



05N30

Power MOSFET

0.5A, 300V N-CHANNEL POWER MOSFET

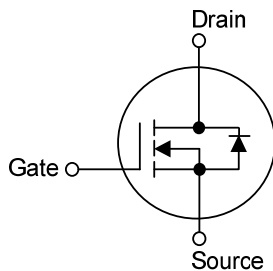
DESCRIPTION

The UTC **05N30** is a N-channel mode power MOSFET using UTC's advanced technology to provide customers with a minimum on-state resistance, low gate charge and superior switching performance.

FEATURES

- * $R_{DS(ON)} \leq 5.0 \Omega @ V_{GS}=10V, I_D=0.25A$
- * High switching speed
- * 100% avalanche tested

SYMBOL



ORDERING INFORMATION

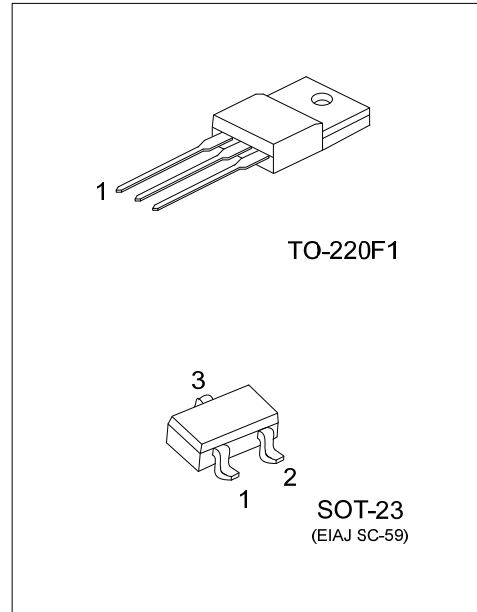
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
05N30L-AE3-R	05N30G-AE3-R	SOT-23	G	S	D	Tape Reel
05N30L-TF1-T	05N30G-TF1-T	TO-220F1	G	D	S	Tube

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

<p>05N30G-AE3-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel, T: Tube (2) AE3: SOT-23, TF1: TO-220F1 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING

SOT-23	TO-220F1



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	300	V
Gate-Source Voltage		V_{GSS}	± 30	V
Continuous Drain Current		I_D	0.5	A
Pulsed Drain Current (Note 2)		I_{DM}	2.0	A
Power Dissipation	SOT-23	P_D	0.6	W
	TO-220F1		15	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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23	θ_{JA}	325	$^\circ\text{C/W}$
	TO-220F1		625	$^\circ\text{C/W}$
Junction to Case	SOT-23	θ_{JC}	208	$^\circ\text{C/W}$
	TO-220F1		8.33	$^\circ\text{C/W}$

Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

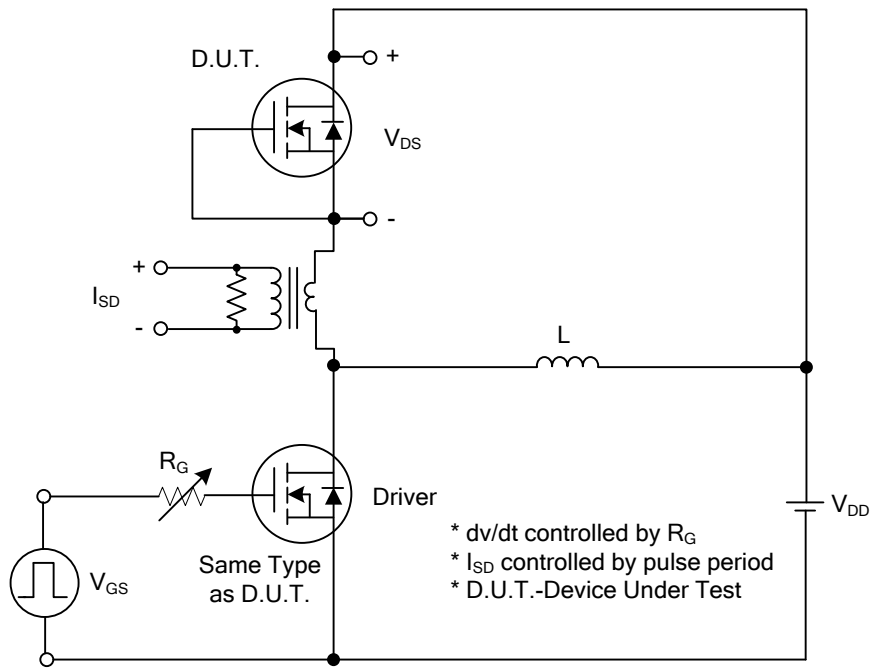
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
OFF CHARACTERISTICS								
Drain-Source Breakdown Voltage		BV_{DSS}	$I_D=250\mu\text{A}$, $V_{DS}=0\text{V}$	300			V	
Drain-Source Leakage Current		I_{DSS}	$V_{DS}=300\text{V}$			10	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		$V_{GS(TH)}$	$I_D=250\mu\text{A}$	1.0		3.0	V	
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=0.25\text{A}$			5.0	Ω	
DYNAMIC PARAMETERS								
Input Capacitance		C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1\text{MHz}$		100		pF	
Output Capacitance		C_{OSS}				20		pF
Reverse Transfer Capacitance		C_{RSS}				3.2		pF
SWITCHING PARAMETERS								
Total Gate Charge (Note 1)		Q_G	$V_{DS}=240\text{V}$, $V_{GS}=10\text{V}$, $I_D=0.5\text{A}$ $I_G=1\text{mA}$ (Note1, 2)		8.5		nC	
Gate to Source Charge		Q_{GS}				2.2		nC
Gate to Drain Charge		Q_{GD}				1.2		nC
Turn-ON Delay Time (Note 1)		$t_{D(ON)}$	$V_{DS}=150\text{V}$, $V_{GS}=10\text{V}$, $I_D=0.5\text{A}$, $R_G=25\Omega$ (Note1, 2)		4		ns	
Rise Time		t_R				17		ns
Turn-OFF Delay Time		$t_{D(OFF)}$				9		ns
Fall-Time		t_F				20		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS								
Maximum Body-Diode Continuous Current		I_S				0.5	A	
Maximum Body-Diode Pulsed Current		I_{SM}				2.0	A	
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	$I_S=0.5\text{A}$, $V_{GS}=0\text{V}$			1.4	V	
Reverse Recovery Time (Note 1)		t_{rr}	$I_S=0.5\text{A}$, $V_{GS}=0\text{V}$			65	ns	
Reverse Recovery Charge		Q_{rr}	$di/dt=100\text{A}/\mu\text{s}$			75	μC	

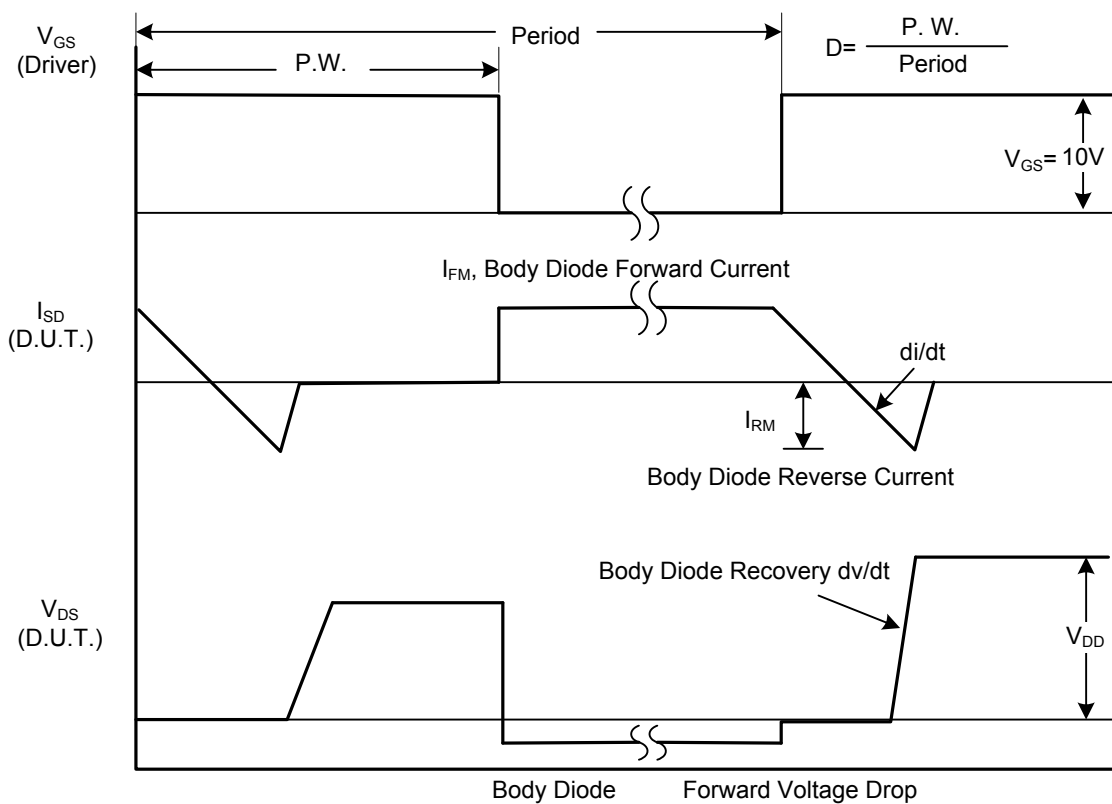
Notes: 1. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

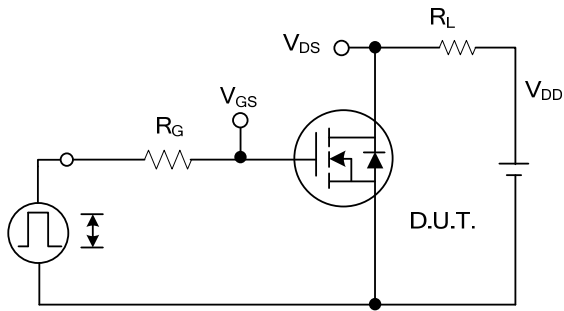


Peak Diode Recovery dv/dt Test Circuit

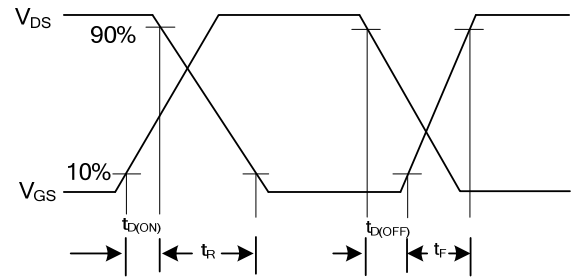


Peak Diode Recovery dv/dt Waveforms

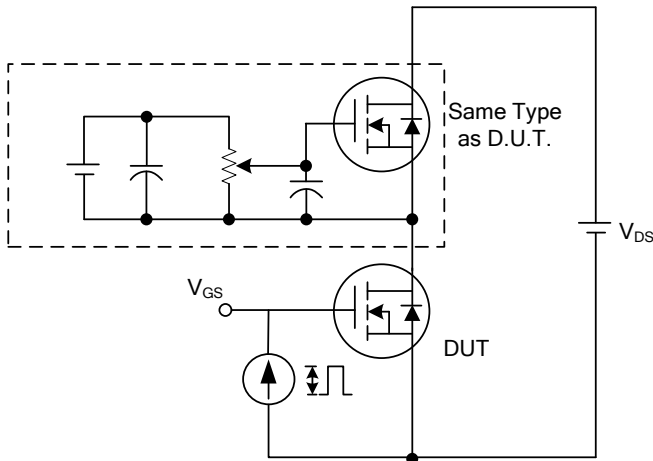
■ TEST CIRCUITS AND WAVEFORMS



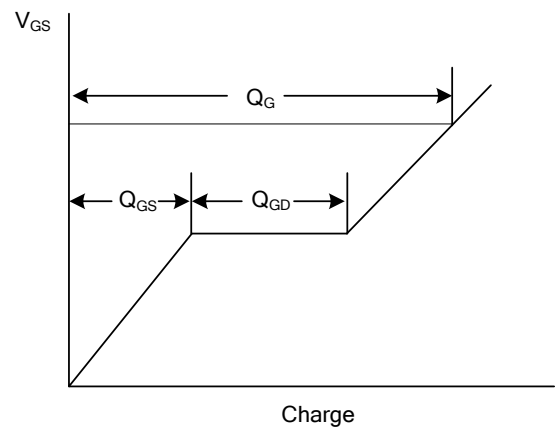
Switching Test Circuit



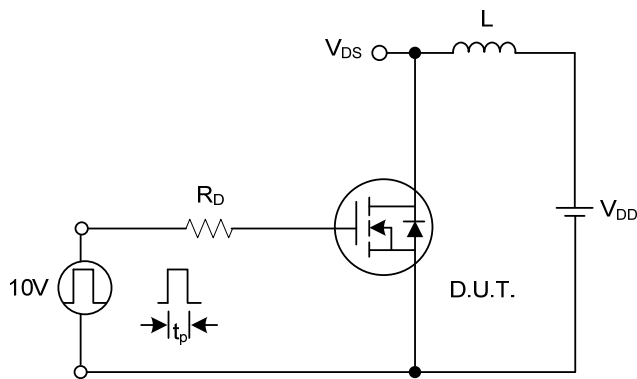
Switching Waveforms



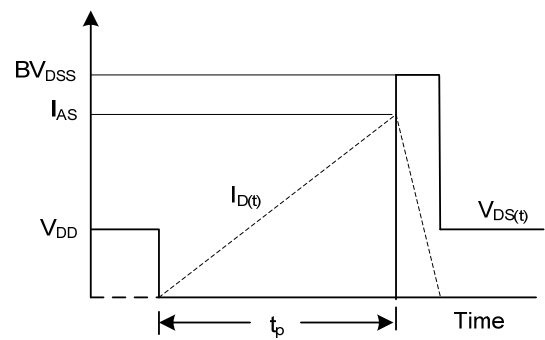
Gate Charge Test Circuit



Gate Charge Waveform

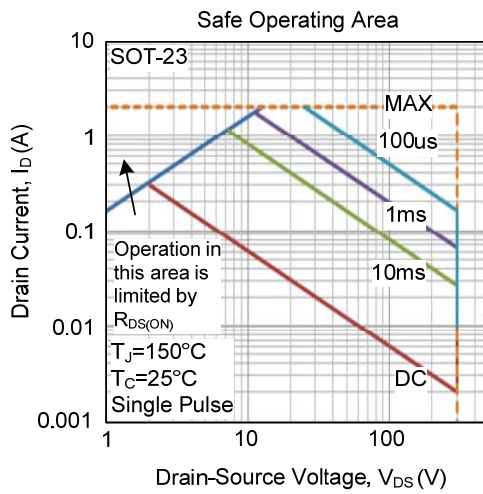


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



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