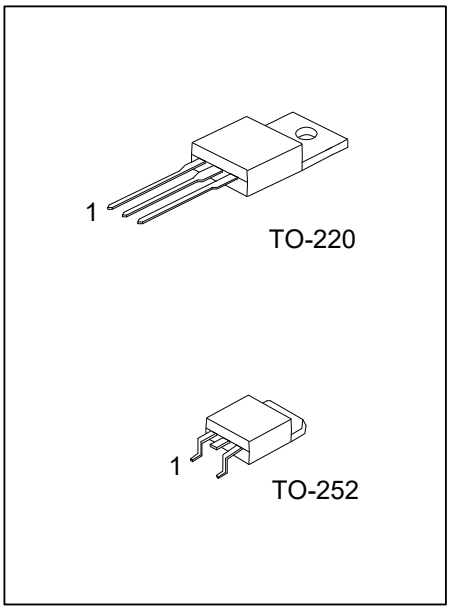
UT36P15

Power MOSFET

-36A, -150V P-CHANNEL POWER MOSFET



■ DESCRIPTION

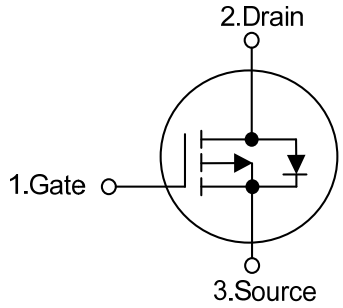
The UTC **UT36P15** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance, and it can also withstand high energy in the avalanche.

This UTC **UT36P15** is suitable for motor drivers, high-side switch and 12V board net, etc.

■ FEATURES

* $R_{DS(ON)} \leq 110\ m\Omega$ @ $V_{GS} = -10V$, $I_D = -18A$
* High Switching Speed

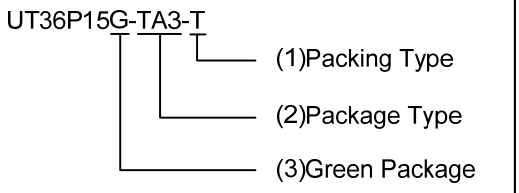
■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT36P15L-TA3-T	UT36P15G-TA3-T	TO-220	G	D	S	Tube
UT36P15L-TN3-R	UT36P15G-TN3-R	TO-252	G	D	S	Tape Reel

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

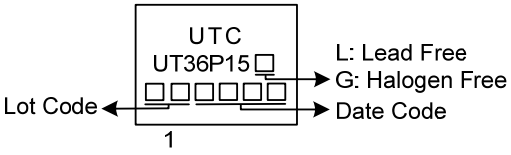


(1) T: Tube, R: Tape Reel

(2) TA3: TO-220, TN3: TO-252

(3) G: Halogen Free and Lead Free L: Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	-150	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	-36	A
	Pulsed	I_{DM}	-72	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	64	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	18.6	V/ns
Power Dissipation	TO-220	P_D	130	W
	TO-252		50	W
Junction Temperature		T_J	-55 ~ +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 = 0.1mH, I_{AS} = -36A, V_{DD} = -50V, R_G = 25 Ω Starting T_J = 25°C
4. I_{SD} ≤ -30A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220	θ_{JA}	62.5	°C/W
	TO-252		110	°C/W
Junction to Case	TO-220	θ_{JC}	0.96	°C/W
	TO-252		2.5 (Note)	°C/W

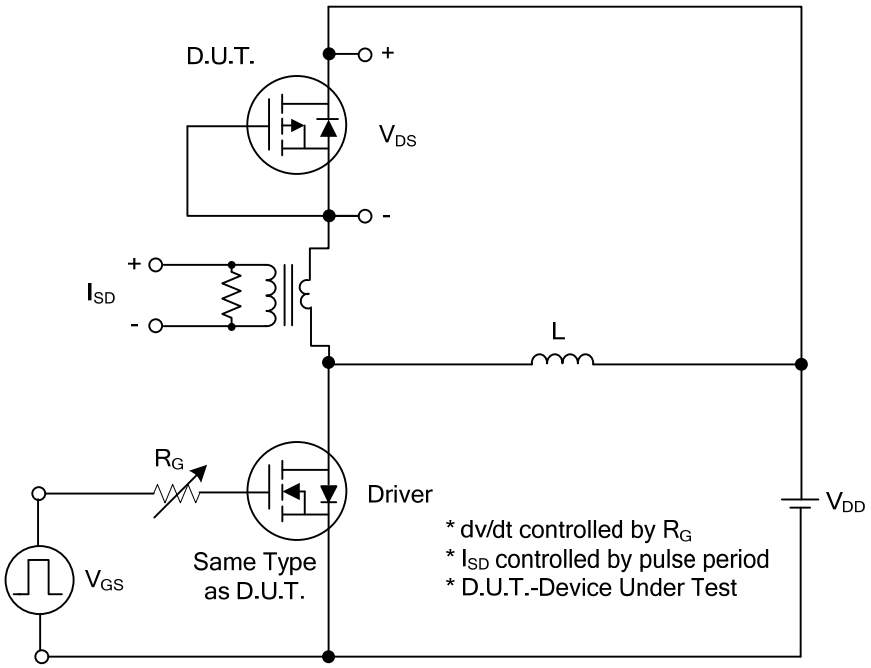
Note: Device mounted on FR-4 substrate P_C board, 2oz copper, with 1inch square copper plate.

