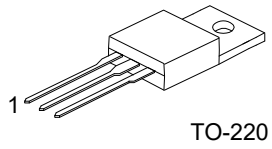
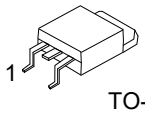
7P50

POWER MOSFET

-7.0A, -500V P-CHANNEL POWER MOSFET



TO-220



TO-252

■ DESCRIPTION

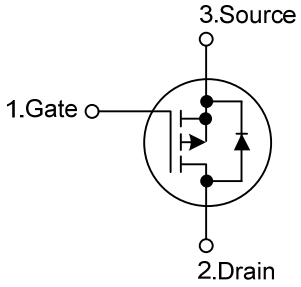
The UTC **7P50** is a P-channel MOS Field Effect Transistor. it uses UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance.

The UTC **7P50** is suitable for high voltage switching applications.

■ FEATURES

* $R_{DS(ON)} \leq 1.8\ \Omega$ @ V_{GS}=-10V, I_D=-3.5A
* High switching speed
* Low input capacitance

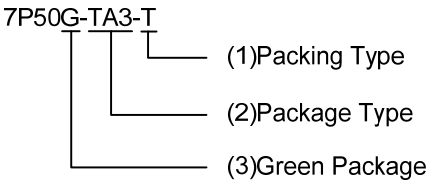
■ SYMBOL



■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
7P50L-TA3-T	7P50G-TA3-T	TO-220	G	D	S	Tube
7P50L-TN3-R	7P50G-TN3-R	TO-252	G	D	S	Tape Reel

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

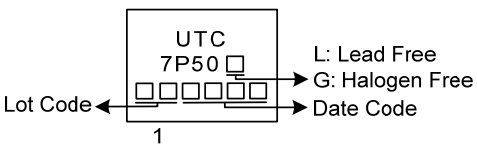


(1) T: Tube, R: Tape Reel

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

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

■ MARKING



■ ABSOLUTE MAXIMUM RATING (T_A=25°C unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	-500	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	DC	$I_{D(DC)}$	-7	A
	Pulsed (Note 2)	$I_{D(pulse)}$	-14	A
Single Avalanche Energy (Note 3)		E_{AS}	331	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	12.7	V/ns
Power Dissipation (T_C=25°C)	TO-220	P_D	85	W
	TO-252		45	W
Junction Temperature		T_J	+150	°C
Storage Temperature Range		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=30mH, I_{AS}=-4.7A, V_{DD}= -50V, R_G=25Ω, Starting T_J=25°C.
4. I_{SD} ≤-7.0A, 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		100	°C/W
Junction to Case	TO-220	θ_{JC}	1.47	°C/W
	TO-252		2.77 (Note)	°C/W

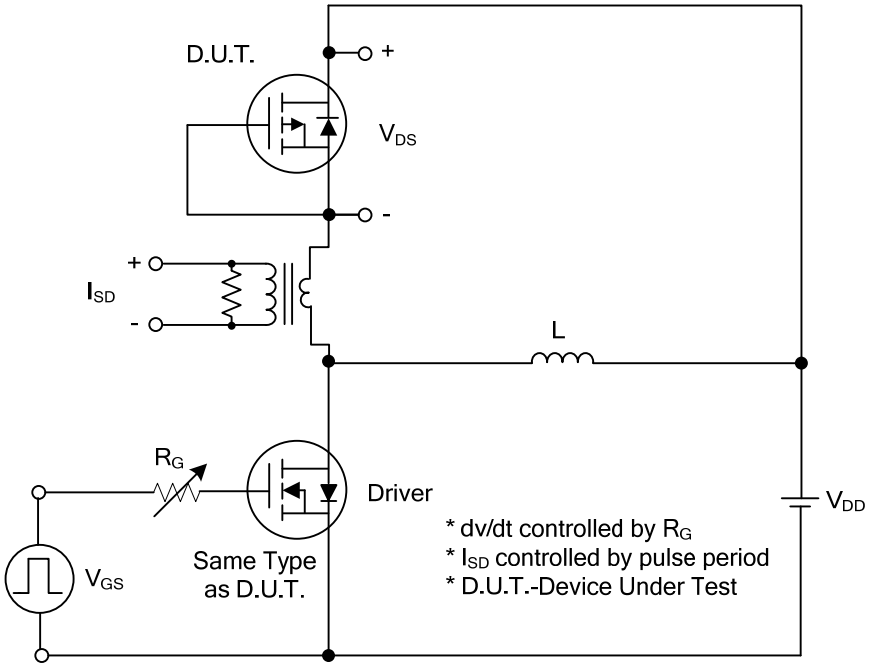
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

