

## SOT-223 Plastic-Encapsulate MOSFETS

### Features

- $V_{DS} = -30V$
- $I_D = -6A$
- $R_{DS(on)}@V_{GS} = -10V < 48m\Omega$
- $R_{DS(on)}@V_{GS} = -4.5V < 80m\Omega$
- High power and current handing capability
- Voltage controlled small signal switch
- Fast Switching Speedze

**Drain-source Voltage**

-30 V

**Drain Current**

-6 Ampere

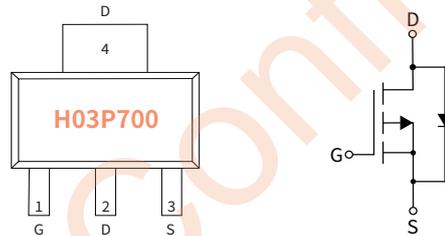
### Applications

- Battery protection
- Load switch
- Power management

### Mechanical Data

- Case: SOT-223  
Molding compound meets UL 94V-0 flammability rating, RoHS-compliant, halogen-free
- Terminals: Solder plated, solderable per MIL-STD-750, Method 2026

### Function Diagram



### Ordering Information

PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
SOT-223	R3	0.125	2500	5000	40000	13"

### Maximum Ratings (Ta=25°C Unless otherwise specified)

PARAMETER	SYMBOL	UNIT	VALUE
Drain-source Voltage	$V_{DS}$	V	-30
Gate-source Voltage	$V_{GS}$	V	$\pm 20$
Drain Current	$I_D$	A	-6
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	A	-23
Single Pulse Avalanche Energy <sup>(2)</sup>	EAS	mJ	16
Total Power Dissipation	$P_D$	W	2.5
Junction temperature	$T_J$	°C	-55 ~ +150
Storage temperature	$T_{stg}$	°C	-55 ~ +150
Thermal Resistance Junction-to-Ambient @ Steady State	$R_{\theta JA}$	°C / W	50

## ● Static Parameter Characteristics (Tj=25°C Unless otherwise specified)

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	V	-30	—	—
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-30V, V_{GS}=0V$	$\mu A$	—	—	-1.0
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	nA	—	—	$\pm 100$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	V	-1.0	-1.6	-3
Static Drain-Source On-Resistance <sup>(3)</sup>	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-5A$	m $\Omega$	—	37	48
		$V_{GS}=-4.5V, I_D=-4A$		—	56	80
Forward Transconductance	$G_{FS}$	$V_{DS}=-10V, I_D=-5A$	S	—	5	—

## ● Dynamic Parameters

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Input Capacitance	$C_{iss}$	$V_{DS}=-25V, V_{GS}=0V, f=1MHz$	pF	—	570	—
Output Capacitance	$C_{oss}$			—	80	—
Reverse Transfer Capacitance	$C_{rss}$			—	75	—

## ● Switching Parameters

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=-10V, V_{DD}=-15V, I_D=-1A, R_{GEN}=3.3\Omega$	nS	—	6.6	—
Turn-on Rise Time	$t_r$		nS	—	7.7	—
Turn-off Delay Time	$t_{D(off)}$		nS	—	22	—
Turn-off fall Time	$t_f$		nS	—	9.3	—
Total Gate Charge	$Q_g$	$V_{DS}=-15V, I_D=-6.0A, V_{GS}=-10V$	nC	—	14.6	—
Gate-Source Charge	$Q_{gs}$		nC	—	1.8	—
Gate-Drain Charge	$Q_{gd}$		nC	—	3.7	—

## ● Drian-Source Diode Characteristics

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Diode Forward Voltage	$V_{SD}$	$I_S=-2.1A, V_{GS}=0V$	V	—	—	-1.2
Maximum Body-Diode Continuous Current	$I_S$	—	A	—	—	-6
Reverse Recovery Time	$t_{rr}$	$I_S=-5A, V_{GS}=0V, di/dt=100A/\mu s$	ns	—	18	—
Reverse Recovery Charge	$Q_{rr}$		nC	—	11	—

Note :

(1) Repetitive Rating: Pulse width limited by maximum junction temperature.

(2) EAS condition : Tj=25°C ,VDD=-25V,VG=-10V,L=0.5mH,IAS=-8A,Rg=25 $\Omega$ .

(3) Pulse test: Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .

● Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)

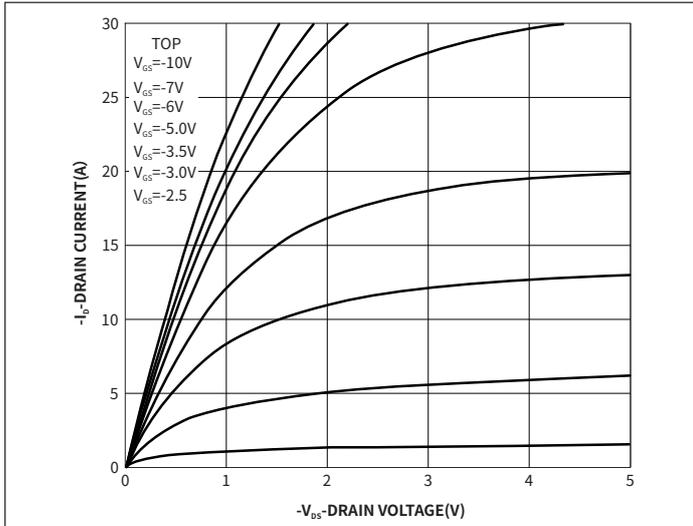


Fig.1 Output Characteristics

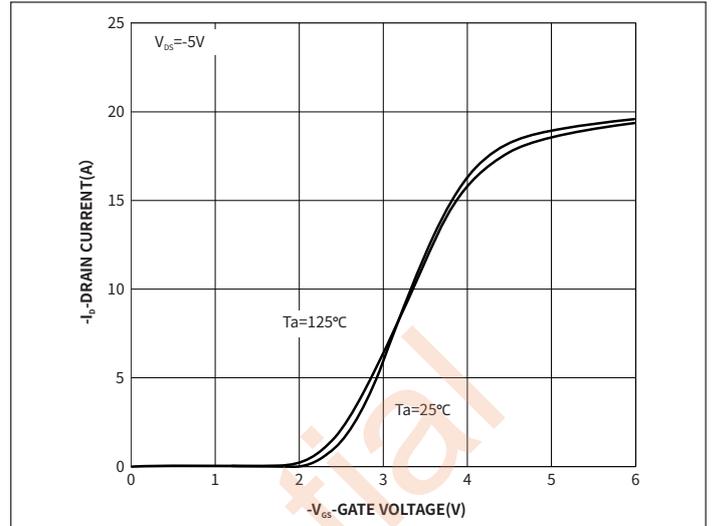


