



12N65-CBQ

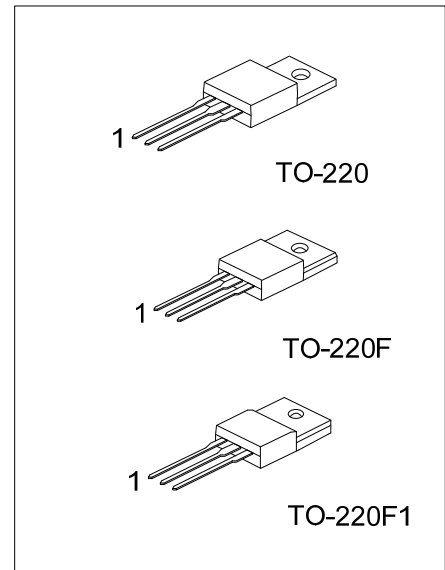
Power MOSFET

12A, 650V N-CHANNEL POWER MOSFET

DESCRIPTION

The UTC **12N65-CBQ** 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.

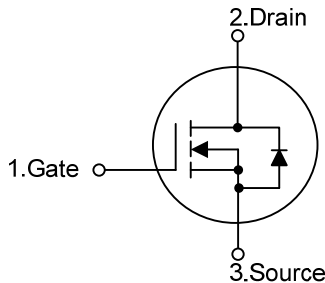
This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient AC to DC converters and bridge circuits.



FEATURES

- * $R_{DS(ON)} \leq 1.0\Omega$ @ $V_{GS}=10V, I_D=6.0A$
- * Fast switching capability
- * Avalanche energy specified

SYMBOL



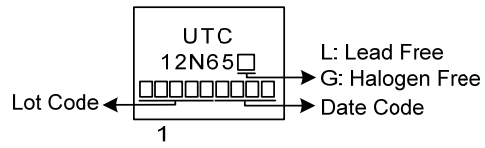
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
12N65L-TA3-T	12N65G-TA3-T	TO-220	G	D	S	Tube
12N65L-TF1-T	12N65G-TF1-T	TO-220F1	G	D	S	Tube
12N65L-TF3-T	12N65G-TF3-T	TO-220F	G	D	S	Tube

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

<p>12N65G-TA3-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube (2) TA3: TO-220, TF1: TO220F1, TF3: TO-220F (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING



FLYING 汎翔國際有限公司
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■ 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	12	A
	Pulsed (Note 2)	I_{DM}	48	A
Avalanche Current (Note 2)		I_{AR}	12	A
Avalanche Energy, Repetitive, Limited by T_{JMAX}		E_{AR}	24	mJ
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	198	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.2	V/ns
Power Dissipation	TO-220	P_D	225	W
	TO-220F/TO-220F1		51	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. $L = 10\text{mH}$, $I_{AS} = 6.3\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 12\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$ Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient		θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	0.56	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		2.45	$^\circ\text{C}/\text{W}$

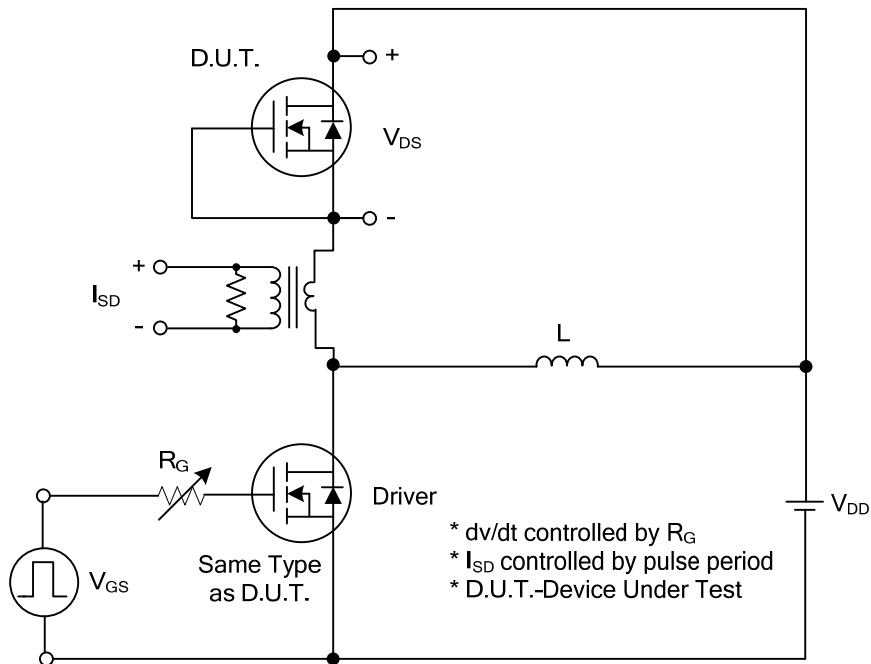
■ ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise specified)

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			10	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±30V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =6.0A			1.0	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1MHz		1369		pF
Output Capacitance	C _{OSS}			128		pF
Reverse Transfer Capacitance	C _{RSS}			6.0		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q _G	V _{DS} =50V, V _{GS} =10V, I _D =1.3A, I _D =100μA (Note 1, 2)		75		nC
Gate-Source Charge	Q _{GS}			7.6		nC
Gate-Drain Charge	Q _{GD}			9.0		nC
Turn-On Delay Time	t _{D(ON)}	V _{DS} =30V, V _{GS} =10V, I _D =0.5A, R _G =25Ω (Note 1, 2)		64		ns
Turn-On Rise Time	t _R			36		ns
Turn-Off Delay Time	t _{D(OFF)}			274		ns
Turn-Off Fall Time	t _F			47		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I _S				12	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}				48	A
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =12A			1.4	V
Reverse Recovery Time	t _{rr}	I _S =12A, V _{GS} =0V di/dt=100A/μs (Note 1)		440		ns
Reverse Recovery Charge	Q _{rr}				3.34	

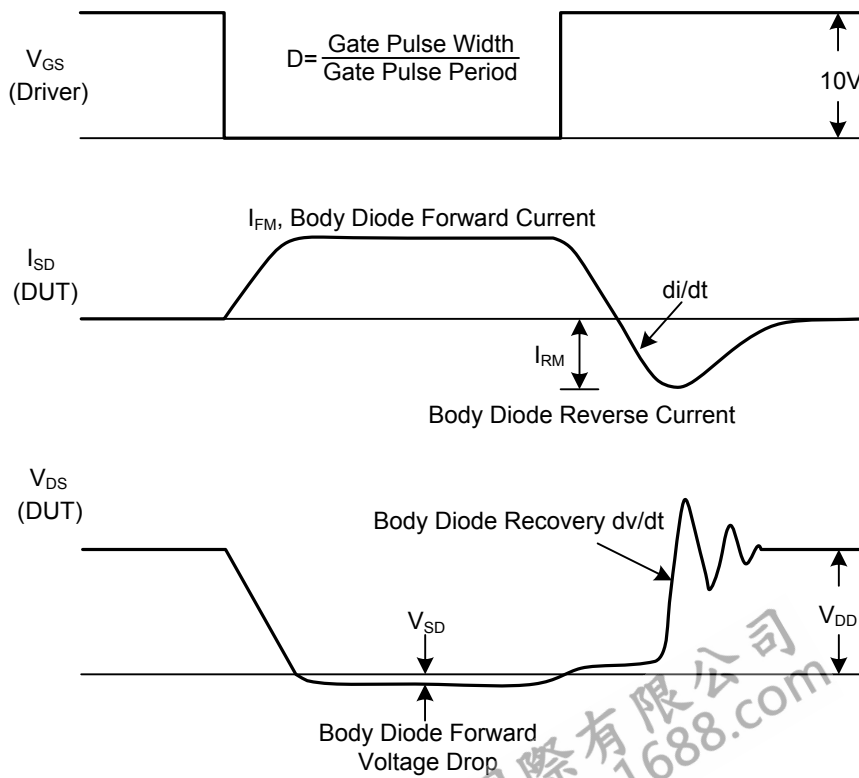
Notes: 1. Pulse Test : Pulse width ≤300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

