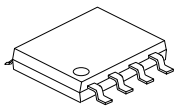
DUAL ENHANCEMENT MODE (N-CHANNEL/P-CHANNEL)



SOP-8

■ DESCRIPTION

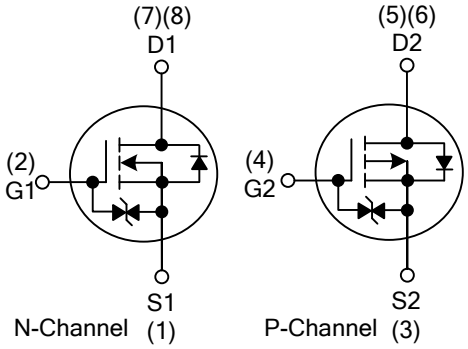
The UTC **QS8M11** uses UTC's advanced technology to provide the customers with low voltage drive, etc.

The UTC **QS8M11** is suitable for switching.

■ FEATURES

* N-Channel: 30V, 3.5A
  $R_{DS(ON)}$ < 50mΩ @ V_{GS} =10V
  $R_{DS(ON)}$ < 65mΩ @ V_{GS}= 4.5V
  $R_{DS(ON)}$ < 70mΩ @ V_{GS}= 4.0V
* P-Channel: -30V, -3.0A
  $R_{DS(ON)}$ < 75mΩ @ V_{GS}= -10V
  $R_{DS(ON)}$ < 115mΩ @ V_{GS}= -4.5V
  $R_{DS(ON)}$ < 125mΩ @ V_{GS}= -4.0V
* Low voltage drive (4V drive)
* Low on-resistance

■ SYMBOL



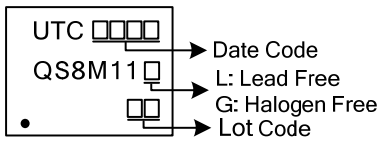
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
QS8M11L-S08-T	QS8M11G-S08-T	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tube
QS8M11L-S08-R	QS8M11G-S08-R	SOP-8	S1	G1	S2	G2	D2	D2	D1	D1	Tape Reel

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

QS8M11L-S08-R (1)Packing Type (2)Package Type (3)Lead Free	(1) T: Tube, R: Tape Reel (2) S08: SOP-8 (3) L: Lead Free, G: Halogen Free

■ MARKING



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

N-Channel

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	T_C=25°C	I_D	3.5	A
Pulsed Drain Current	T_C=25°C	I_{DM}	12	A
Power Dissipation		P_D	2	W
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

P-Channel

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	-30	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	T_C=25°C	I_D	-3.0	A
Pulsed Drain Current	T_C=25°C	I_{DM}	-12	A
Power Dissipation		P_D	2	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. P_W ≤ 10μs, Duty cycle ≤ 1%, Mounted on a ceramic board.

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

N-CHANNEL

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=1mA, V_{GS}=0V	30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±10	uA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=10V, I_D=1mA	1.0		2.5	V
Drain-Source On-State Resistance (Note2)	$R_{DS(ON)}$	V_{GS}=10V, I_D=3.5A		35	50	mΩ
		V_{GS}=4.5V, I_D=3.5A		45	65	mΩ
		V_{GS}=4.0V, I_D=3.5A		50	70	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS}=10V, f=1.0MHz		180		pF
Output Capacitance	C_{OSS}			70		pF
Reverse Transfer Capacitance	C_{RSS}			35		pF
SWITCHING CHARACTERISTICS						
Turn-ON Delay Time (Note2)	$t_{D(ON)}$	V_{DD}≈15V, V_{GS}=10V, I_D=1.7A, R_G=10Ω, R_L=8.8Ω		10		ns
Turn-ON Rise Time	t_R			25		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			25		ns
Turn-OFF Fall Time	t_F			7		ns
Total Gate Charge (Note2)	Q_G	V_{GS}=5V, V_{DD}≈15V, I_D=3.5A		3.5		nC
Gate-Source Charge	Q_{GS}			1		nC
Gate-Drain Charge	Q_{GD}			1		nC
SOURCE TO DRAIN DIODE SPECIFICATIONS						
Source to Drain Diode Voltage (Note 2)	V_{SD}	I_S=3.5A, V_{GS}=0V			1.2	V
Maximum Continuous Drain-Source Diode Forward Current	I_S				1.0	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				12	A

■ ELECTRICAL CHARACTERISTICS(Cont.)

