



UT3P06-Q

Preliminary

Power MOSFET

-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.

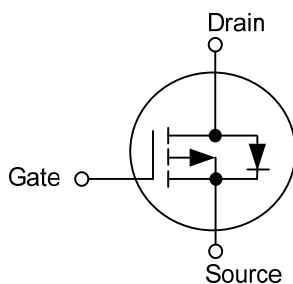
This UTC **UT3P06-Q** can be operated with -4.5V low gate voltage.

FEATURES

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

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

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

<p>UT3P06G-AE3-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) AE3: SOT-23, AG6: SOT-26, TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING

SOT-23	SOT-26	TO-252
		<p>Lot Code → UTC UT3P06 → Date Code L: Lead Free G: Halogen Free</p>

■ ABSOLUTE MAXIMUM RATINGS ($T_C=25^{\circ}\text{C}$, 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	$^{\circ}\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

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. $L = 0.1\text{mH}$, $I_{AS} = -15.7\text{A}$, $V_{DD} = -50\text{V}$, $R_G = 25\ \Omega$ Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD} \leq -3.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^{\circ}\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23/SOT-26	θ_{JA}	100	$^{\circ}\text{C}/\text{W}$
	TO-252		40	$^{\circ}\text{C}/\text{W}$

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

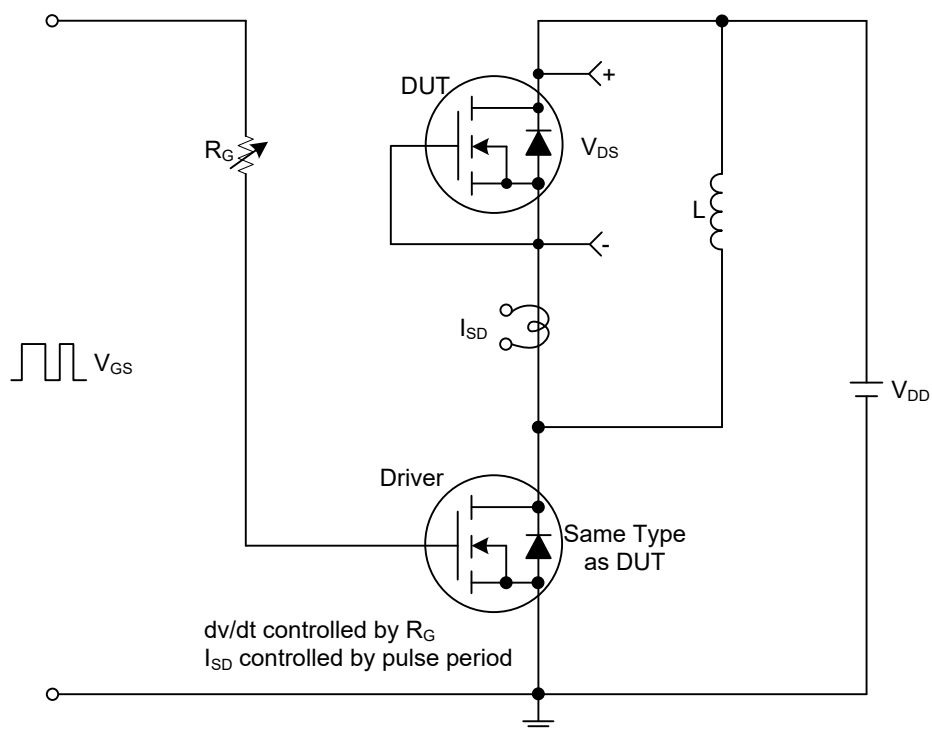
■ ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

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}	dl _F /dt=100A/μs (Note1)		25		nC

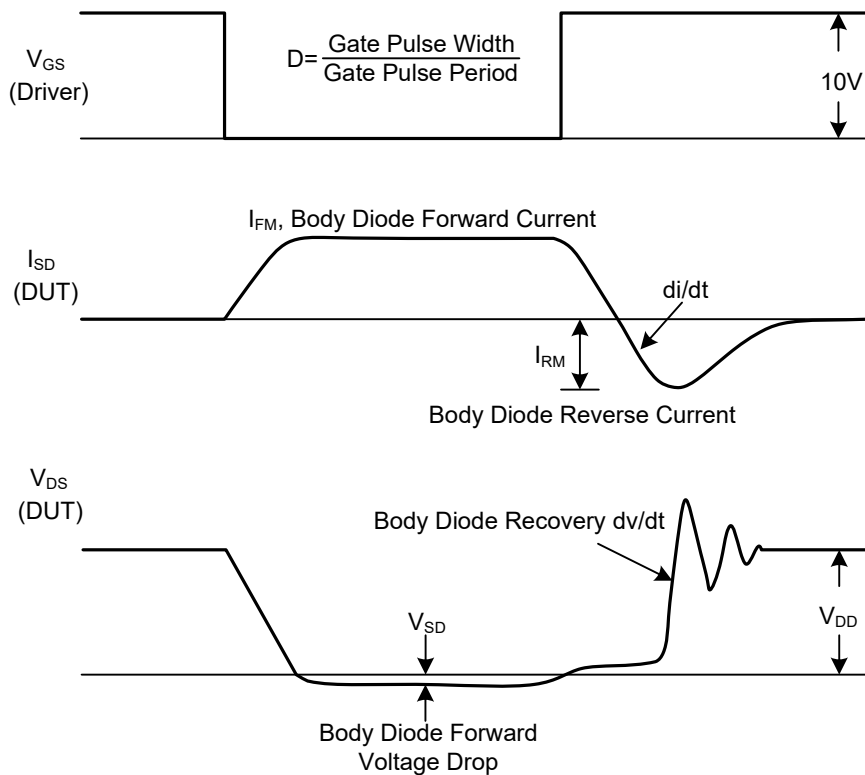
Notes: 1. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