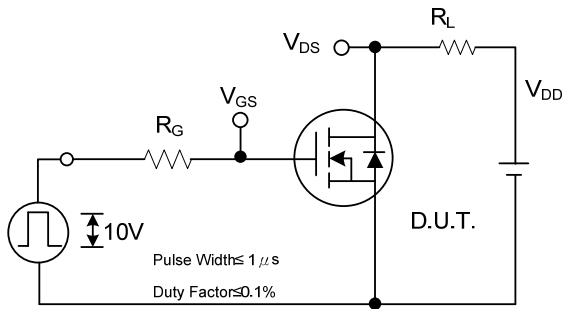


Peak Diode Recovery dv/dt Test Circuit

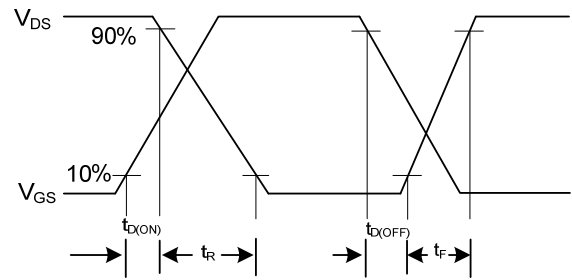


Peak Diode Recovery dv/dt Waveforms

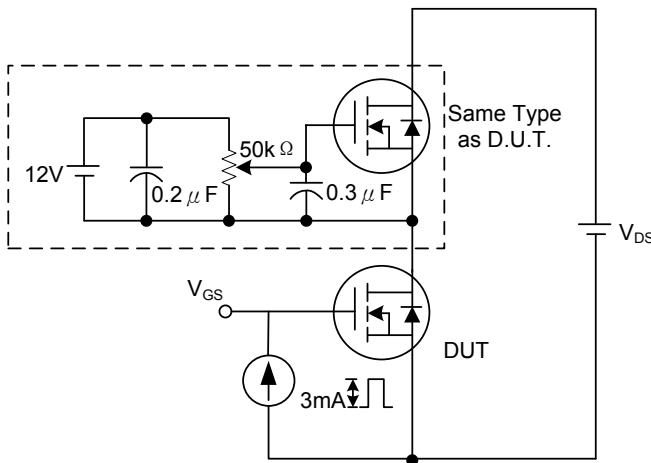
TEST CIRCUITS AND WAVEFORMS



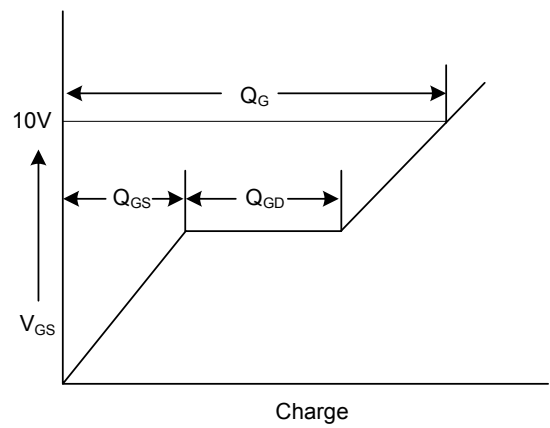
Switching Test Circuit



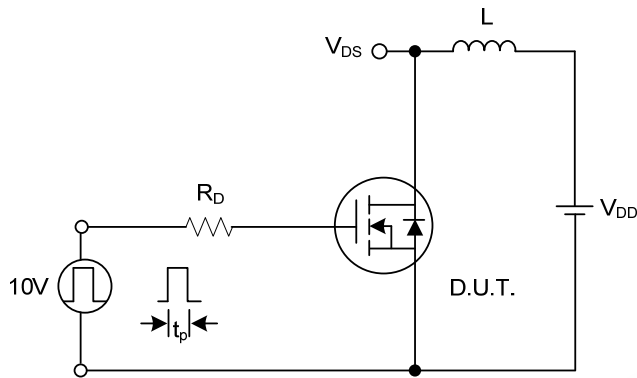
Switching Waveforms



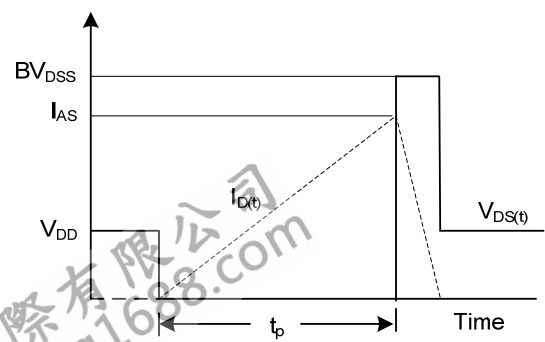
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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