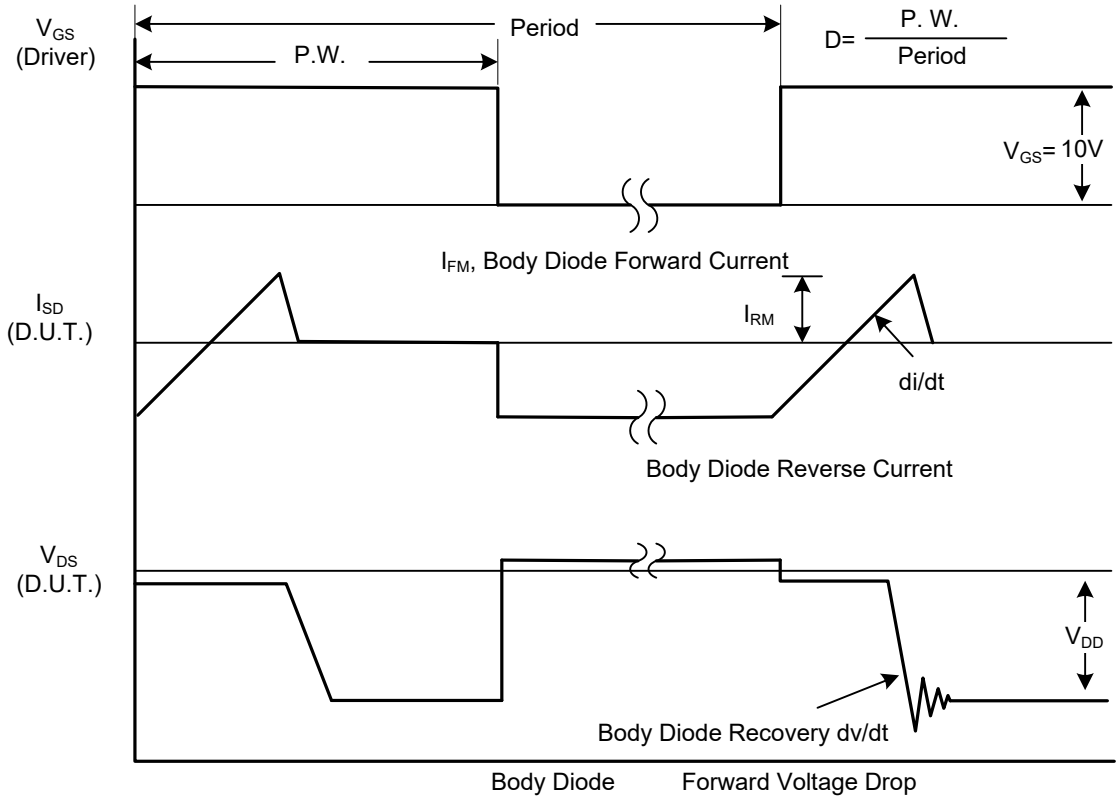
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=-250μA	-500			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-500V, V_{GS}=0V			-10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		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		-4.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-3.5A			1.8	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=-25V, f=1.0MHz		1335		pF
Output Capacitance		C_{OSS}			128		pF
Reverse Transfer Capacitance		C_{RSS}			16		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=-100V, V_{GS}=-10V, I_D=-7.0A , (Note 1, 2)		34.5		nC
Gate to Source Charge		Q_{GS}			8.6		nC
Gate to Drain Charge		Q_{GD}			7.6		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=-100V, V_{GS}=-10V, I_D=-7.0A, R_G=-25Ω (Note 1, 2)		16		ns
Rise Time		t_R			19		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			127		ns
Fall-Time		t_F			44		ns
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				-7	A
Maximum Body-Diode Pulsed Current		I_{SM}				-14	A
Diode Forward Voltage		V_{SD}	I_F=-7.0A, V_{GS}=0V			-1.4	V
Body Diode Reverse Recovery Time		t_{rr}	I_F=-7.0A, V_{GS}=0V, di/dt=100A/μs		280		ns
Body Diode Reverse Recovery Charge		Q_{rr}			6.9		μC