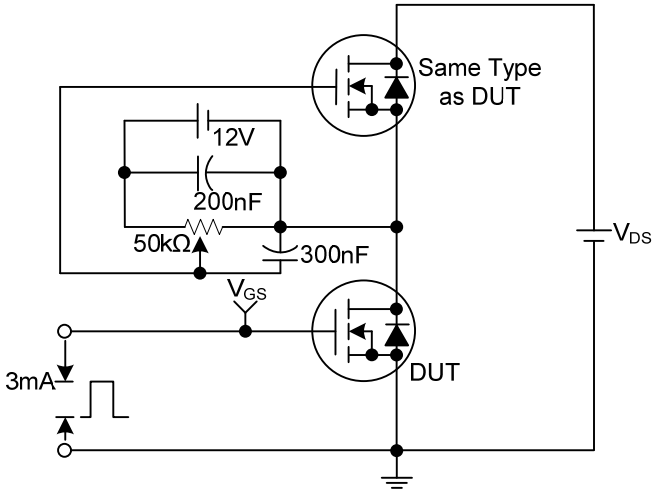
P-CHANNEL

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=-1mA, V_{GS}=0V	-30			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-30V, V_{GS}=0V			-1	μA
Gate-Source Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±10	μA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=-10V, I_D=-1mA	-1.0		-2.5	V
Drain-Source On-State Resistance (Note2)	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-3.5A		55	75	mΩ
		V_{GS}=-4.5V, I_D=-1.5A		85	115	mΩ
		V_{GS}=-4.0V, I_D=-1.5A		95	125	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS}=-10V, f=1.0MHz		480		pF
Output Capacitance	C_{OSS}			70		pF
Reverse Transfer Capacitance	C_{RSS}			70		pF
SWITCHING CHARACTERISTICS						
Turn-ON Delay Time (Note2)	$t_{D(ON)}$	V_{DD}≈-15V, V_{GS}=-10V, I_D=-1.5A, R_G=10Ω, R_L=10Ω		7		ns
Turn-ON Rise Time	t_R			18		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			50		ns
Turn-OFF Fall Time	t_F			35		ns
Total Gate Charge (Note2)	Q_G	V_{GS}=-5V, V_{DD}≈-15V, I_D=-3A		5.2		nC
Gate-Source Charge	Q_{GS}			1.6		nC
Gate-Drain Charge	Q_{GD}			1.6		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage(Note2)	V_{SD}	I_S=-3A, V_{GS}=0V			-1.2	V
Continuous Drain-Source Diode Forward Current	I_S				-1.0	A
Pulsed Drain-Source Diode Forward Current	I_{SM}				-12	A

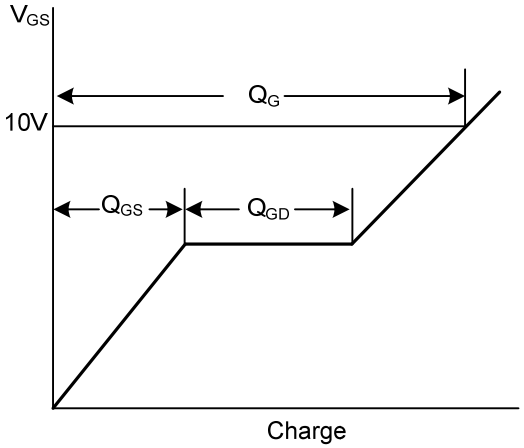
Notes: 1. Pulse width limited by $T_{J(MAX)}$
2. Pulse width ≤ 300us, duty cycle ≤ 2%.
3. Surface Mounted on 1in^2 pad area, t ≤ 10 sec.

■ TEST CIRCUITS AND WAVEFORMS

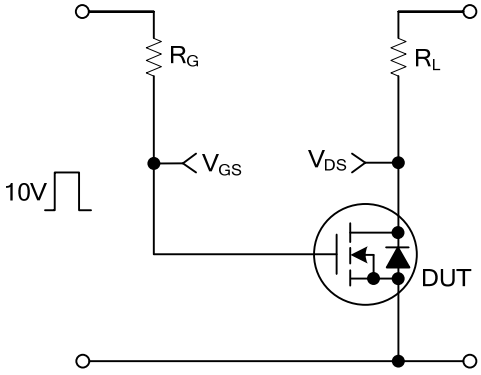
N-CHANNEL



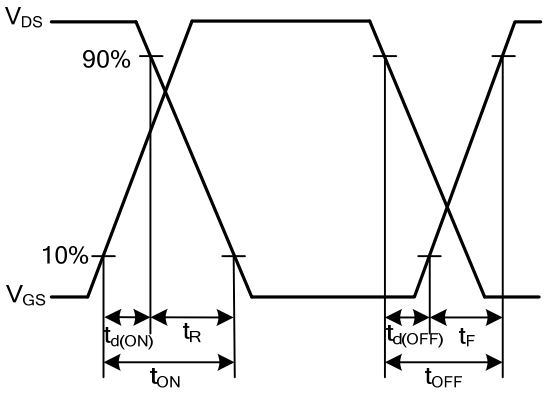
Gate Charge Test Circuit



Gate Charge Waveforms



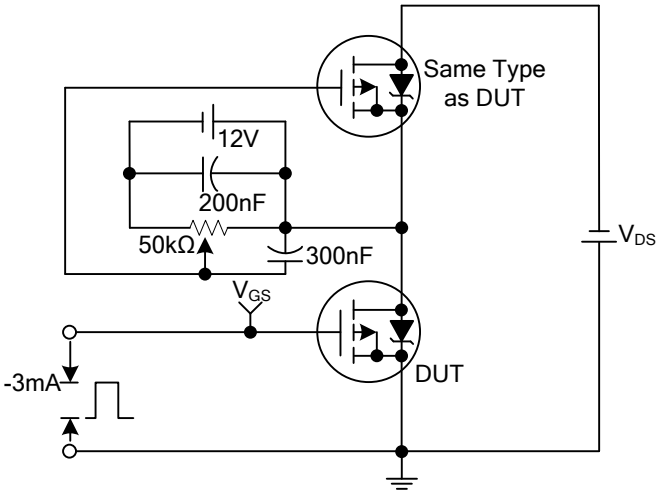
Resistive Switching Test Circuit



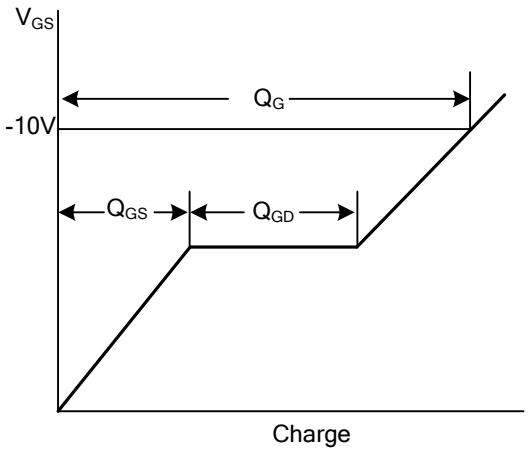
Resistive Switching Waveforms

■ TEST CIRCUITS AND WAVEFORMS(Cont.)

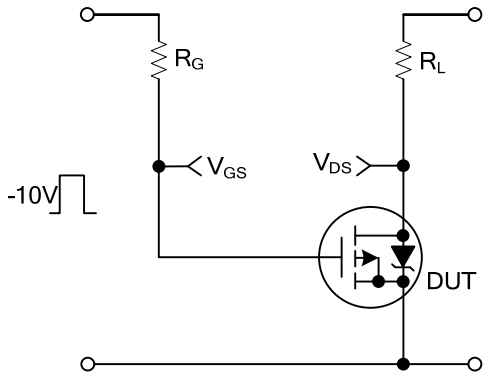
P-CHANNEL



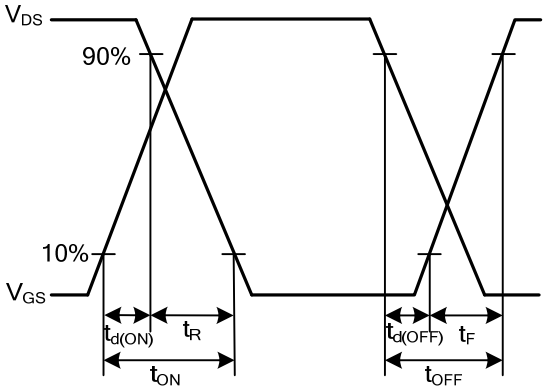
Gate Charge Test Circuit



Gate Charge Waveforms



Resistive Switching Test Circuit



Resistive Switching Waveforms