

**2N60Q-TA**

Preliminary

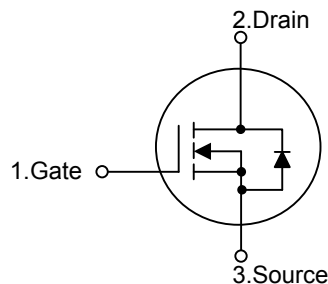
Power MOSFET

**2A, 600V N-CHANNEL
POWER MOSFET****DESCRIPTION**

The UTC **2N60Q-TA** is a high voltage MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

FEATURES

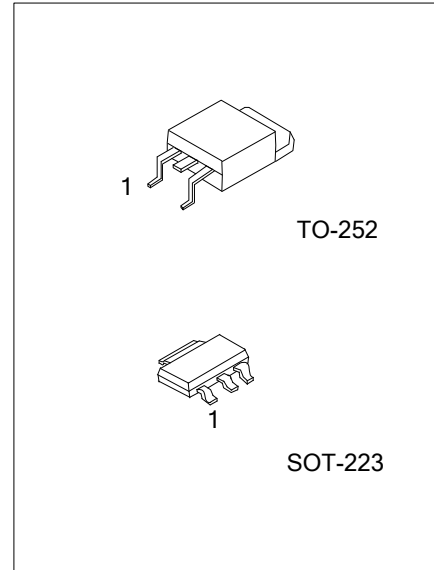
- * $R_{DS(ON)} \leq 12 \Omega$ @ $V_{GS}=10V$, $I_D=1.0A$
- * High Switching Speed
- * 100% Avalanche Tested

SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
2N60QL-AA3-R	2N60QG-AA3-R	SOT-223	G	D	S	Tape Reel
2N60QL-TN3-R	2N60QG-TN3-R	TO-252	G	D	S	Tape Reel

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

2N60QG-AA3-R 		(1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel (2) AA3: SOT-223, TN3: TO-252 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

SOT-223	TO-252
2N60Q□ □□□□ Lot Code ← 1 → Date Code L: Lead Free G: Halogen Free	UTC 2N60Q□ □□□□□□ Lot Code ← 1 → Date Code L: Lead Free G: Halogen Free

■ **ABSOLUTE MAXIMUM RATINGS** ($T_C=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	600	V
Gate-Source Voltage		V_{GSS}	± 30	V
Drain Current	Continuous ($T_C=25^{\circ}\text{C}$)	I_D	2	A
	Pulsed (Note 2)	I_{DM}	4	A
Avalanche Energy	Single Pulsed	E_{AS}	36.3	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.7	V/ns
Power Dissipation ($T_C=25^{\circ}\text{C}$)	SOT-223	P_D	2.1	W
	TO-252		32	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. $L=30\text{mH}$, $I_{AS}=1.5\text{A}$, $V_{DD}=80\text{V}$, $R_G=25\ \Omega$, Starting $T_J = 25^{\circ}\text{C}$

4. $I_{SD}\leq 2.0\text{A}$, $di/dt\leq 200\text{A}/\mu\text{s}$, $V_{DD}\leq BV_{DSS}$, Starting $T_J=25^{\circ}\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	160	$^{\circ}\text{C}/\text{W}$
	TO-252		110	$^{\circ}\text{C}/\text{W}$
Junction to Case	SOT-223	θ_{JC}	59.5	$^{\circ}\text{C}/\text{W}$
	TO-252		3.9	$^{\circ}\text{C}/\text{W}$