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

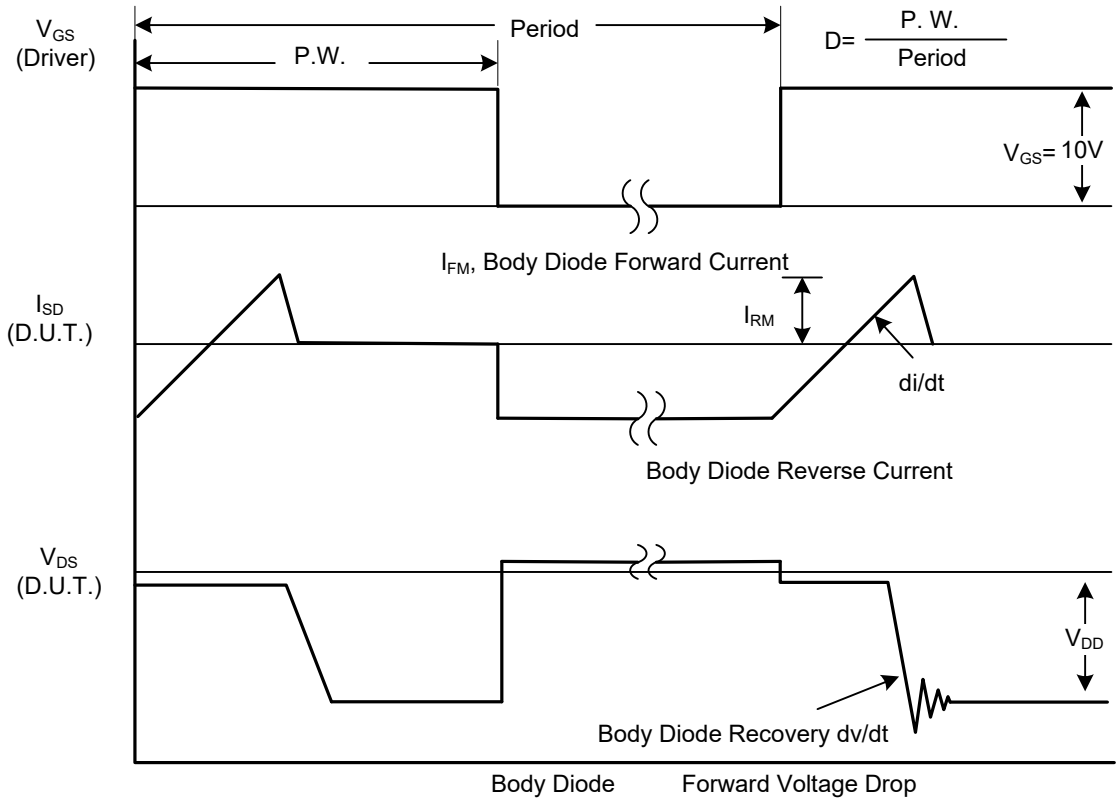
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=-250μA, V_{GS}=0V	-150			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-150V, V_{GS}=0V			-1	μA
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-2.0		-4.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-18A			110	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{DS}=-25V, V_{GS}=0V, f=1MHz		6450		pF
Output Capacitance		C_{OSS}			265		pF
Reverse Transfer Capacitance		C_{RSS}			212		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=-120V, V_{GS}=-10V, I_D=-36A (Note 1, 2)		98		nC
Gate to Source Charge		Q_{GS}			31		nC
Gate to Drain Charge		Q_{GD}			32		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DS}=-100V, V_{GS}=-10V, I_D=-36A, R_G=3Ω (Note 1, 2)		25		ns
Rise Time		t_R			21		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			78		ns
Fall-Time		t_F			27		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				-36	A
Maximum Body-Diode Pulsed Current		I_{SM}				-72	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=-36A, V_{GS}=0V			1.4	V
Reverse Recovery Time (Note 1)		t_{rr}	I_S=-30A, V_{GS}=0V dI$_F$/dt=100A/μs (Note1)		100		ns
Reverse Recovery Charge		Q_{rr}			0.4		μC

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

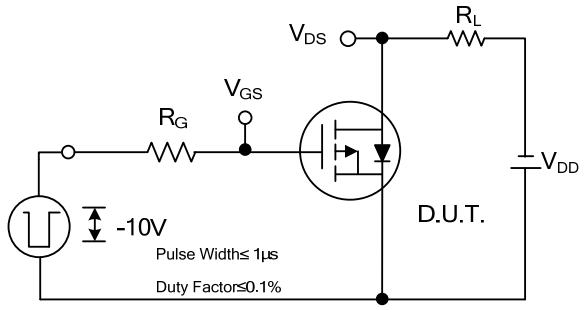


Peak Diode Recovery dv/dt Test Circuit

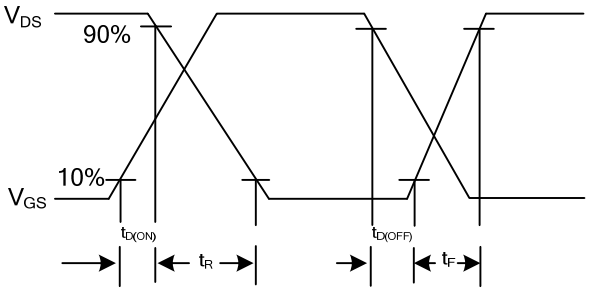


Peak Diode Recovery dv/dt Waveforms

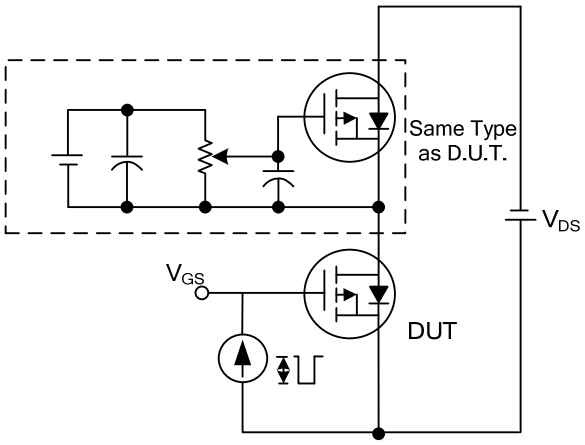
■ TEST CIRCUITS AND WAVEFORMS



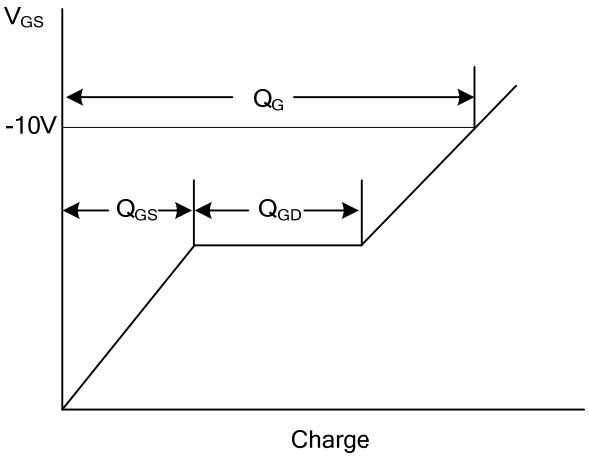
Switching Test Circuit



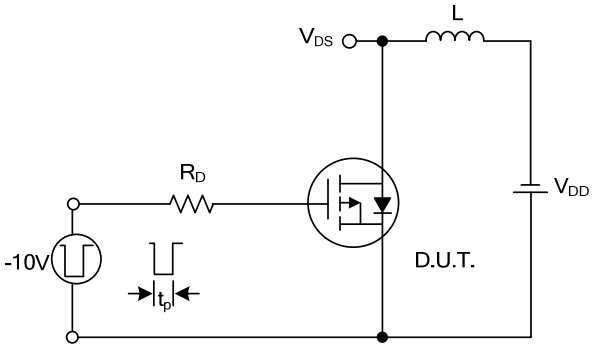
Switching Waveforms



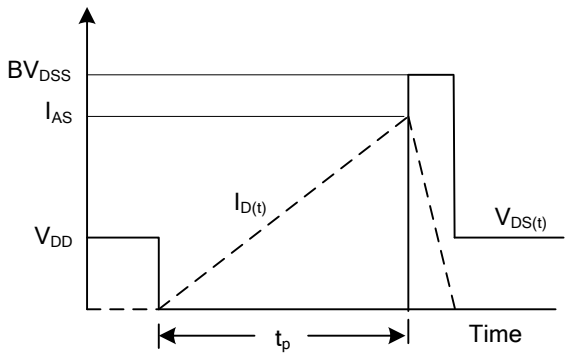
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms