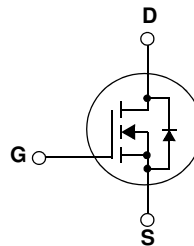
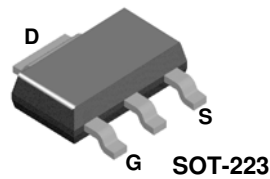


## Features

- 0.2 A, 600 V,  $R_{DS(on)}=9.3 \Omega$



## MOSFET Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted\*

Symbol	Parameter	FQT1N60C	Unit
$V_{DSS}$	Drain to Source Voltage	600	V
$V_{GSS}$	Gate to Source Voltage	$\pm 30$	V
$I_D$	Drain Current	- Continuous ( $T_C = 25^\circ\text{C}$ )	0.2
		- Continuous ( $T_C = 100^\circ\text{C}$ )	0.12
$I_{DM}$	Drain Current	- Pulsed (Note 1)	0.8
$E_{AS}$	Single Pulsed Avalanche Energy	(Note 2)	33
$I_{AR}$	Avalanche Current	(Note 1)	0.2
$E_{AR}$	Repetitive Avalanche Energy	(Note 1)	0.2
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	4.5
$P_D$	Power Dissipation	( $T_A = 25^\circ\text{C}$ )	2.1
		- Derate above $25^\circ\text{C}$	0.02
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
$T_L$	Maximum Lead Temperature for Soldering Purpose, 1/8" from Case for 5 Seconds	300	$^\circ\text{C}$

## Thermal Characteristics

Symbol	Parameter	Min.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient*	-	60	$^\circ\text{C}/\text{W}$

\* When mounted on the minimum pad size recommended (PCB Mount)

**Package Marking and Ordering Information**  $T_C = 25^\circ\text{C}$  unless otherwise noted

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FQT1N60C	FQT1N60C	SOT-223	330mm	12mm	4000

**Electrical Characteristics**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
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**Off Characteristics**

$BV_{DSS}$	Drain to Source Breakdown Voltage	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}, T_J = 25^\circ\text{C}$	600	-	-	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\mu\text{A}$ , Referenced to $25^\circ\text{C}$	-	0.6	-	$\text{V}/^\circ\text{C}$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 600\text{V}, V_{GS} = 0\text{V}$ $V_{DS} = 480\text{V}, T_C = 125^\circ\text{C}$	-	-	25 250	$\mu\text{A}$
$I_{GSS}$	Gate to Body Leakage Current	$V_{GS} = \pm 30\text{V}, V_{DS} = 0\text{V}$	-	-	$\pm 100$	nA

**On Characteristics**

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	2.0	-	4.0	V
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10\text{V}, I_D = 0.1\text{A}$	-	9.3	11.5	$\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 40\text{V}, I_D = 0.1\text{A}$ (Note 4)	-	0.75	-	S

**Dynamic Characteristics**

$C_{iss}$	Input Capacitance	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}$ $f = 1\text{MHz}$	-	130	170	pF
$C_{oss}$	Output Capacitance		-	19	25	pF
$C_{rss}$	Reverse Transfer Capacitance		-	3.5	6	pF
$Q_g$	Total Gate Charge at 10V	$V_{DS} = 480\text{V}, I_D = 1\text{A}$ $V_{GS} = 10\text{V}$ (Note 4, 5)	-	4.8	6.2	nC
$Q_{gs}$	Gate to Source Gate Charge		-	0.7	-	nC
$Q_{gd}$	Gate to Drain "Miller" Charge		-	2.7	-	nC

**Switching Characteristics**

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 300\text{V}, I_D = 1\text{A}$ $R_G = 25\Omega$ (Note 4, 5)	-	7	24	ns
$t_r$	Turn-On Rise Time		-	21	52	ns
$t_{d(off)}$	Turn-Off Delay Time		-	13	36	ns
$t_f$	Turn-Off Fall Time		-	27	64	ns

**Drain-Source Diode Characteristics**

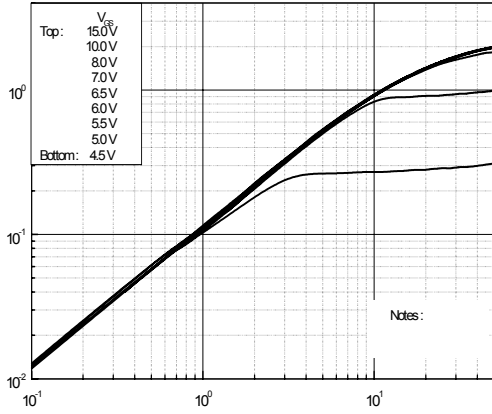
$I_S$	Maximum Continuous Drain to Source Diode Forward Current	-	-	0.2	A	
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current	-	-	0.8	A	
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS} = 0\text{V}, I_{SD} = 0.2\text{A}$	-	-	1.4	V
$t_{rr}$	Reverse Recovery Time	$V_{GS} = 0\text{V}, I_{SD} = 1\text{A}$	-	190	-	ns
$Q_{rr}$	Reverse Recovery Charge	$di_F/dt = 100\text{A}/\mu\text{s}$ (Note 4)	-	0.53	-	$\mu\text{C}$

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $L = 59\text{mH}, I_{AS} = 1.1\text{A}, V_{DD} = 50\text{V}, R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$
3.  $I_{SD} \leq 0.2\text{A}, di/dt \leq 200\text{A}/\mu\text{s}, V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$
4. Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$
5. Essentially Independent of Operating Temperature Typical Characteristics

## Typical Performance Characteristics

**Figure 1. On-Region Characteristics**



**Figure 2. Transfer Characteristics**

**Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage**

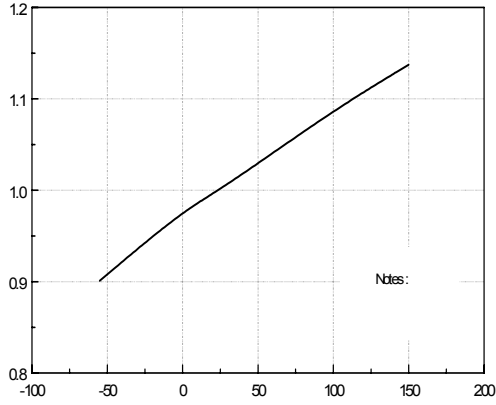
**Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature**

**Figure 5. Capacitance Characteristics**

**Figure 6. Gate Charge Characteristics**

**Typical Performance Characteristics** (Continued)

**Figure 7. Breakdown Voltage Variation vs. Temperature**



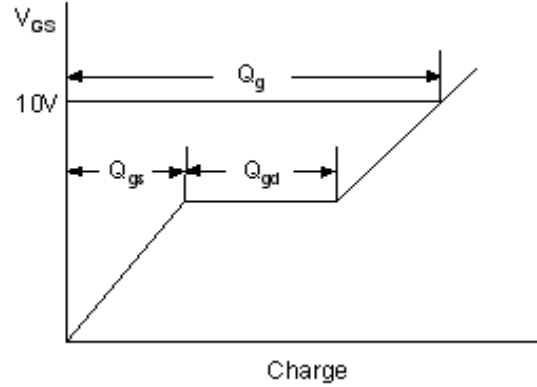
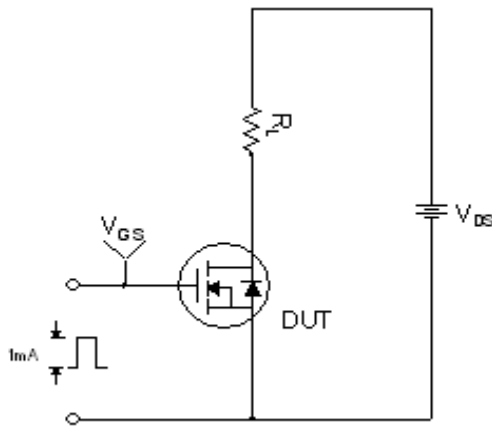
**Figure 8. On-Resistance Variation vs. Temperature**

**Figure 9. Maximum Safe Operating Area**

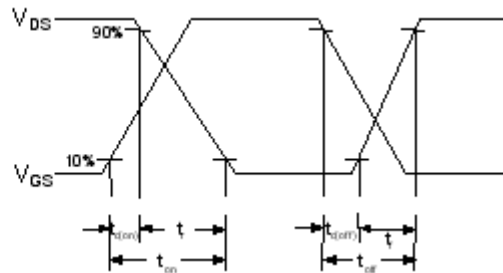
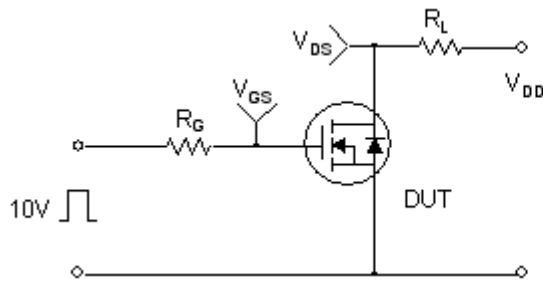
**Figure 10. Maximum Drain Current vs. Case Temperature**

**Figure 11. Transient Thermal Response Curve**

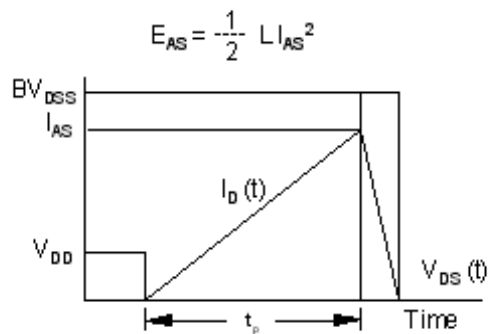
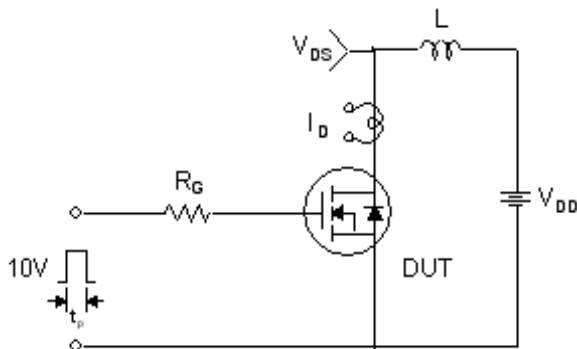
**Gate Charge Test Circuit & Waveform**



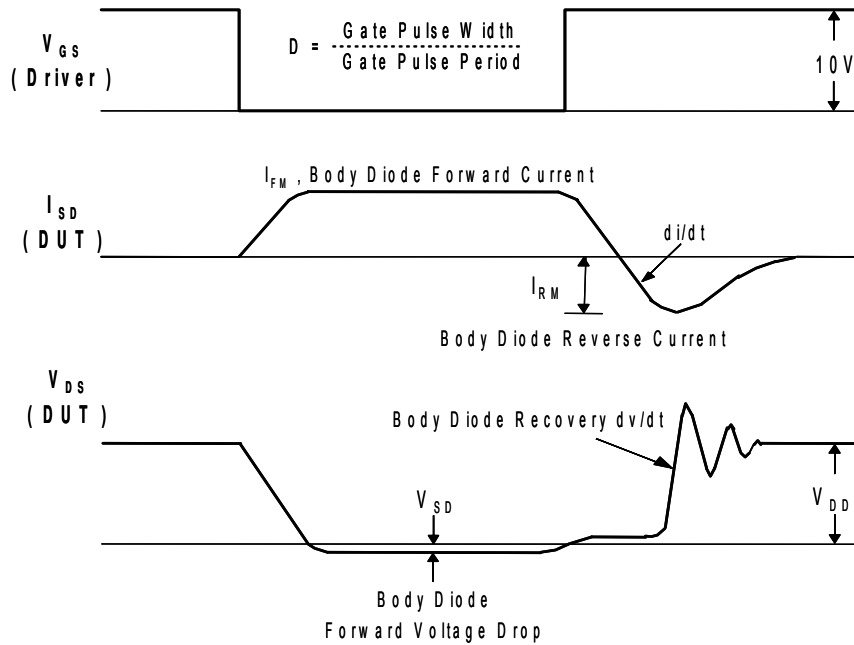
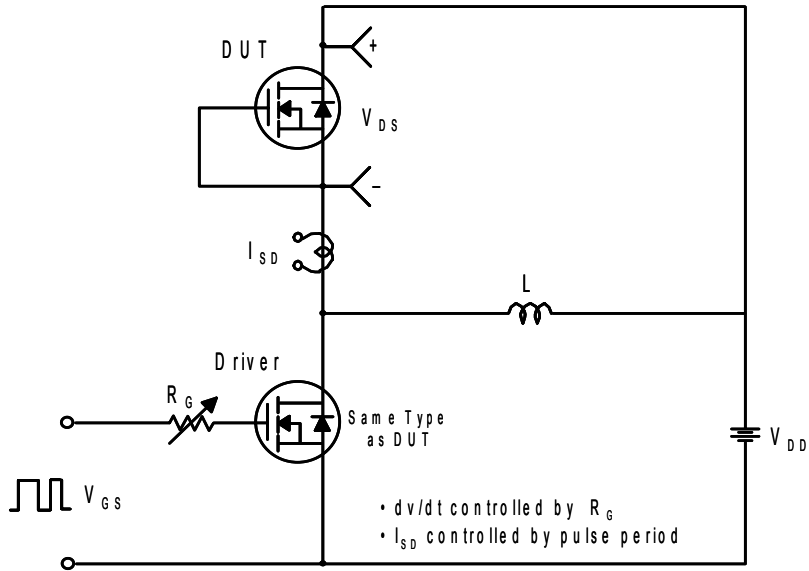
**Resistive Switching Test Circuit & Waveforms**



**Unclamped Inductive Switching Test Circuit & Waveforms**

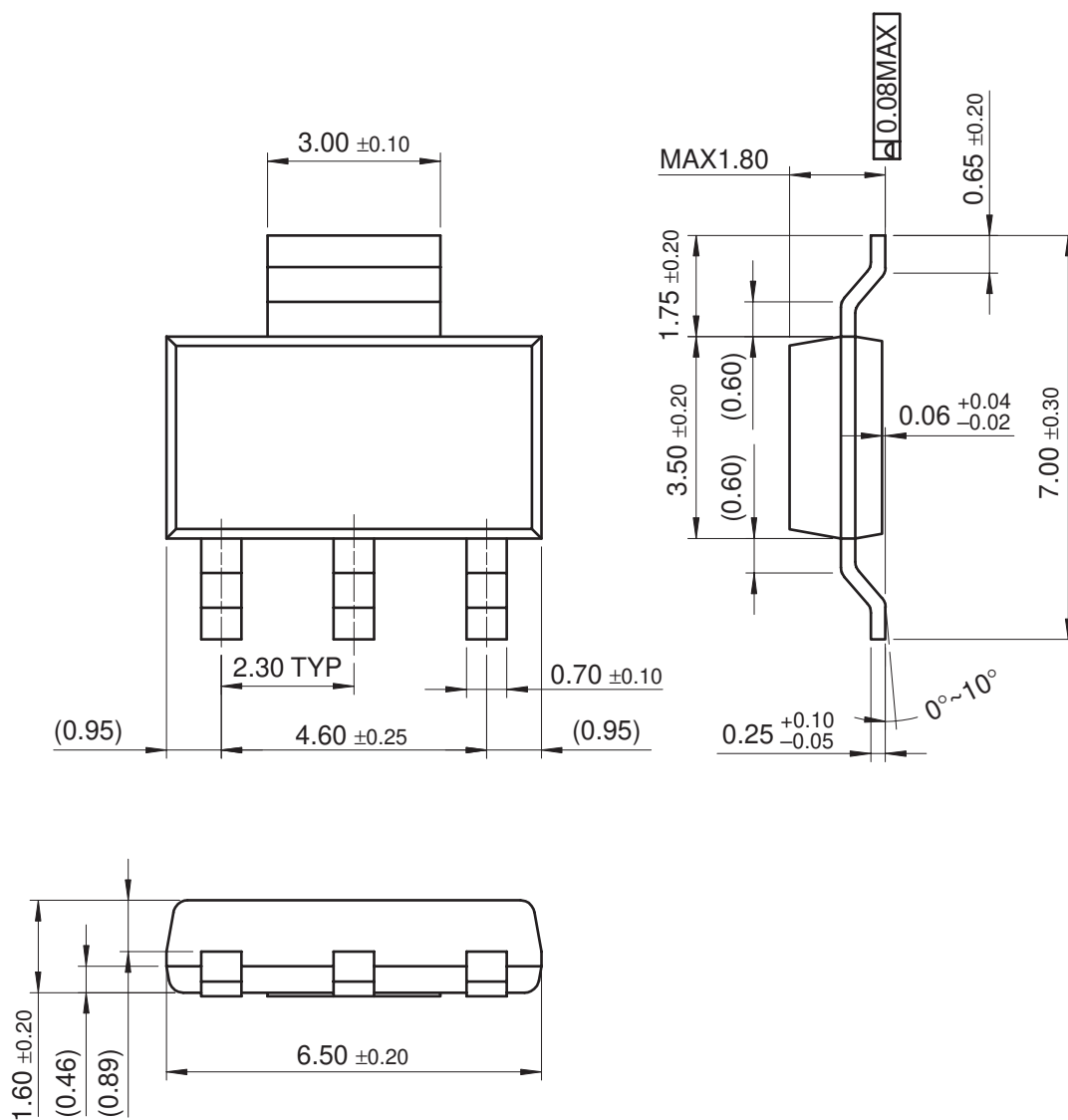



Peak Diode Recovery dv/dt Test Circuit & Waveforms



Mechanical Dimensions

# SOT-223



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