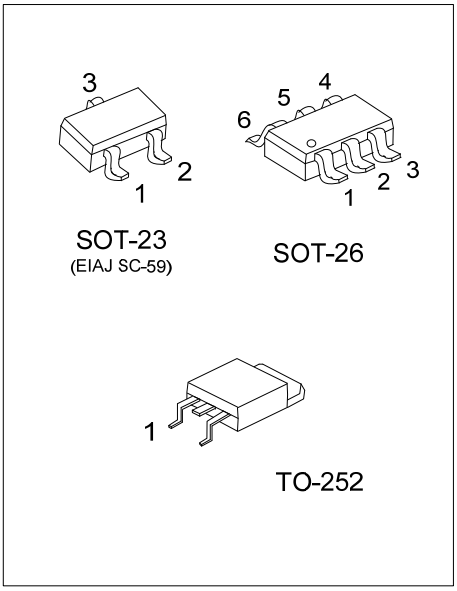
-3.0A, -60V (D-S) P-CHANNEL POWER MOSFET



■ DESCRIPTION

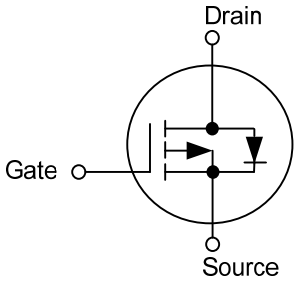
The UTC **UT3P06-Q** is a P-channel enhancement power MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$ and low gate charge.

This UTC **UT3P06-Q** can be operated with -4.5V low gate voltage.

■ FEATURES

* $R_{DS(ON)} \leq 160\ m\Omega$ @ V_{GS}=-10V, I_D=-2.0A
$R_{DS(ON)} \leq 210\ m\Omega$ @ V_{GS}=-4.5V, I_D=-2.0A

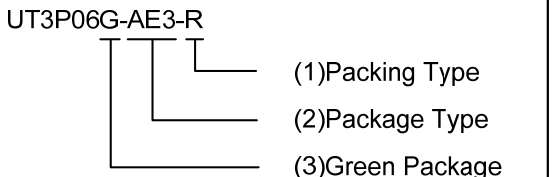
■ SYMBOL



■ ORDERING INFORMATION

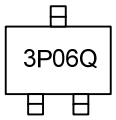
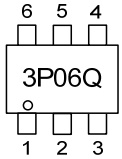
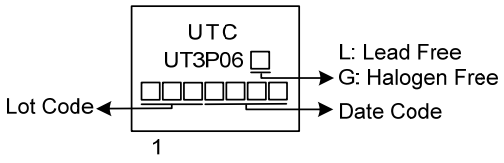
Ordering Number		Package	Pin Assignment						Packing
Lead Free	Halogen Free		1	2	3	4	5	6	
UT3P06L-AE3-R	UT3P06G-AE3-R	SOT-23	G	S	D	-	-	-	Tape Reel
UT3P06L-AG6-R	UT3P06G-AG6-R	SOT-26	D	D	G	S	D	D	Tape Reel
UT3P06L-TN3-R	UT3P06G-TN3-R	TO-252	G	D	S	-	-	-	Tape Reel

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



(1) R: Tape Reel
(2) AE3: SOT-23, AG6: SOT-26, TN3: TO-252
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

SOT-23	SOT-26	TO-252
		

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	-60	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	-3	A
	Pulsed	I_{DM}	-10	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	12	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.2	V/ns
Power Dissipation (Note 1, 2)	SOT-23/SOT-26	P_D	1.25	W
	TO-252		3.1	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.
3. L = 0.1mH, I_{AS} = -15.7A, V_{DD} = -50V, R_G = 25 Ω Starting T_J = 25°C
4. I_{SD} ≤ -3.0A, di/dt ≤ 200A/μs, V_{DD} ≤BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23/SOT-26	θ_{JA}	100	°C/W
	TO-252		40	°C/W