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

■ TEST CIRCUITS AND WAVEFORMS

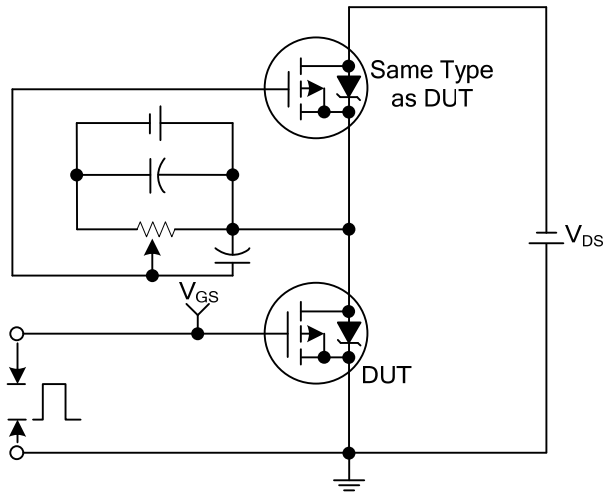


Peak Diode Recovery dv/dt Test Circuit

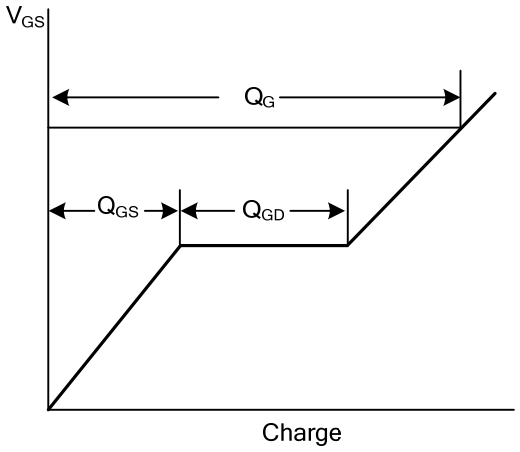


Peak Diode Recovery dv/dt Waveforms

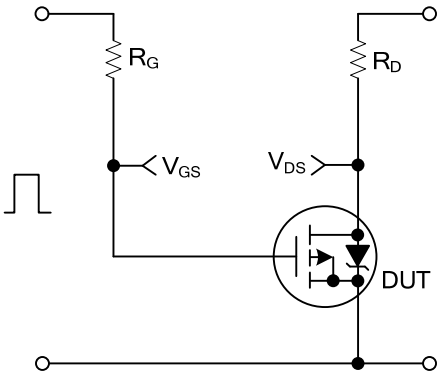
■ TEST CIRCUITS AND WAVEFORMS



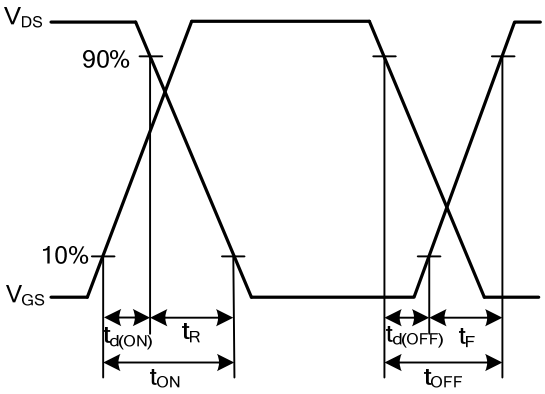
Gate Charge Test Circuit



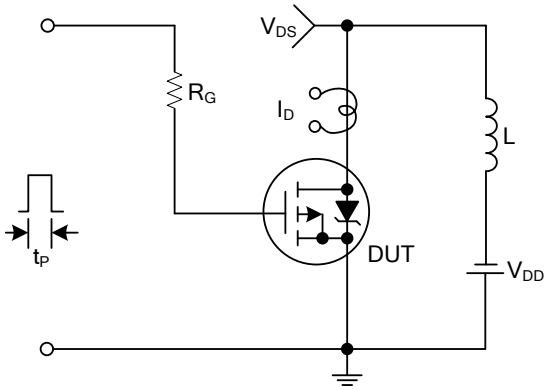
Gate Charge Waveforms



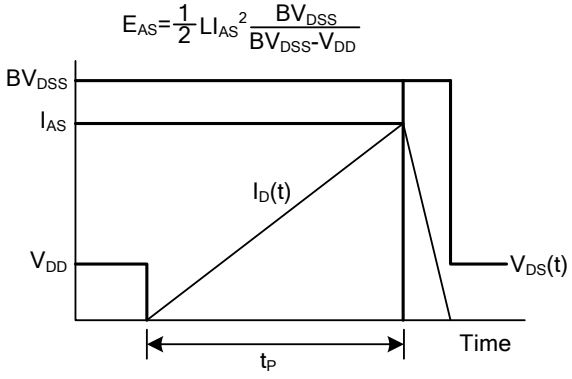
Resistive Switching Test Circuit



Resistive Switching Waveforms



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS