CHINA BASE INTERNATIONAL

# SOT-23

# BC3423

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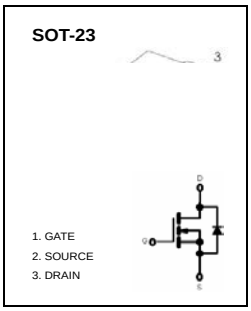
## 20V P-Channel MOSFET

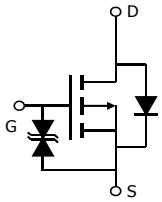
### General Description

The 3423 uses advanced trench technology to provi de excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch applications.




### Product Summary

| | |
|---|---|
| $V_{DS}$ | -20V |
| $I_D$ (at $V_{GS}$=-10V) | -2A |
| $R_{DS(ON)}$ (at $V_{GS}$= -10V) | < 92mΩ |
| $R_{DS(ON)}$ (at $V_{GS}$= -4.5V) | < 118mΩ |
| $R_{DS(ON)}$ (at $V_{GS}$= -2.5V) | < 166mΩ |
| **Typical ESD protection** | **HBM Class 2** |

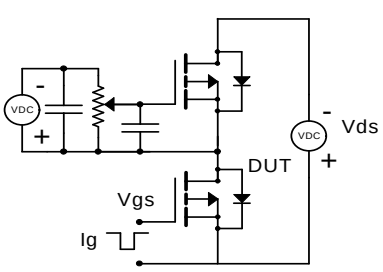


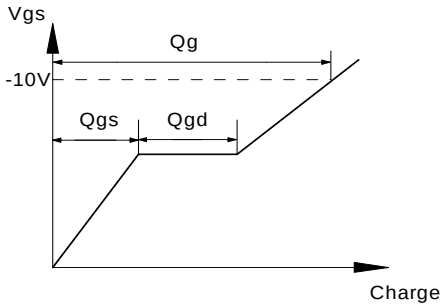

**Absolute Maximum Ratings $T_A$=25℃ unless otherwise noted**

| Parameter | | Symbol | Maximum | Units |
|---|---|---|---|---|
| D | | V | -20 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±12 | V |
| Continuous Drain Current | $T_A$=25℃ | $I_D$ | -2 | A |
| | $T_A$=70℃ | | -2 | |
| Pulsed Drain Current [C] | | $I_{DM}$ | -17 | |
| Power Dissipation [B] | $T_A$=25℃ | $P_D$ | 1.4 | W |
| | $T_A$=70℃ | | 0.9 | |
| Junction and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to 150 | ℃ |

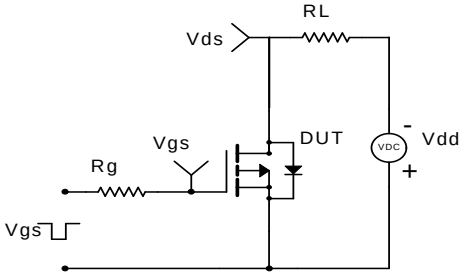
| Thermal Characteristics | | | | | |
|---|---|---|---|---|---|
| **Parameter** | | **Symbol** | **Typ** | **Max** | **Units** |
| Maximum Junction-to-Ambient | t ≤ 10s | $R_{\theta JA}$ | 65 | 90 | ℃/W |
| Maximum Junction-to-Ambient [D] | Steady-State | | 85 | 125 | ℃/W |
| Maximum Junction-to-Lead | Steady-State | $R_{\theta JL}$ | 43 | 60 | ℃/W |

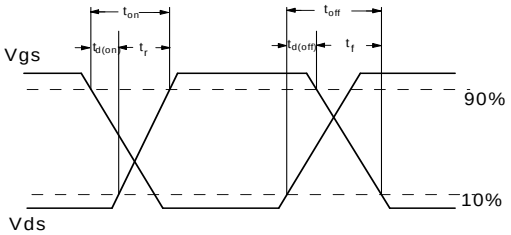
Gate Charge Test Circuit & Waveform




Resistive Switching Test Circuit & Waveforms



# BC3423 20V P-Channel MOSFET

**Electrical Characteristics ($T_J$=25℃ unless otherwise noted)**

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **STATIC PARAMETERS** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $I_D$=-250μA, $V_{GS}$=0V | -20 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=-20V, $V_{GS}$=0V | | | -1 | μA |
| | | $T_J$=55℃ | | | -5 | |
| $I_{GSS}$ | Gate-Body leakage current | $V_{DS}$=0V, $V_{GS}$= ±12V | | | ±10 | μA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=-250μA | -0.5 | -0.85 | -1.2 | V |
| $I_{D(ON)}$ | On state drain current | $V_{GS}$=-4.5V, $V_{DS}$=-5V | -17 | | | A |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=-10V, $I_D$=-2A | | 76 | 92 | mΩ |
| | | $T_J$=125℃ | | 99 | 119 | |
| | | $V_{GS}$=-4.5V, $I_D$=-2A | | 94 | 118 | mΩ |
| | | $V_{GS}$=-2.5V, $I_D$=-1A | | 128 | 166 | mΩ |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$=-5V, $I_D$=-2A | | 6.8 | | S |
| $V_{SD}$ | Diode Forward Voltage | $I_S$=-1A,$V_{GS}$=0V | | -0.76 | -1 | V |
| $I_S$ | Maximum Body-Diode Continuous Current | | | | -1.5 | A |
| **DYNAMIC PARAMETERS** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V, $V_{DS}$=-10V, f=1MHz | 250 | 325 | 400 | pF |
| $C_{oss}$ | Output Capacitance | | 40 | 63 | 85 | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | 22 | 37 | 52 | pF |
| $R_g$ | Gate resistance | $V_{GS}$=0V, $V_{DS}$=0V, f=1MHz | | 11.2 | 17 | Ω |
| **SWITCHING PARAMETERS** | | | | | | |
| $Q_g$ | Total Gate Charge | $V_{GS}$=-4.5V, $V_{DS}$=-10V, $I_D$=-2A | | 3.2 | 4.5 | nC |
| $Q_{gs}$ | Gate Source Charge | | | 0.6 | | nC |
| $Q_{gd}$ | Gate Drain Charge | | | 0.9 | | nC |
| $t_{D(on)}$ | Turn-On DelayTime | $V_{GS}$=-10V, $V_{DS}$=-10V, $R_L$=5Ω, $R_{GEN}$=3Ω | | 11 | | ns |
| $t_r$ | Turn-On Rise Time | | | 5.5 | | ns |
| $t_{D(off)}$ | Turn-Off DelayTime | | | 22 | | ns |
| $t_f$ | Turn-Off Fall Time | | | 8 | | ns |
| $t_{rr}$ | Body Diode Reverse Recovery Time | $I_F$=-2A, dI/dt=100A/μs | | 6.1 | | ns |
| $Q_{rr}$ | Body Diode Reverse Recovery Charge | $I_F$=-2A, dI/dt=100A/μs | | 1.4 | | nC |

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A$ =25° C. The value in any given application depends on the user's specific board design.
B. The power dissipation $P_D$ is based on $T_{J(MAX)}$=150° C, using ≤ 10s junction-to-ambient thermal resistance.
C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150° C. Ratings are based on low frequency and duty cycles to keep initial$T_J$=25° C.
D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.
E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.
F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}$=150° C. The SOA curve provides a single pulse rating.