

12N65-C

12A, 650V N-CHANNEL POWER MOSFET

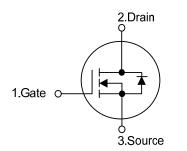
DESCRIPTION

The UTC **12N65-C** is a high voltage power MOSFET designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and high rugged avalanche characteristics. This power MOSFET is usually used in high speed switching applications of switching power supplies and adaptors.

FEATURES

- * $R_{DS(ON)}$ < 0.75 Ω @ V_{GS} = 10 V, I_D = 6.0 A
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness

SYMBOL



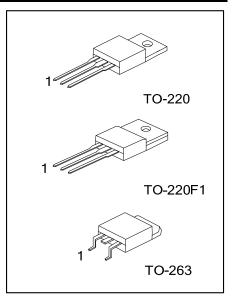
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing	
Lead Free	Halogen Free	Гаскауе	1	2	3	I acking	
12N65L-TF1-T	12N65G-TF1-T	TO-220F1	G	D	S	Tube	
12N65L-TF3-T	12N65G-TF3-T	TO-220F	G	D	S	Tube	
12N65L-TQ2-T	12N65G-TQ2-T	TO-263	G	D	S	Tube	
12N65L-TQ2-R	12N65G-TQ2-R	TO-263	G	D	S	Tape Reel	

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

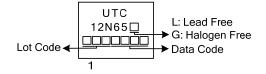
12N65 <u>G</u> - <u>TF1</u> -Ţ		
	(1)Packing Type	(1) T: Tube, R: Tape Reel
	(2)Package Type	(2) TF1: TO-220F1, TF3: TO-220F, TQ2: TO-263
	(3)Green Package	(3) G: Halogen Free and Lead Free, L: Lead Free

Power MOSFET



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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
Continuous Drain Current		Ι _D	12	А
Pulsed Drain Current (N	lote 2)	I _{DM}	48	А
Avalanche Energy	Single Pulsed (Note 3)	E _{AS}	123	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2	ns
Dower Dissinction	TO-220/TO-263	D	225	W
Power Dissipation	TO-220F1	PD	51	W
Junction Temperature		TJ +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 = 10mH, I_{AS} = 4.95A, V_{DD} = 50V, R_G = 25 Ω , Starting T_J = 25°C 4. I_{SD} ≤ 12A, di/dt ≤200A/µs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT	
Junction to Ambient		θ _{JA}	62.5	°C/W	
Junction to Case	TO-220/TO-263	0	0.56	°C/W	
	TO-220F1	θις	2.45	°C/W	



PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
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			1	μA
Cate Source Lookage Current 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)}	$V_{DS}=V_{GS}, I_{D}=250\mu A$	2.0		4.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =6.0A			0.75	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}			1440		рF
Output Capacitance	C _{OSS}	V _{GS} =0V, V _{DS} =25V, f =1.0 MHz		240		рF
Reverse Transfer Capacitance	C _{RSS}			45		рF
SWITCHING CHARACTERISTICS		_				
Total Gate Charge (Note 1)	Q_{G}			143.7		nC
Gate-Source Charge	Q _{GS}	−V _{DS} =50V, I _D =1.3A, I _G =100μA −V _{GS} =10V (Note 1,2)		10.7		nC
Gate-Drain Charge	Q_{GD}			26.1		nC
Turn-On Delay Time (Note 1)	t _{D(ON)}			80		ns
Turn-On Rise Time	t _R	V _{DD} =30V, I _D =0.5A,		150		ns
Turn-Off Delay Time	t _{D(OFF)}	$R_{G} = 25\Omega, V_{GS} = 10V$ (Note 1,2)		442		ns
Turn-Off Fall Time	t _F			215		ns
DRAIN-SOURCE DIODE CHARACTERIST	ICS AND MAXI	MUM RATINGS	_		_	
Maximum Continuous Drain-Source Diode					12	٨
Forward Current	I _S				12	A
Maximum Pulsed Drain-Source Diode	I _{SM}				48	А
Forward Current					40	А
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0 V, I _S =6.0 A			1.4	V
Reverse Recovery Time	t _{rr}	V _{GS} =0 V, I _S =6.0 A,		375		ns
Reverse Recovery Charge	Qrr	dI _F /dt=100 A/µs (Note 1)		2.46		μC

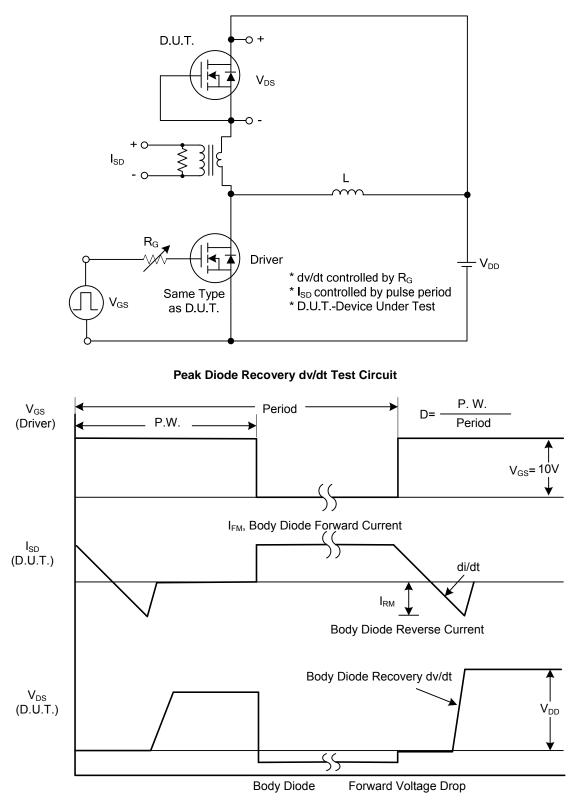
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

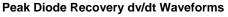
Notes: 1. Pulse Test: Pulse width \leq 300µs, Duty cycle \leq 2%.

2. Essentially independent of operating temperature.



TEST CIRCUITS AND WAVEFORMS

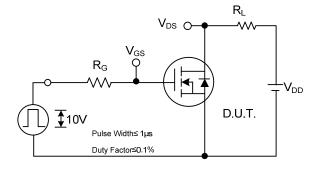


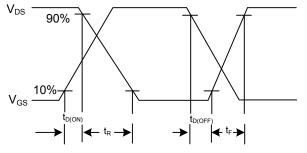




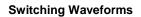
12N65-C

■ TEST CIRCUITS AND WAVEFORMS (Cont.)





Switching Test Circuit



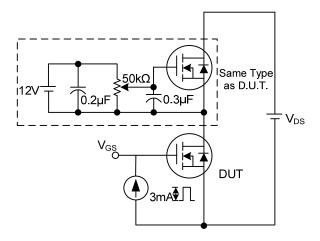
 Q_G

 Q_{GD}

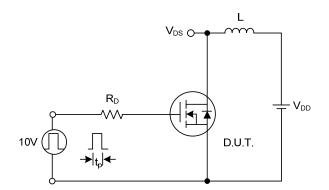
 V_{GS}

10V

Q_{GS}



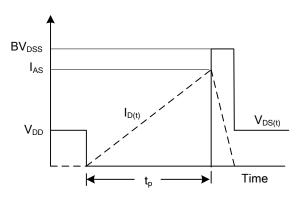
Gate Charge Test Circuit



Unclamped Inductive Switching Test Circuit

Gate Charge Waveform

Charge



Unclamped Inductive Switching Waveforms



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