

UTC UNISONIC TECHNOLOGIES CO., LTD

3NM65

Preliminary

3A, 650V N-CHANNEL SUPER-JUNCTION MOSFET

DESCRIPTION

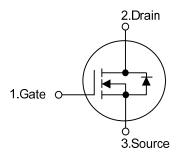
The UTC 3NM65 is an Super Junction MOSFET Structure. It uses UTC advanced planar stripe, DMOS technology to provide customers perfect switching performance, minimal on-state resistance.

The UTC 3NM65 is universally applied in electronic lamp ballasts based on half bridge topology, high efficiency switched mode power supplies, active power factor correction, etc.

FEATURES

- * $R_{DS(ON)}$ < 1.86 Ω @ V_{GS} = 10 V, I_D = 1.5 A
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

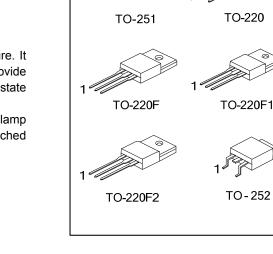
SYMBOL



ORDERING INFORMATION

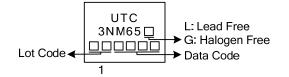
Orde	Package	Pin Assignment			Deaking		
Lead Free	Halogen Free	Гаскауе		2	3	Packing	
3NM65L-TA3-T	3NM65G-TA3-T	TO-220	G	D	S	Tube	
3NM65L-TF1-T	3NM65G-TF1-T	TO-220F1	G	D	S	Tube	
3NM65L-TF2-T	3NM65G-TF2-T	TO-220F2	G	D	S	Tube	
3NM65L-TF3-T	3NM65G-TF3-T	TO-220F	G	D	S	Tube	
3NM65L-TM3-T	3NM65G-TM3-T	TO-251	G	D	S	Tube	
3NM65L-TN3-R	3NM65G-TN3-R	TO-252	G	D	S	Tape Reel	
Note: Pin Assignment: G: G	ate D: Drain S: Source						
ЗNM65 <u>G</u> - <u>ТАЗ-Т</u>	(4) =	-					

3NM65G- <u>TA3-T</u>	(1)Packing Type	(1) T: Tube, R: Tape Reel
	(2)Package Type (3)Green Package	 (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TF2: TO-220F2, TM3: TO-251, TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free



3NM65

MARKING





■ **ABSOLUTE MAXIMUM RATINGS** (T_c = 25°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	3	А
	Pulsed (Note 2)	I _{DM}	12	А
Avalanche Current (Note 2)		I _{AR}	1.2	А
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	104	mJ
Peak Diode Recovery dv/dt	Recovery dv/dt (Note 4)		4.5	V/ns
	TO-220	P _D	75	W
Power Dissipation	TO-220F/TO-220F1		34	W
	TO-220F2		35	W
	TO-251/TO-252		50	W
Junction Temperature	ction Temperature		+150	°C
Storage Temperature		T _{STG}	-55 ~ +150	°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=144mH, I_{AS}=1.2A, V_{DD}=50V, R_G=25 $\Omega,$ Starting T_J = 25°C

4. $I_{SD} \leq 2.0A$, di/dt $\leq 200A/\mu s$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}C$

THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT	
Junction to Ambient	TO-220/TO-220F TO-220F1/TO-220F2	θ _{JA}	62.5	°C/W	
	TO-251/TO-252		110		
Junction to Case	TO-220	θ _{JC}	1.67		
	TO-220F/TO-220F1		3.68	°C/W	
	TO-220F2		3.58	0/10	
	TO-251/TO-252		2.5		