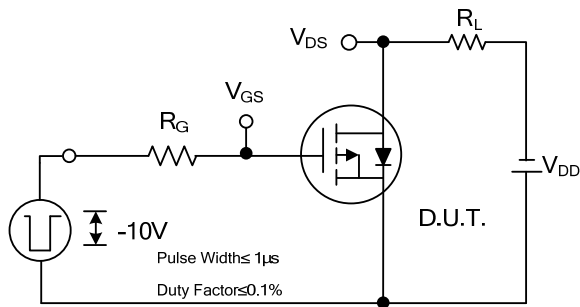
Peak Diode Recovery dv/dt Test Circuit



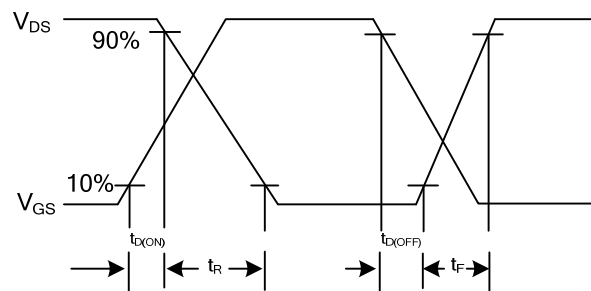
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

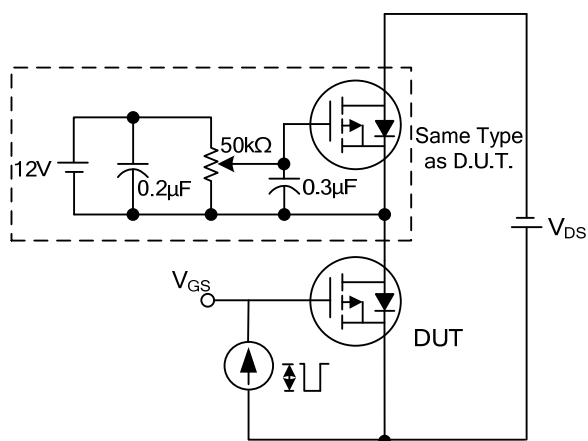
■ TEST CIRCUITS AND WAVEFORMS



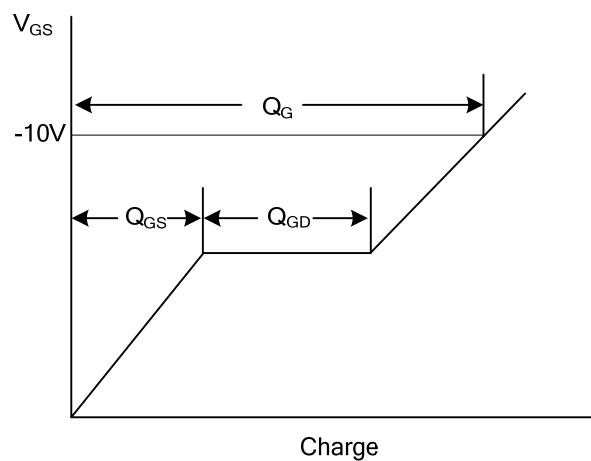
Switching Test Circuit



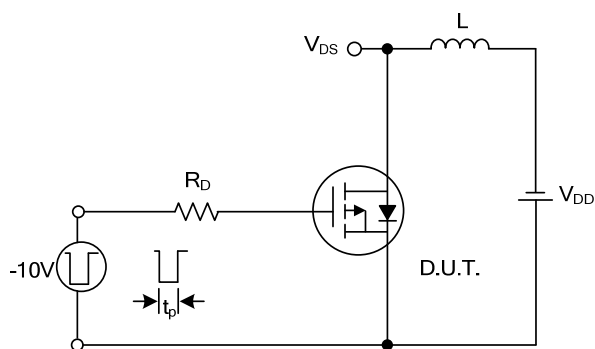
Switching Waveforms



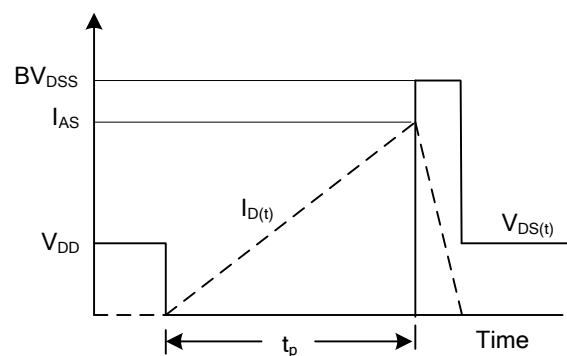
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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