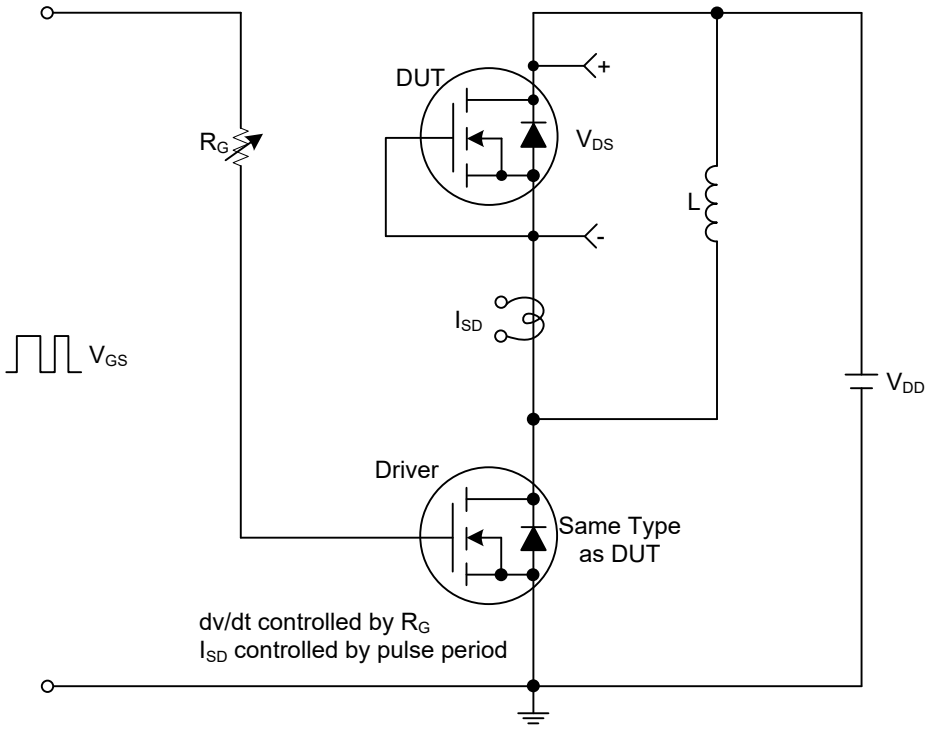
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

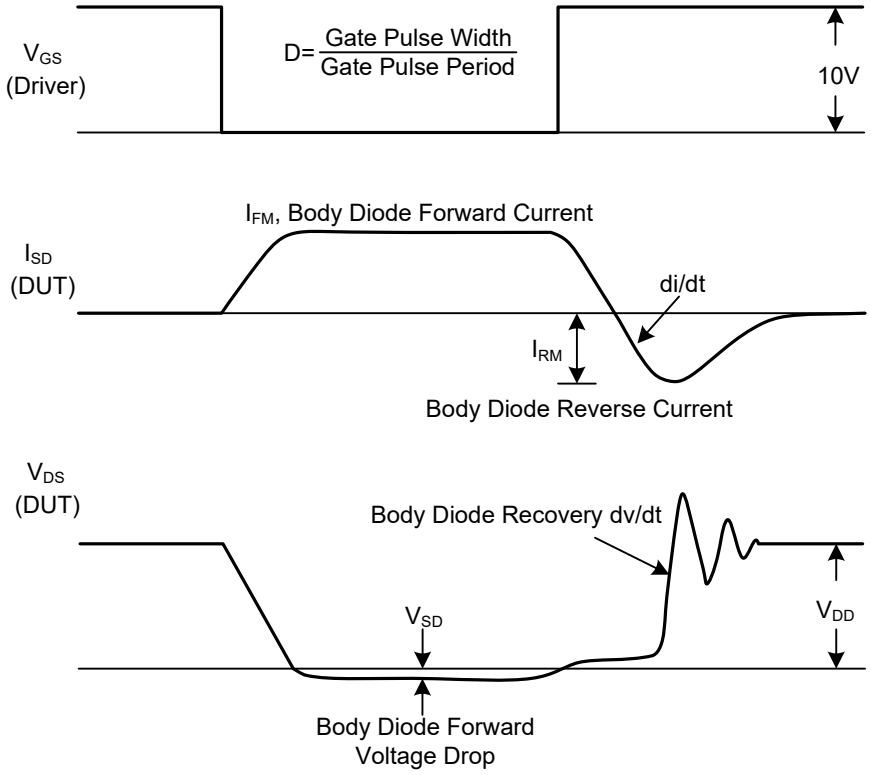
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=-250μA, V_{GS}=0V	-60			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=-48V, V_{GS}=0V			-1	μA
			V_{DS}=-48V, V_{GS}=0V , T_J=150°C			-50	
Gate- Source Leakage Current	Forward	I_{GSS}	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	-1.0		-3.0	V
Static Drain-Source On-State Resistance (Note 1)		$R_{DS(ON)}$	V_{GS}=-10V, I_D=-2.0A		135	160	mΩ
			V_{GS}=-4.5V, I_D=-2.0A		175	210	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{DS} =-25V, V_{GS} =0V, f =1MHz		420		pF
Output Capacitance		C_{OSS}			45		pF
Reverse Transfer Capacitance		C_{RSS}			30		pF
SWITCHING PARAMETERS (Note 2)							
Total Gate Charge		Q_G	V_{DS}=-48V, V_{GS}=-10V, I_D=-3.0A		14		nC
Gate to Source Charge		Q_{GS}			3		nC
Gate to Drain Charge		Q_{GD}			2.5		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=-30V, V_{GS}=-10V, I_D=-3.0A, R_G=3Ω		4		ns
Rise Time		t_R			17		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			16		ns
Fall-Time		t_F			19		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS (Note 2)							
Maximum Body-Diode Continuous Current		I_S				-1.7	A
Maximum Body-Diode Pulsed Current		I_{SM}				-10	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=-3.0A, V_{GS}=0V (Note 1)		-0.8	-1.2	V
Reverse Recovery Time (Note 1)		t_{rr}	I_S=-3.0A, V_{GS}=0V		40		ns
Reverse Recovery Charge		Q_{rr}	dI_F/dt=100A/μs (Note1)		25		nC