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

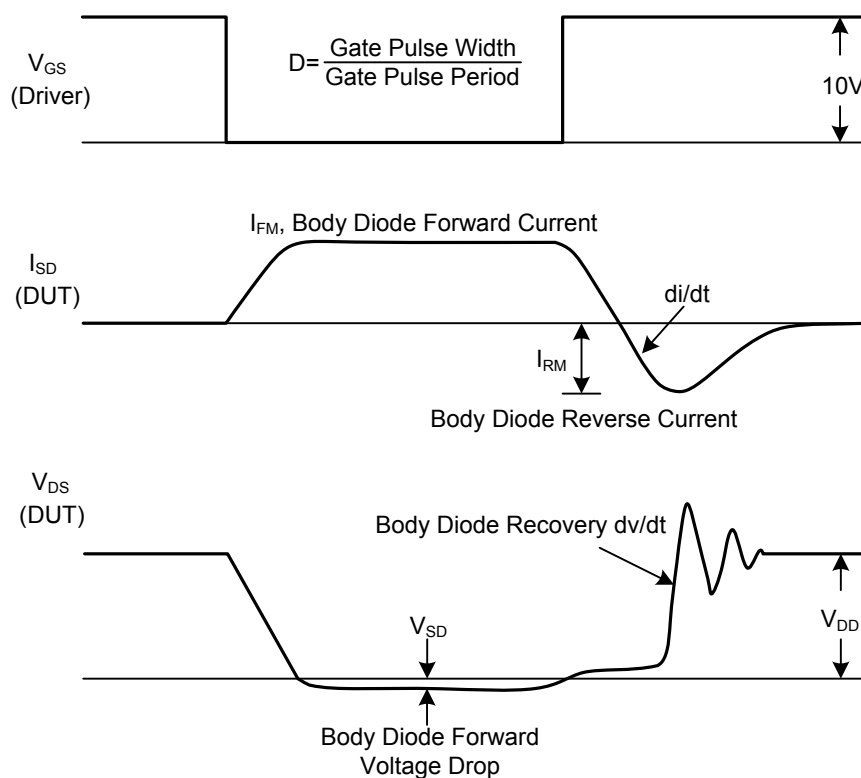
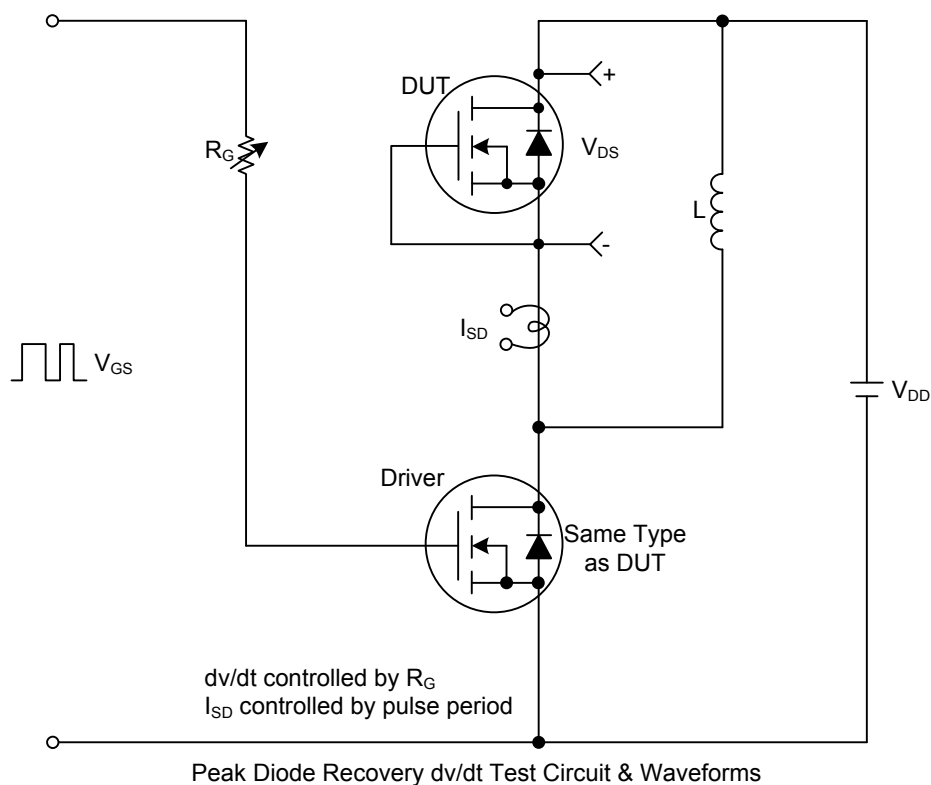
■ **ELECTRICAL CHARACTERISTICS** ($T_C=25^\circ\text{C}$, unless otherwise noted)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	I _D =250μA, V _{GS} =0V	600			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} =600V, V _{GS} =0V			10	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =+30V, V _{DS} =0V			+100	nA
	Reverse		V _{GS} =-30V, V _{DS} =0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =1.0A			12	Ω
DYNAMIC PARAMETERS							
Input Capacitance		C _{ISS}	V _{GS} =0V, V _{DS} =25V, f=1.0MHz		133.8		pF
Output Capacitance		C _{OSS}			21.1		pF
Reverse Transfer Capacitance		C _{RSS}			3.3		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q _G	V _{DS} =480V, V _{GS} =10V, I _D =2.0A, I _G = 1mA (Note 1, 2)		10.1		nC
Gate to Source Charge		Q _{GS}			3.9		nC
Gate to Drain Charge		Q _{GD}			2		nC
Turn-ON Delay Time		t _{D(ON)}	V _{DD} =100V, V _{GS} =10V, I _D =2.0A, R _G =25Ω (Note 1, 2)		4.2		ns
Rise Time		t _R			14.9		ns
Turn-OFF Delay Time		t _{D(OFF)}			16.1		ns
Fall-Time		t _F			26.5		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I _S				2	A
Maximum Body-Diode Pulsed Current		I _{SM}				4	A
Drain-Source Diode Forward Voltage		V _{SD}	I _S =2.0A, V _{GS} =0V			1.4	V
Reverse Recovery Time		t _{rr}	I _S =2.0A, V _{GS} =0V, di/dt=100A/μs		246.6		ns
Reverse Recovery Charge		Q _{rr}			1.9		μC

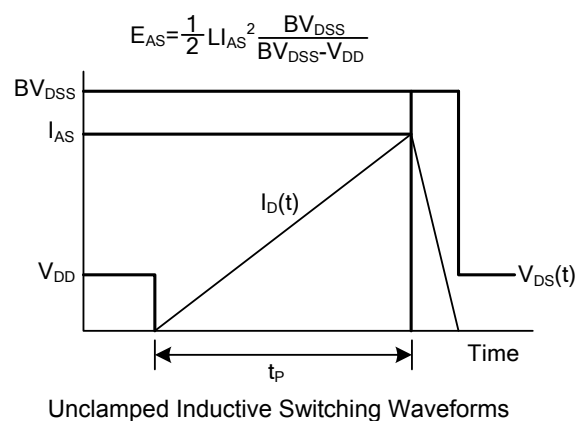
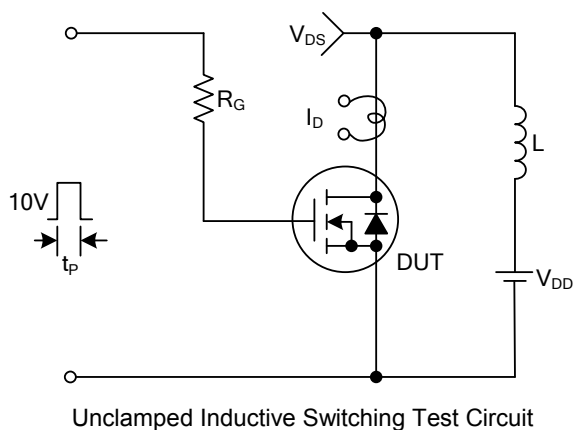
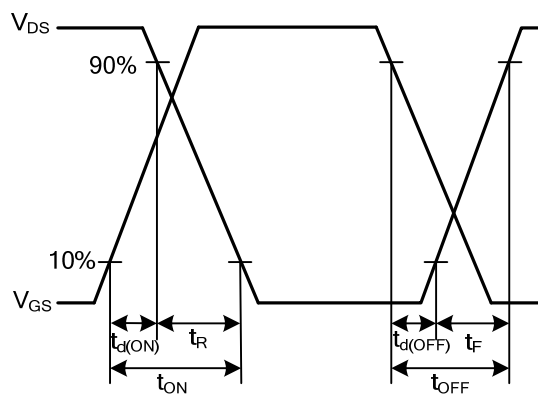
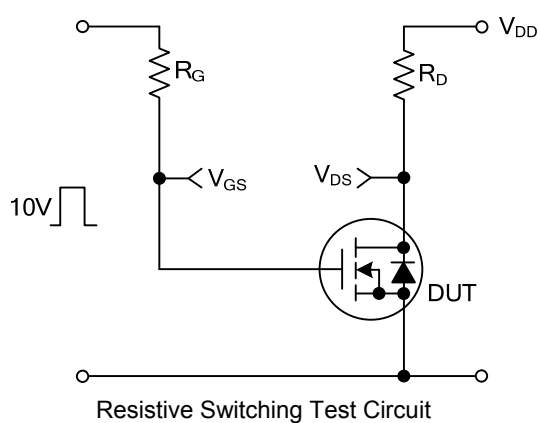
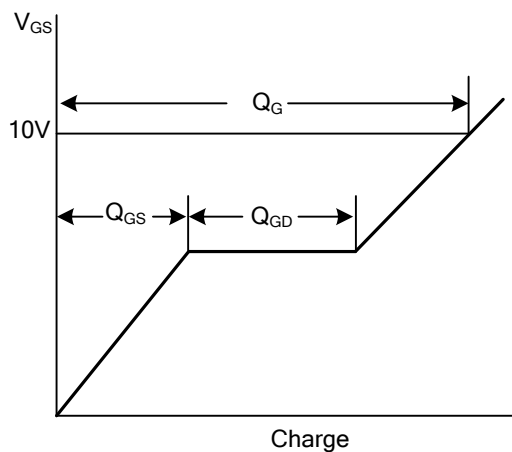
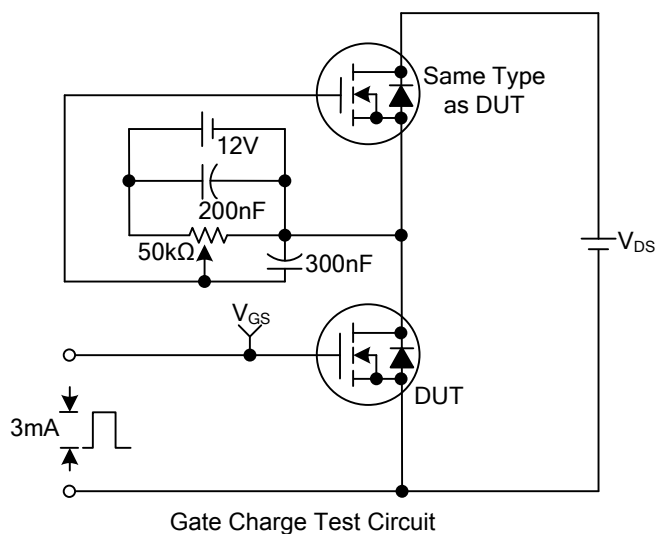
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS



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