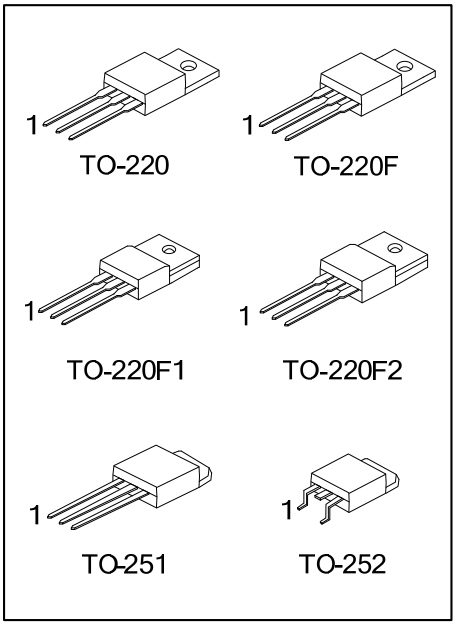
UTT50P10

Preliminary | ***Power MOSFET***

-50A, -100V P-CHANNEL POWER MOSFET



■ DESCRIPTION

The UTC **UTT50P10** 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. It can also withstand high energy in the avalanche.

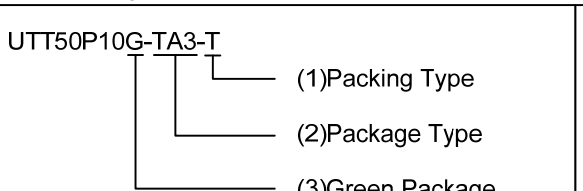
■ FEATURES

* V_{DS}= -100V
* I_D = -50A
* $R_{DS(ON)}$ ≤ 60 mΩ @ V_{GS}= -10V, I_D= -20A
* High Switching Speed

■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT50P10L-TA3-T	UTT50P10G-TA3-T	TO-220	G	D	S	Tube
UTT50P10L-TF1-T	UTT50P10G-TF1-T	TO-220F1	G	D	S	Tube
UTT50P10L-TF2-T	UTT50P10G-TF2-T	TO-220F2	G	D	S	Tube
UTT50P10L-TF3-T	UTT50P10G-TF3-T	TO-220F	G	D	S	Tube
UTT50P10L-TM3-T	UTT50P10G-TM3-T	TO-251	G	D	S	Tube
UTT50P10L-TN3-R	UTT50P10G-TN3-R	TO-252	G	D	S	Tape Reel

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

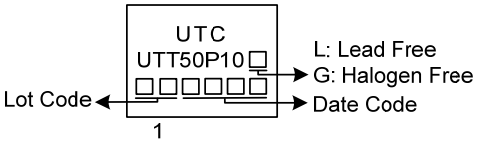


(1) T: Tube, R: Tape Reel

(2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TF2: TO-220F2, TM3: TO-251, 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
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	-50	A
	Pulsed	I_{DM}	-90	A
Power Dissipation	TO-220	P_D	140	W
	TO-220F/TO-220F1 TO-220F2		28	W
	TO-251/TO-252		40	W
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

Note: 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.

■ THERMAL DATA

PARAMETER	PACKAGE	SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F TO-220F1/TO-220F2	θ_{JA}	62.5	°C/W
	TO-251/TO-252		50	°C/W
Junction to Case	TO-220	θ_{JC}	0.89	°C/W
	TO-220F/TO-220F1 TO-220F2		4.46	°C/W
	TO-251/TO-252		3.12	°C/W

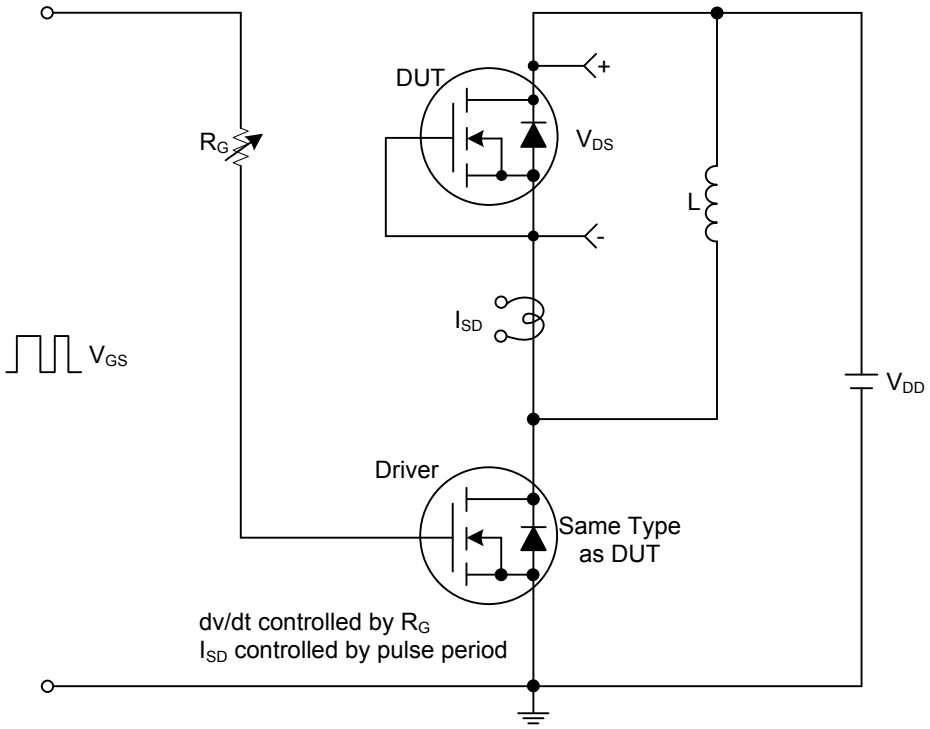
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