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

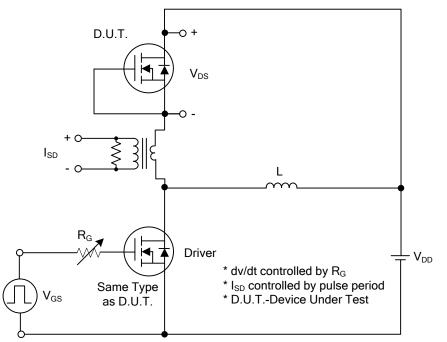
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS	0111202					••••
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250µA	650			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V			10	μA
Forward	- I _{GSS}	V _{GS} =30V, V _{DS} =0V			100	nA
Gate-Source Leakage Current Reverse		V _{GS} =-30V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250µA	2.5		4.5	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D = 1.5A			1.86	Ω
DYNAMIC CHARACTERISTICS				_	_	
Input Capacitance	C _{ISS}			210		рF
Output Capacitance	Coss	V _{GS} =0V, V _{DS} =25V, f=1MHz		95		pF
Reverse Transfer Capacitance	C _{RSS}			16		рF
SWITCHING CHARACTERISTICS						
Total Gate Charge (Note 1)	Q_{G}	-V _{DS} =50V, V _{GS} =10 V, I _D =1.3A, -I _G =100 μA (Note 1, 2)		22.6		nC
Gate-Source Charge	Q_{GS}			2.1		nC
Gate-Drain Charge	Q_{DD}	$I_{G} = 100 \ \mu A (100 \ e \ 1, 2)$		7.4		nC
Turn-On Delay Time (Note 1)	t _{D(ON)}			32		ns
Turn-On Rise Time	t _R	V_{DD} =30V, V_{GS} =10 V, I_{D} =0.5A, R_{G} =25 Ω (Note 1, 2)		58		ns
Turn-Off Delay Time	t _{D(OFF)}			84		ns
Turn-Off Fall Time	t⊢			36		ns
SOURCE- DRAIN DIODE RATINGS AND CH	ARACTERIS	TICS				
Maximum Continuous Drain-Source Diode	I _S				3.0	А
Forward Current					5.0	A
Maximum Pulsed Drain-Source Diode	I _{SM}				12	А
Forward Current	ISM				12	~
Drain-Source Diode Forward Voltage (Note 1)	V _{SD}	$V_{GS} = 0 V, I_S = 3.0 A$			1.4	V
Body Diode Reverse Recovery Time (Note 1)	trr	V _{GS} =0V, I _S =3.0A		236		ns
Body Diode Reverse Recovery Charge	Qrr	dI _F /dt=100A/µs		1.5		nC

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

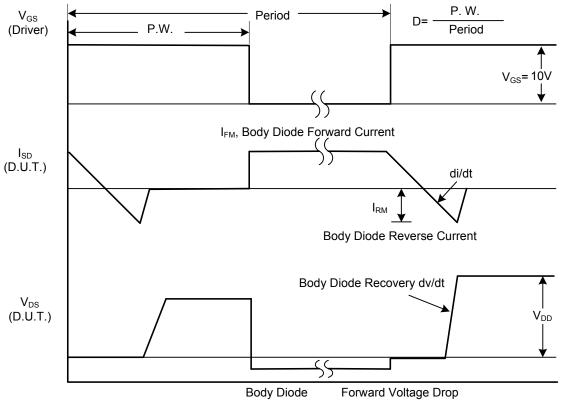
2. Essentially independent of operating temperature



TEST CIRCUITS AND WAVEFORMS



Peak Diode Recovery dv/dt Test Circuit

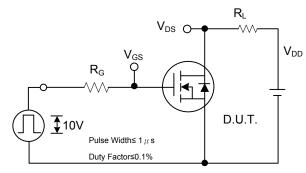


Peak Diode Recovery dv/dt Waveforms

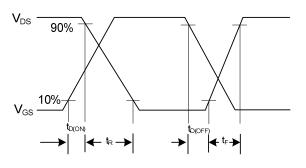


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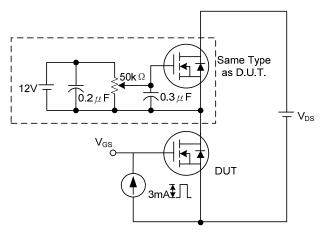
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



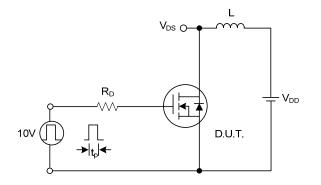
Switching Test Circuit



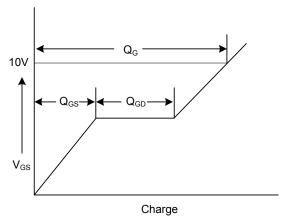
Switching Waveforms



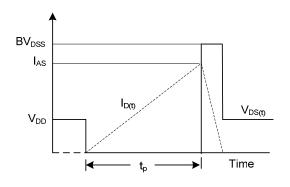
Gate Charge Test Circuit



Unclamped Inductive Switching Test Circuit











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