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

■ TEST CIRCUITS AND WAVEFORMS



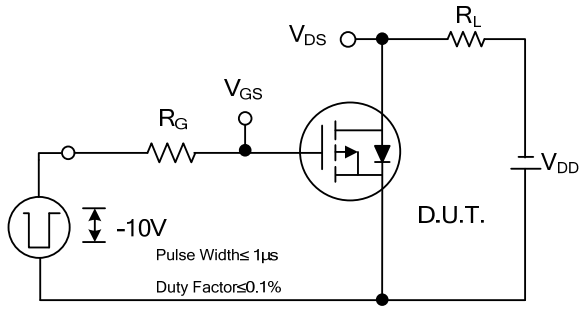
Peak Diode Recovery dv/dt Test Circuit



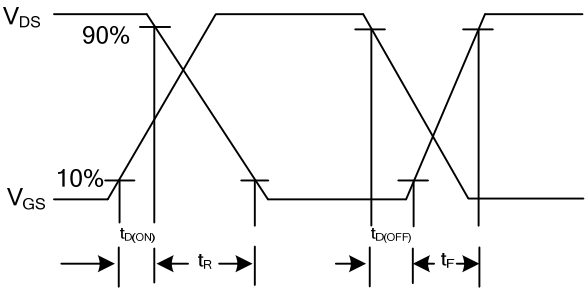
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

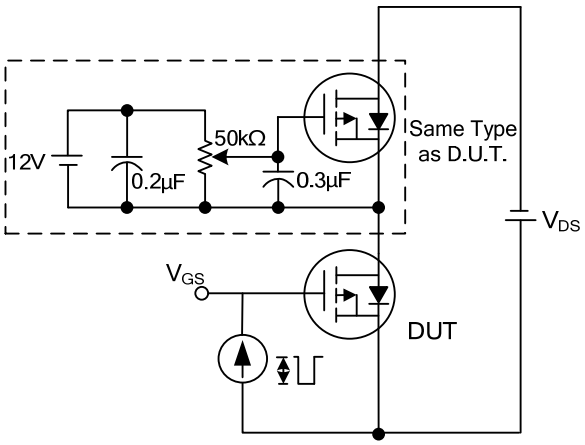
■ TEST CIRCUITS AND WAVEFORMS



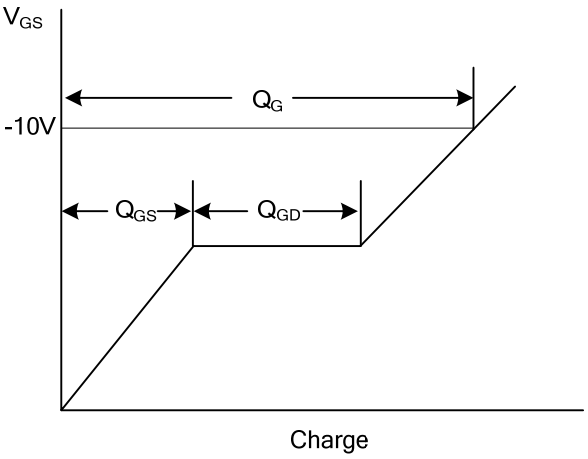
Switching Test Circuit



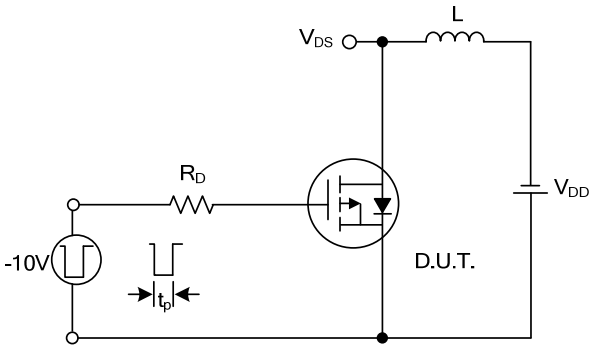
Switching Waveforms



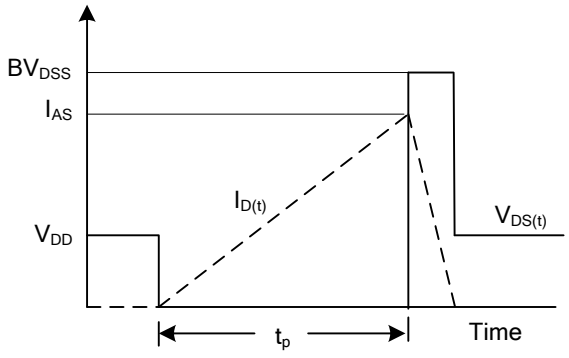
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms