



2NM65-FDQ

Power MOSFET

2A, 650V N-CHANNEL SUPER-JUNCTION MOSFET

DESCRIPTION

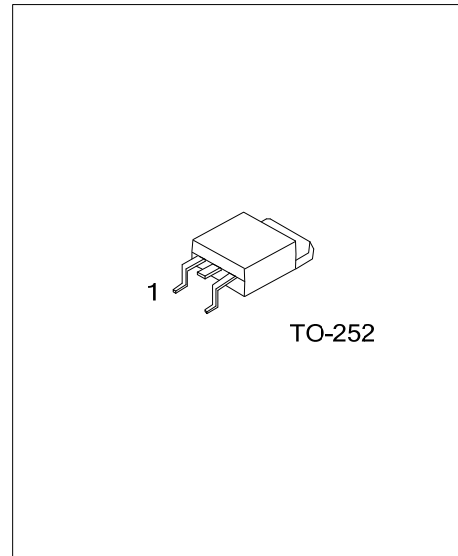
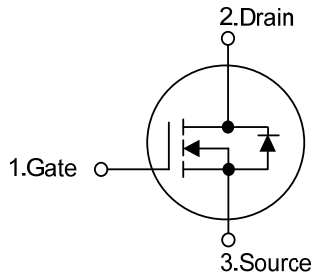
The UTC **2NM65-FDQ** is a Super Junction MOSFET Structure. It uses UTC advanced planar stripe, DMOS technology to provide customers perfect switching performance, minimal on-state resistance.

The UTC **2NM65-FDQ** is universally applied in electronic lamp ballasts based on half bridge topology, high efficiency switched mode power supplies, active power factor correction, etc.

FEATURES

- * $R_{DS(ON)} < 3.0 \Omega @ V_{GS} = 10V, I_D = 1.0A$
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

SYMBOL



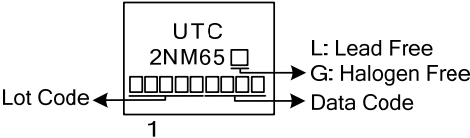
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
2NM65L-TN3-R	2NM65G-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>2NM65G-TN3-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) 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}	6	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	72	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	8	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. $L=144\text{mH}$, $I_{AS}=1.0\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\ \Omega$, 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

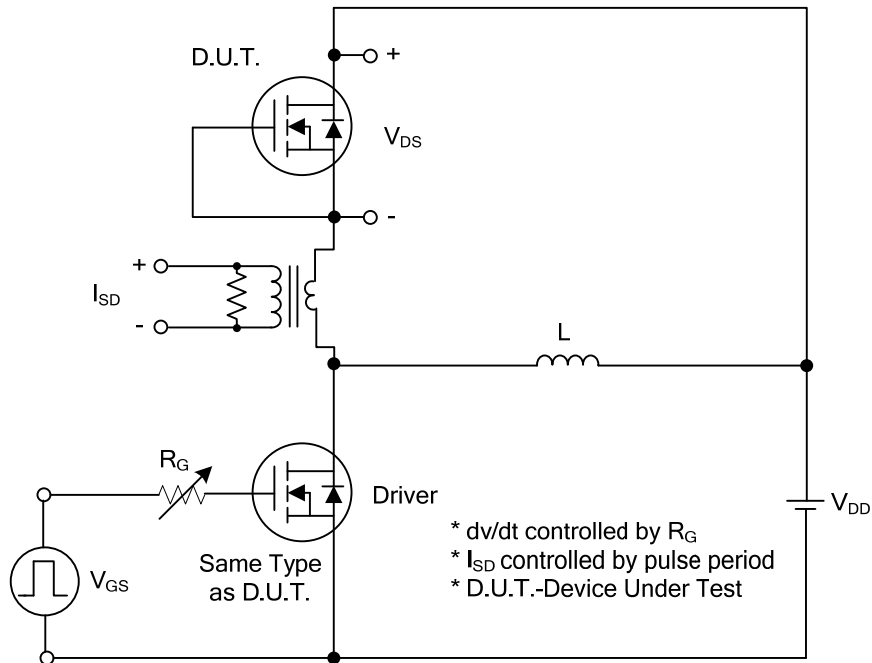
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	100	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	2.8	$^\circ\text{C}/\text{W}$

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

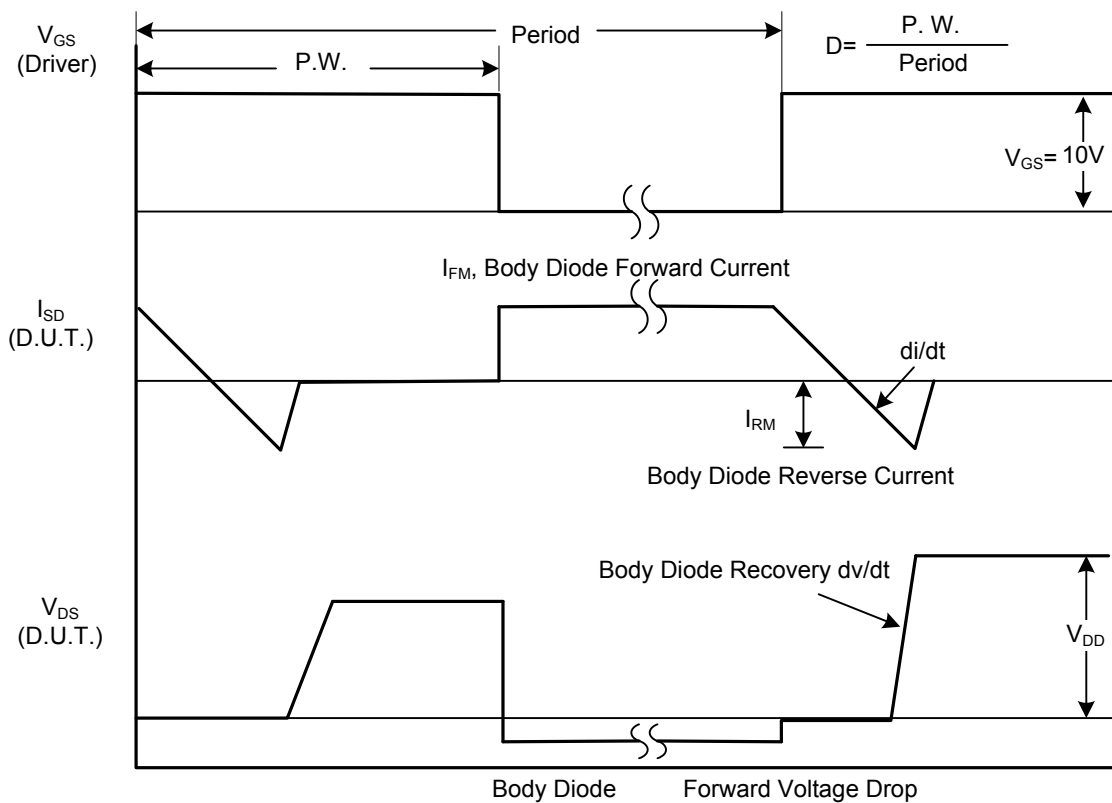
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0\text{V}$, $I_D = 250\mu\text{A}$	650			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 650\text{V}$, $V_{GS} = 0\text{V}$			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}			100	nA
	Reverse				$V_{GS} = -30\text{V}$, $V_{DS} = 0\text{V}$	-100
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	2.5		4.5	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS} = 10\text{V}$, $I_D = 1.0\text{A}$			3.0	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$		130		pF
Output Capacitance	C_{OSS}			110		pF
Reverse Transfer Capacitance	C_{RSS}			10		pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=300\text{V}$, $V_{GS}=10\text{V}$, $I_D = 2.0\text{A}$, $R_G = 25\Omega$ (Note 1, 2)		1.2		ns
Turn-On Rise Time	t_R			8.4		ns
Turn-Off Delay Time	$t_{D(OFF)}$			14		ns
Turn-Off Fall Time	t_F			20		ns
DRAIN-SOURCE DIODE CHARACTERISTICS						
Continuous Drain-Source Current	I_S				2.0	A
Maximum Body-Diode Pulsed Current	I_{SM}				6.0	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=2.0\text{A}$, $V_{GS}=0\text{V}$			1.4	V
Body Diode Reverse Recovery Time	t_{rr}	$I_S=2.0\text{A}$, $V_{GS}=0\text{V}$		110		nS
Body Diode Reverse Recovery Charge	Q_{rr}	$di/dt=100\text{A}/\mu\text{s}$		0.4		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

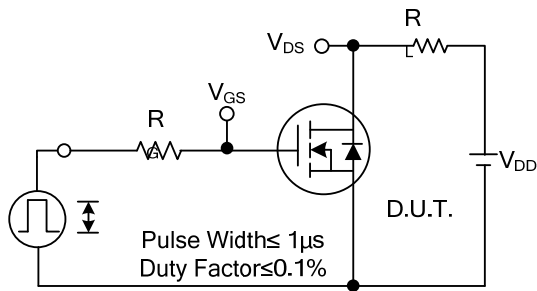


Peak Diode Recovery dv/dt Test Circuit

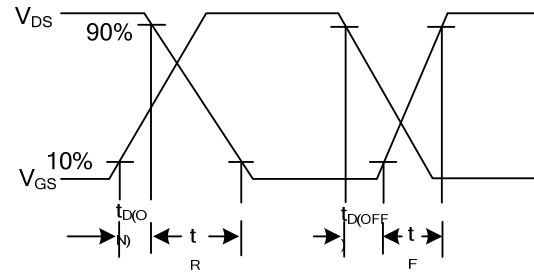


Peak Diode Recovery dv/dt Waveforms

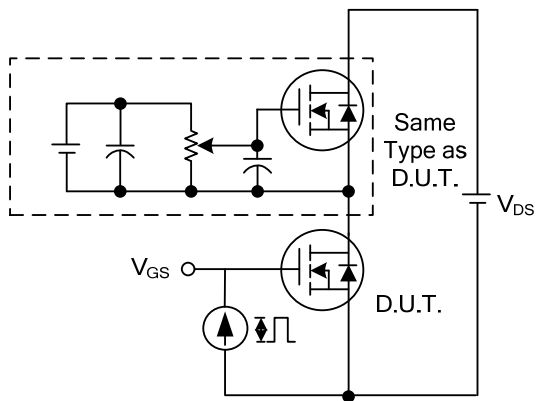
TEST CIRCUITS AND WAVEFORMS



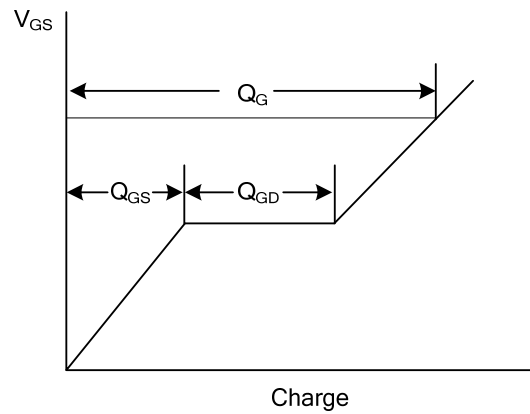
Switching Test Circuit



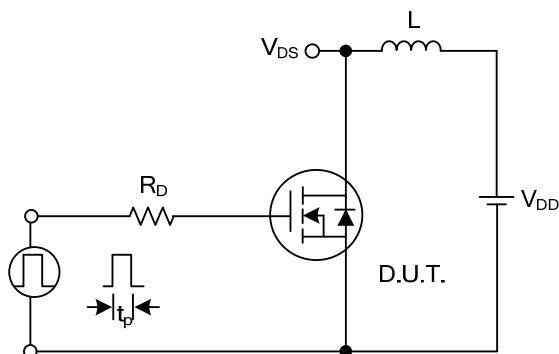
Switching Waveforms



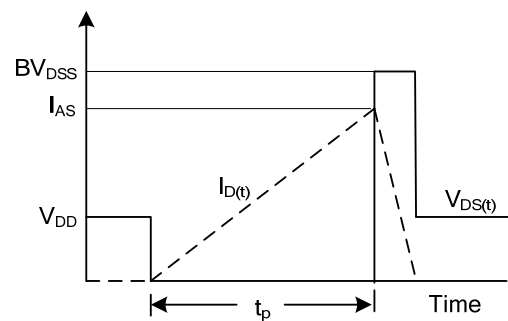
Gate Charge Test Circuit



Gate Charge Waveform

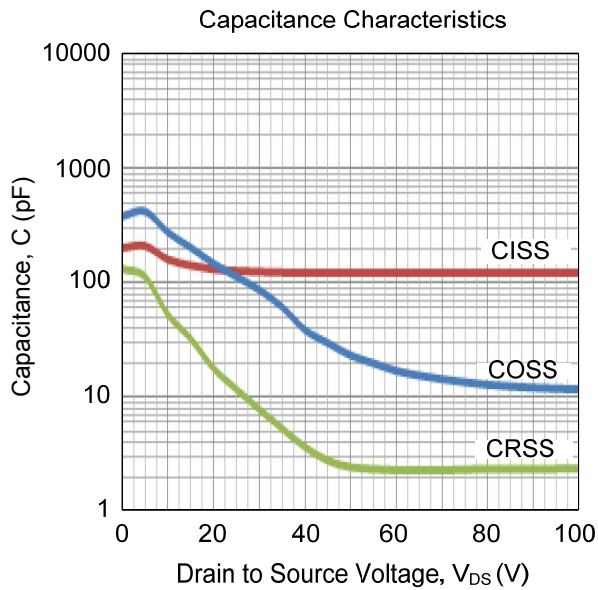


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



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