■ ELECTRICAL CHARACTERISTICS

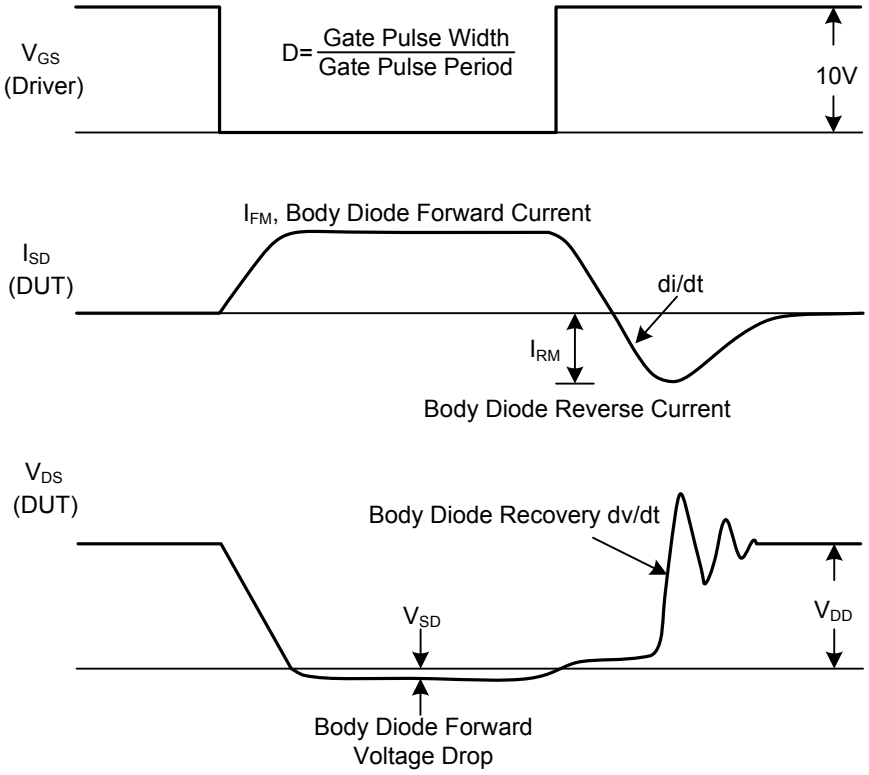
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=-250μA, V_{GS}=0V	-100			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=0.8×Max.rating, V_{GS}=0V, T_J=25°C			-1	μA
			V_{DS}=0.8×Max.rating, V_{GS}=0V, T_J=125°C			-500	
Gate- Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V			+100	nA
	Reverse		V_{GS}=-20V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.0		-3.0	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-20A			60	mΩ
			V_{GS}=-4.5V, I_D=-15A			65	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=-50V, f=1.0MHz		4200		pF
Output Capacitance		C_{OSS}			250		pF
Reverse Transfer Capacitance		C_{RSS}			110		pF
SWITCHING PARAMETERS							
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=-50V, V_{GS}=-10V, I_D=-50A, R_G=1Ω		80	130	ns
Rise Time		t_R			76	130	ns
Turn-OFF Delay Time		$t_{D(OFF)}$			740	900	ns
Fall-Time		t_F			200	400	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Drain-Source Diode Forward Voltage		V_{SD}	I_F=-20A, V_{GS}=0V, Pulse test, t≤300μs, duty cycle d≤2%			-2.0	V
Body Diode Reverse Recovery Time		t_{RR}	T_J=25°C, I_F=-20A, V_R=-50V, di/dt=-100A/μs		80	120	ns

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

■ TEST CIRCUITS AND WAVEFORMS



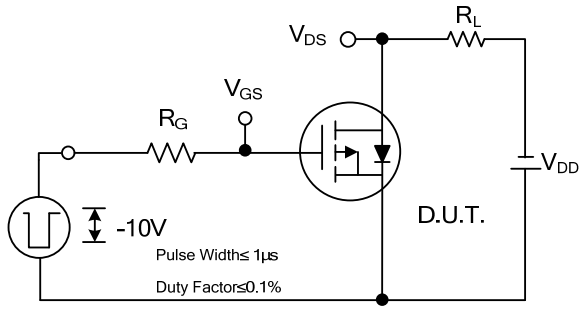
Peak Diode Recovery dv/dt Test Circuit



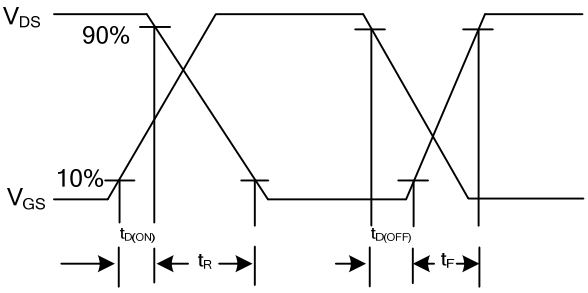
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

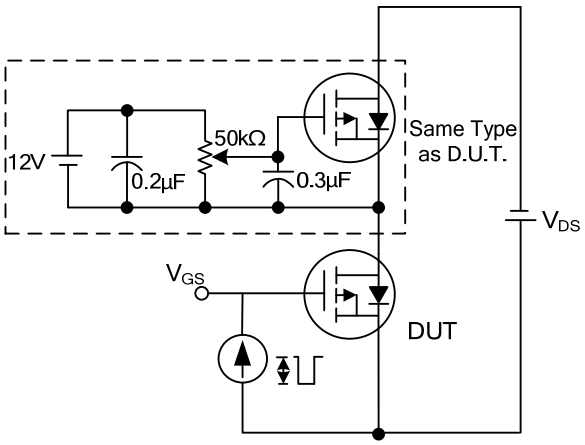
■ TEST CIRCUITS AND WAVEFORMS



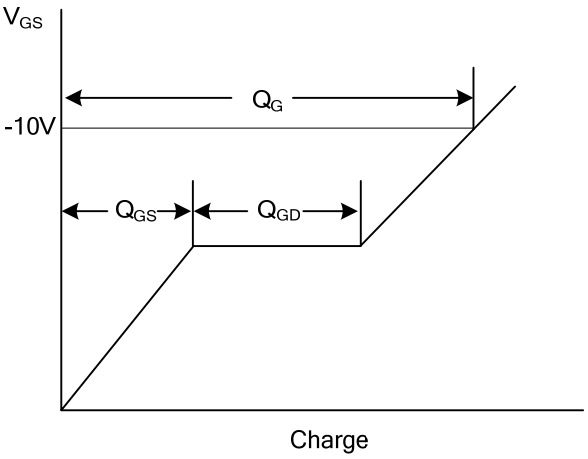
Switching Test Circuit



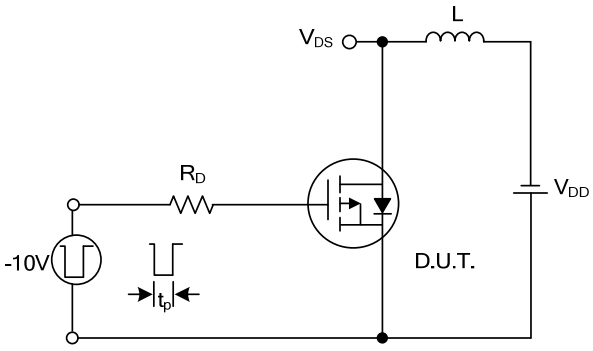
Switching Waveforms



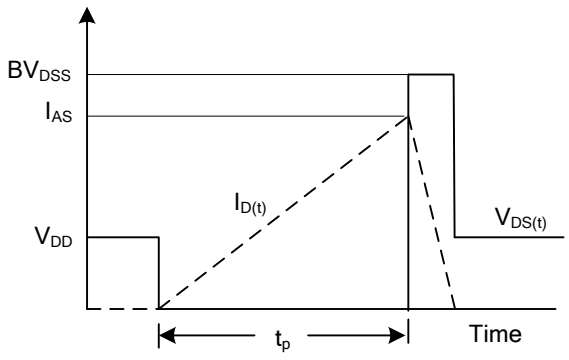
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms