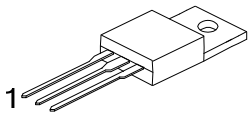
36A, 50V N-CHANNEL ENHANCEMENT MODE POWER MOSFET TRANSISTOR



TO-220

■ DESCRIPTION

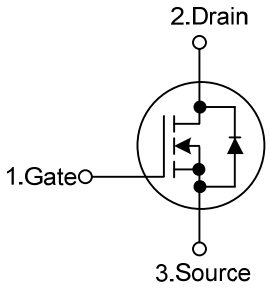
The UTC **UTT36N05** is an N-channel enhancement power MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$, high switching speed, high current capacity and low gate charge.

The UTC **UTT36N05** is suitable for motor control, AC-DC or DC-DC converters and audio amplifiers, etc.

■ FEATURES

* $R_{DS(ON)}$=33mΩ @ V_{GS}=5V,I_D=18A
* High Switching Speed
* High Current Capacity
* Low Gate Charge(typical 35nC)

■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT36N05L-TA3-T	UTT36N05G-TA3-T	TO-220	G	D	S	Tube

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

UTT36N05L- 3-T (1)Packing Type (2)Package Type (3)Lead Free	(1) T: Tube (2) TA3: TO-220 (3) G: Halogen Free, L: Lead Free

■ ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage (V_{GS}=0)			V_{DSS}	50	V
Drain-Gate Voltage (R_{GS}=20kΩ)			V_{DGR}	50	V
Gate-Source Voltage			V_{GSS}	±15	V
Drain Current	Continuous	T_C=25°C	I_D	36	A
		T_C=100°C		25	A
	Pulsed (Note 2)		I_{DM}	144	A
Avalanche Energy		Single Pulsed	E_{AS}	240	mJ
		Repetitive	E_{AR}	60	mJ
Power Dissipation (T_C=25°C)			P_D	100	W
Junction Temperature			T_J	150	°C
Storage Temperature			T_{STG}	-65~175	°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. Pulse width limited by safe operating area

■ THERMAL DATA

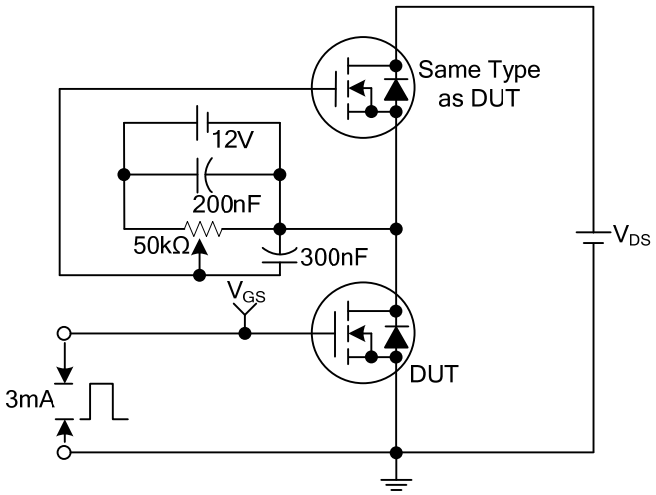
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	62.5	°C/W
Junction to Case	θ_{JC}	1.25	°C/W

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

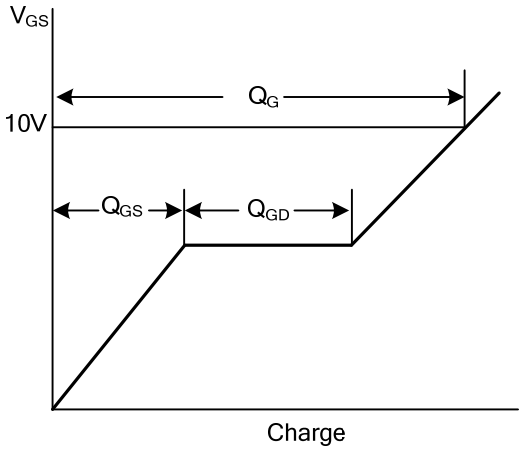
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	50			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=Max Rating, V_{GS}=0V			1	μA
			V_{DS}= Max ×0.8,T_C=125°C,V_{GS}=0V			10	
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+15V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-15V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS (Note 1)							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	1	1.6	2.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=5V, I_D=18A		0.033	0.04	Ω
On State Drain Current		$I_{D(ON)}$	V_{DS}>$I_{D(ON)}$×$R_{DS(ON)}$max, V_{GS}=10V	36			A
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		1350	1800	pF
Output Capacitance		C_{OSS}			450	600	pF
Reverse Transfer Capacitance		C_{RSS}			130	200	pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{GS}=5V, V_{DS}=40V, I_D=36A		35	50	nC
Gate to Source Charge		Q_{GS}			11		nC
Gate to Drain Charge		Q_{GD}			19		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=25V, I_D=18A, R_G=50Ω, V_{GS}=5V		90	130	ns
Rise Time		t_R			550	800	ns
OFF-Voltage Rise Time		$t_{R(VOFF)}$	V_{DD}=40V, I_D=36A, R_G=50Ω, V_{GS}=5V		110	160	ns
Fall-Time		t_F			180	260	ns
Cross-Over Time		t_C			310	450	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				36	A
Maximum Body-Diode Pulsed Current		I_{SM}	(Note 2)			144	A
Drain-Source Diode Forward Voltage		V_{SD}	I_{SD}=36A, V_{GS}=0V (Note 1)			1.6	V
Body Diode Reverse Recovery Time		t_{RR}	I_{SD}=36A, V_{DD}=30V, di/dt=100A/μs, T_J = 150°C		100		ns
Body Diode Reverse Recovery Charge		Q_{RR}			0.27		μC
Body Diode Reverse Recovery Current		I_{RRM}			5.5		A

Notes: 1. Pulsed: Pulse duration = 300 ms, duty cycle 1.5%
2. Pulse width limited by safe operating area

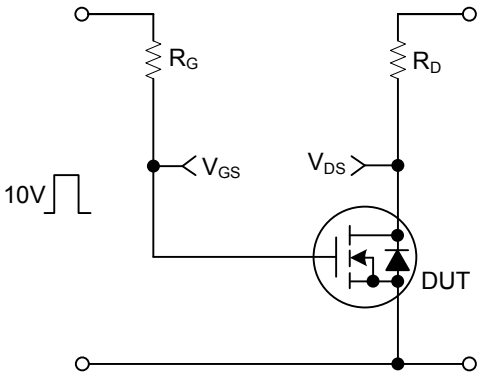
■ TEST CIRCUITS AND WAVEFORMS



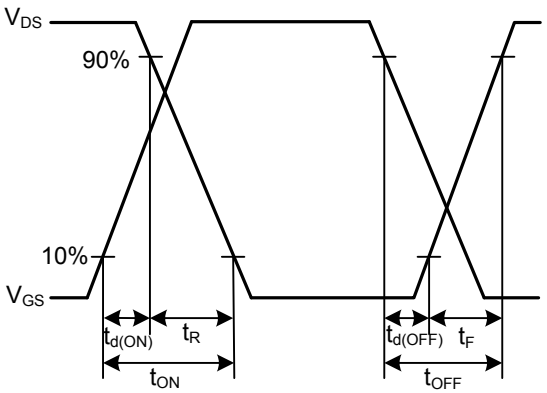
Gate Charge Test Circuit



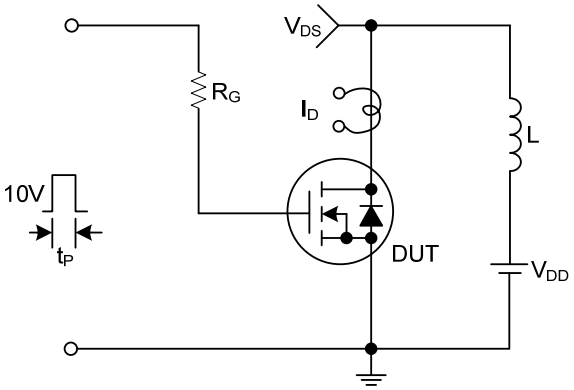
Gate Charge Waveforms



Resistive Switching Test Circuit

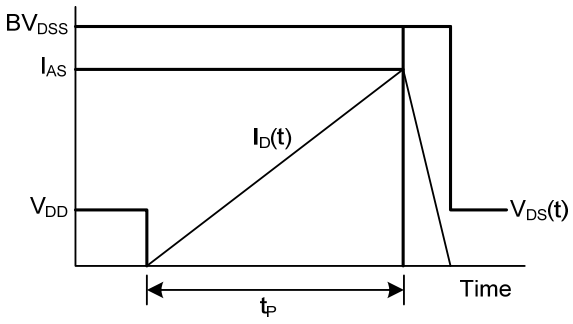


Resistive Switching Waveforms



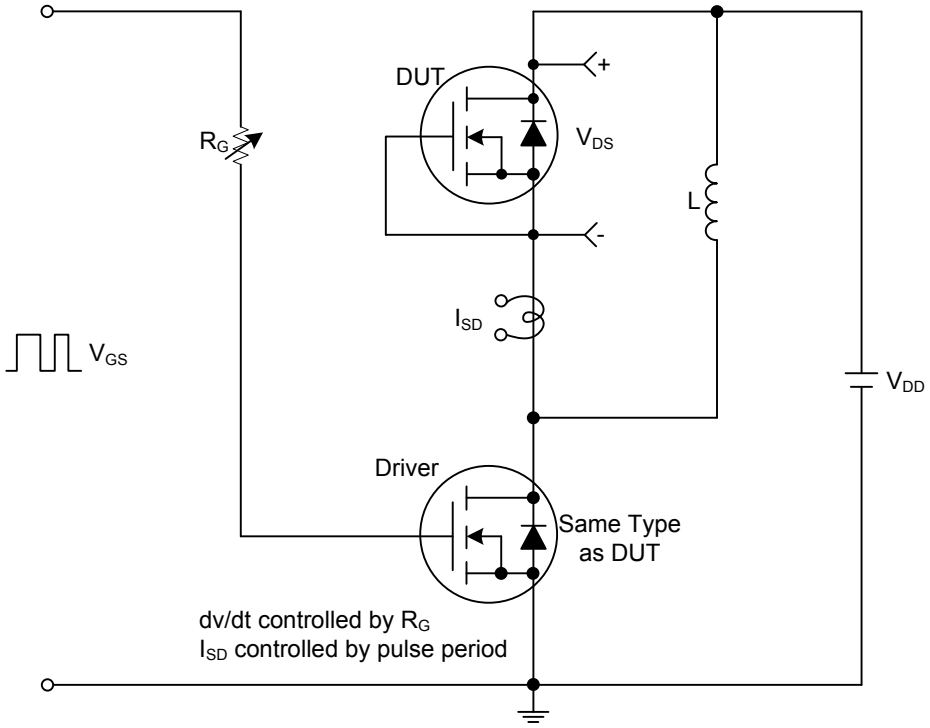
Unclamped Inductive Switching Test Circuit

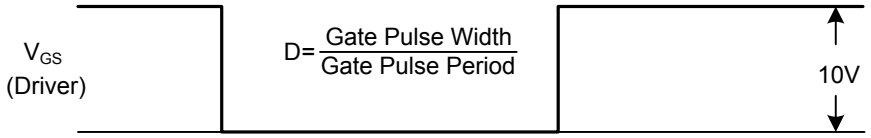
$$E_{AS}=\frac{1}{2}LI_{AS}^{2}\frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

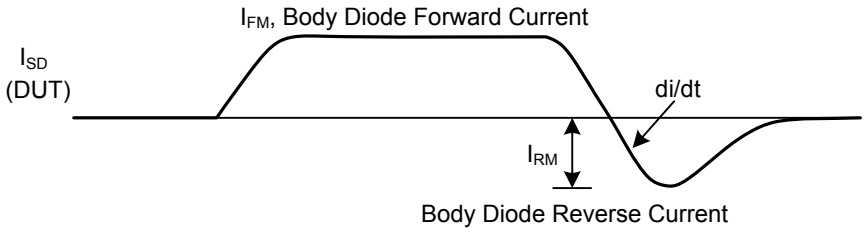


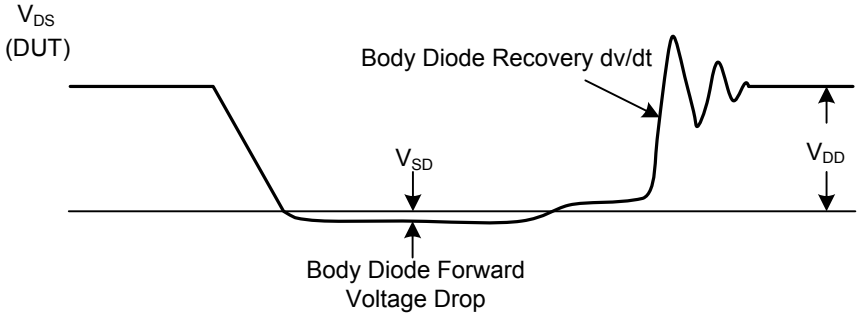
Unclamped Inductive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS(Cont.)









Peak Diode Recovery dv/dt Test Circuit and Waveforms