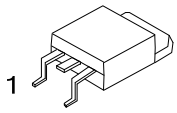
UTT60P03 **Preliminary** ***Power MOSFET***

-60A, -30V, P-CHANNEL POWER MOSFETS



TO-252

■ DESCRIPTION

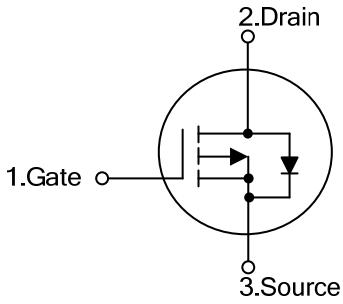
The UTC **UTT60P03** is a P-channel power MOSFET using UTC's advanced technology to provide the customers with high switching speed and a minimum on-state resistance and it can also withstand high energy in the avalanche.

This UTC **UTT60P03** is suitable for switching converters, motor drivers, switching regulators and relay drivers.

■ FEATURES

* $R_{DS(ON)}$ < 13mΩ @ V_{GS}=-10V, I_D=-20A
* High Switching Speed

■ SYMBOL



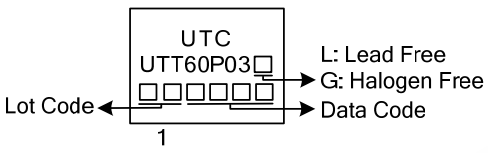
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UTT60P03L-TN3-R	UTT60P03G-TN3-R	TO-252	G	D	S	Tape Reel

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

UTT60P03L-TM3-T (1)Packing Type	(1) T: Tube, R: Tape Reel
(2)Package Type	(2) TM3: TO-251, TN3: TO-252
(3)Green Package	(3) L: Lead Free, G: Halogen Free and Lead Free

■ MARKING



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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage (Note 2)		V_{DSS}	-30	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	-60	A
	Pulsed (Note 2)	I_{DM}	240	A
Power Dissipation		P_D	45	W
Junction Temperature		T_J	+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.

■ THERMAL CHARACTERISTICS

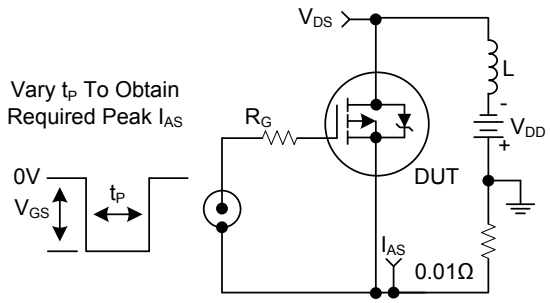
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	110	°C/W
Junction to Case	θ_{JC}	2.73	°C/W

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

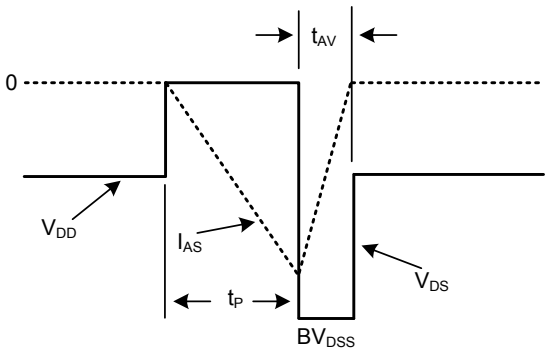
PARAMETER		SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS								
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=-250μA, V_{GS}=0V		-30			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=Rated BV_{DSS}, V_{GS}=0V				-1	μA
			V_{DS}=0.8×Rated BV_{DSS}, T_C=150°C				-50	
Gate- Source Leakage 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		-2		-4	V
Static Drain-Source On-State Resistance (Note1)		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-20A				13	mΩ
DYNAMIC PARAMETERS								
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=-25V, f=1.0MHz			3000		pF
Output Capacitance		C_{OSS}				1500		pF
Reverse Transfer Capacitance		C_{RSS}				525		pF
SWITCHING PARAMETERS								
Total Gate Charge		Q_G	V_{GS}=0 ~ -20V	V_{DD}=-24V, I_D≈-60A, R_L=0.4Ω, $I_{G(REF)}$=-3mA		190	230	nC
Gate Charge at 10V		$Q_{G(-10)}$	V_{GS}=0 ~ -10V			100	120	nC
Threshold Gate Charge		$Q_{G(TH)}$	V_{GS}=0 ~ -2V			7.5	9	nC
Turn-On Time		t_{ON}	V_{DD}=15V, V_{GS}=-10V, I_D≈60A, R_L=0.25Ω, R_G=2.5Ω				140	ns
Turn-ON Delay Time		$t_{D(ON)}$				20		ns
Rise Time		t_R				75		ns
Turn-OFF Delay Time		$t_{D(OFF)}$				35		ns
Fall-Time		t_F				40		ns
Turn-Off Time		t_{OFF}					115	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS								
Drain-Source Diode Forward Voltage (Note)		V_{SD}	I_{SD}=-60A				-1.75	V
Body Diode Reverse Recovery Time		t_{RR}	I_{SD}=-60A, I_{SD}/dt=100A/μs				200	ns

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

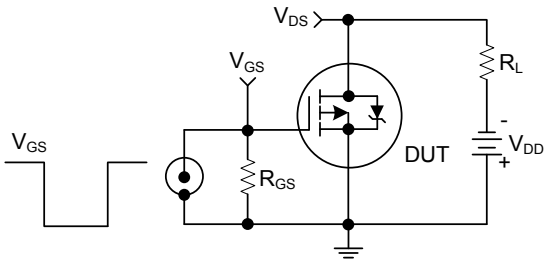
■ TEST CIRCUITS AND WAVEFORMS



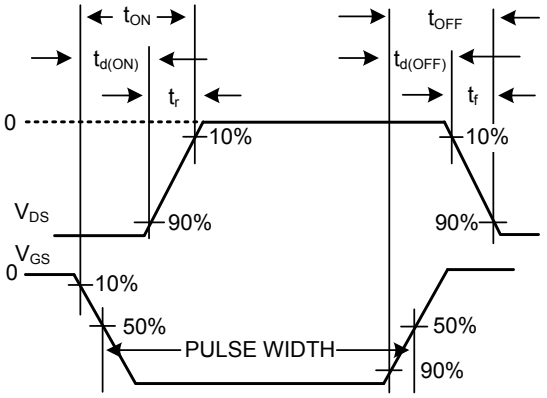
Unclamped Energy Test Circuit



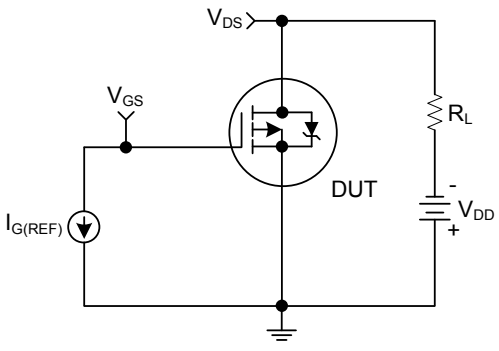
Unclamped Energy Waveform



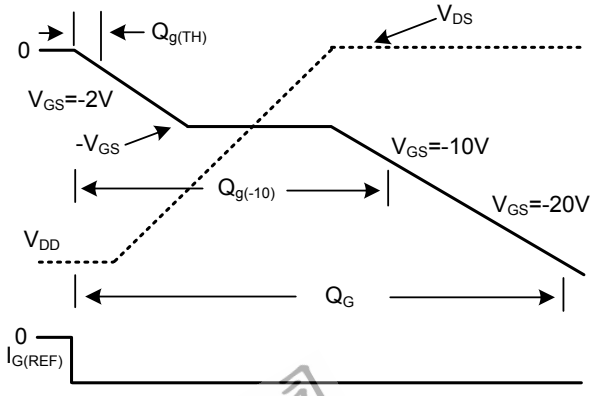
Switching Time Test Circuit



Resistive Switching Waveforms



Gate Charge Test Circuit



Gate Charge Waveforms