_{GS}=10\text{V}$, $I_D=1.5\text{A}$ $I_G=3\text{mA}$ (Note 1, 2)		8.6		nC
Gate-source Charge		Q_{GS}			3.3		nC
Gate-drain Charge		Q_{GD}			2.7		nC
Turn-on Delay Time (Note 1)		$t_{D(ON)}$	$V_{DS}=325\text{V}$, $V_{GS}=10\text{V}$, $I_D=2.0\text{A}$, $R_G=25\ \Omega$ (Note 1, 2)		6		ns
Rise Time		t_R			17		ns
Turn-off Delay Time		$t_{D(OFF)}$			20		ns
Fall-Time		t_F			23		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				2	A
Maximum Body-Diode Pulsed Current		I_{SM}				8	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	$V_{GS}=0\text{V}$, $I_S=2.0\text{A}$			1.4	V
Reverse Recovery Time (Note 1)		t_{rr}	$V_{GS}=0\text{V}$, $I_S=2.0\text{A}$		215		ns
Reverse Recovery Charge		Q_{rr}	$di/dt=100\text{A}/\mu\text{s}$ (Note1)		1.1		μC

- 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

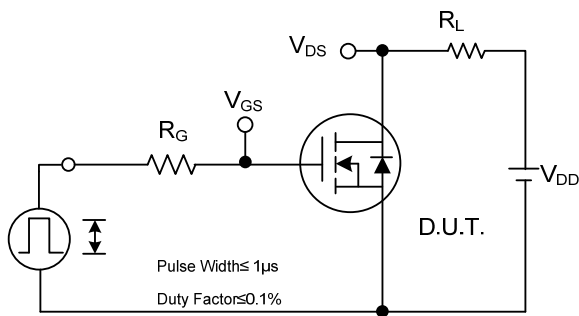


Peak Diode Recovery dv/dt Test Circuit

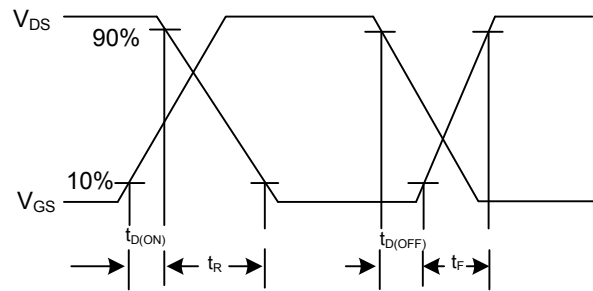


Peak Diode Recovery dv/dt Waveforms

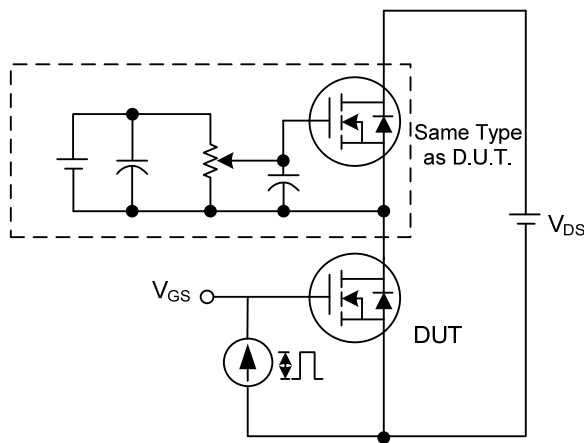
TEST CIRCUITS AND WAVEFORMS



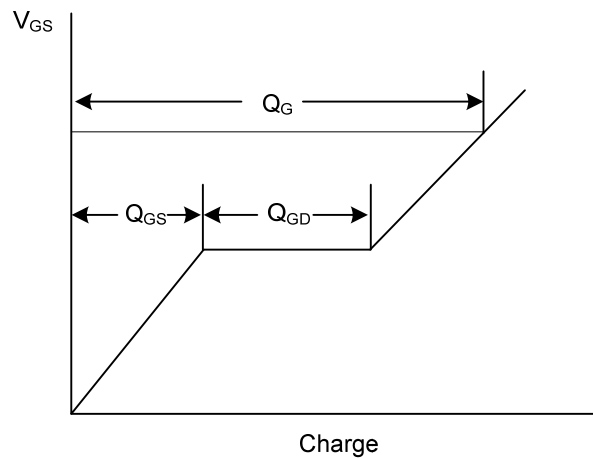
Switching Test Circuit



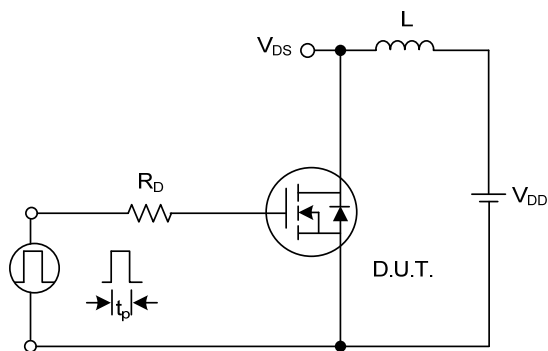
Switching Waveforms



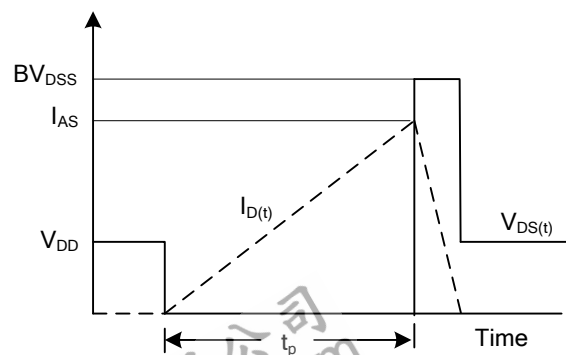
Gate Charge Test Circuit



Gate Charge Waveform

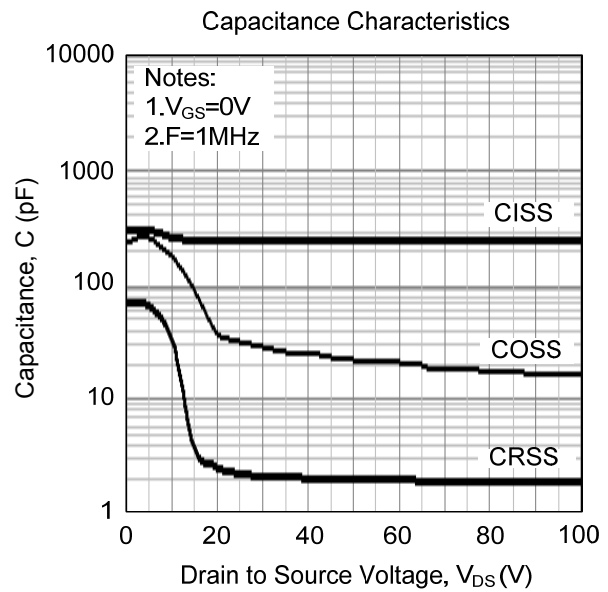
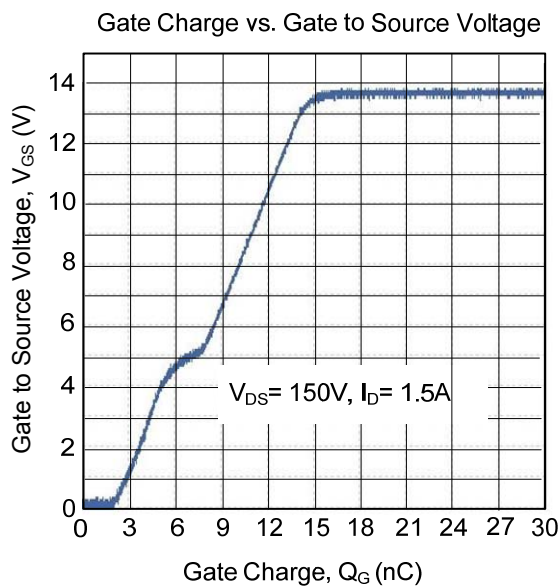


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



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