Fig.2 Transfer Characteristics

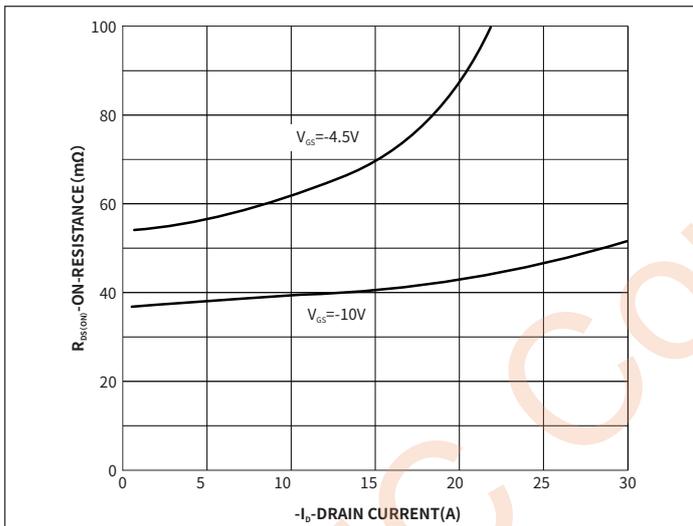


Fig.3 On-Resistance vs. Drain Current and Gate Voltage

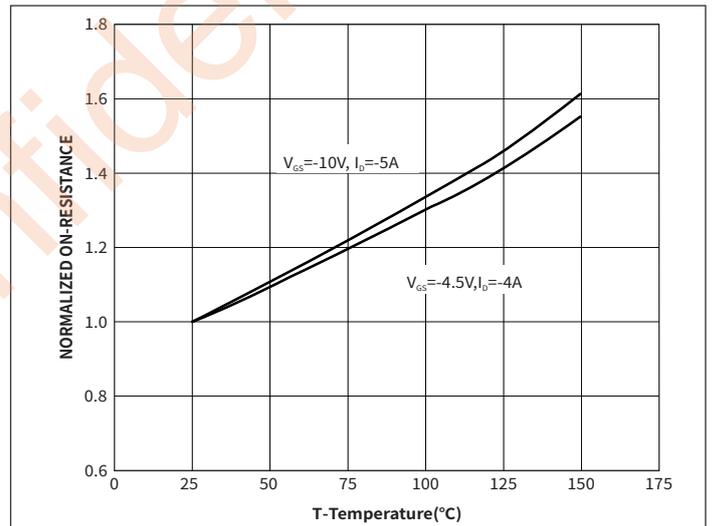


Fig.4 On-Resistance vs. Junction Temperature

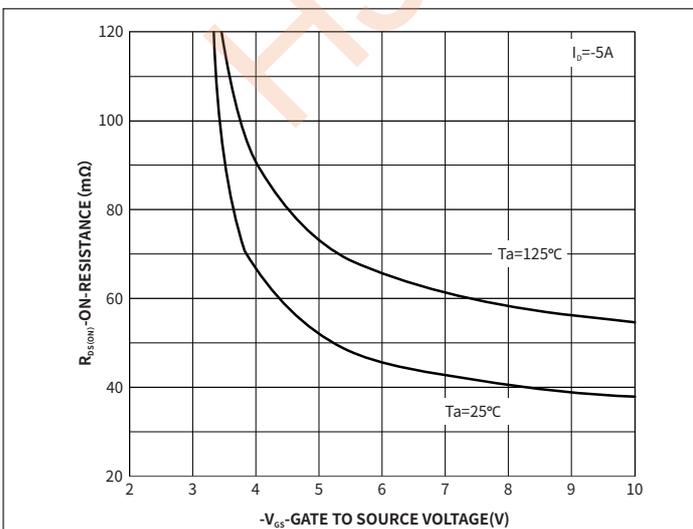


Fig.5 On-Resistance vs. Gate to Source Voltage

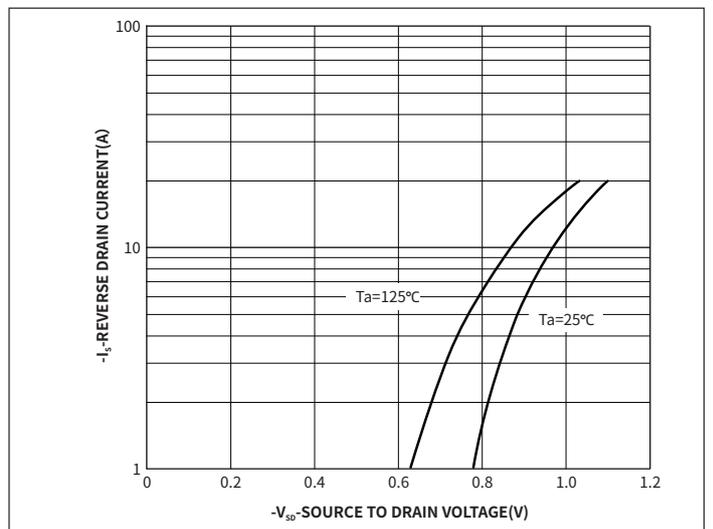
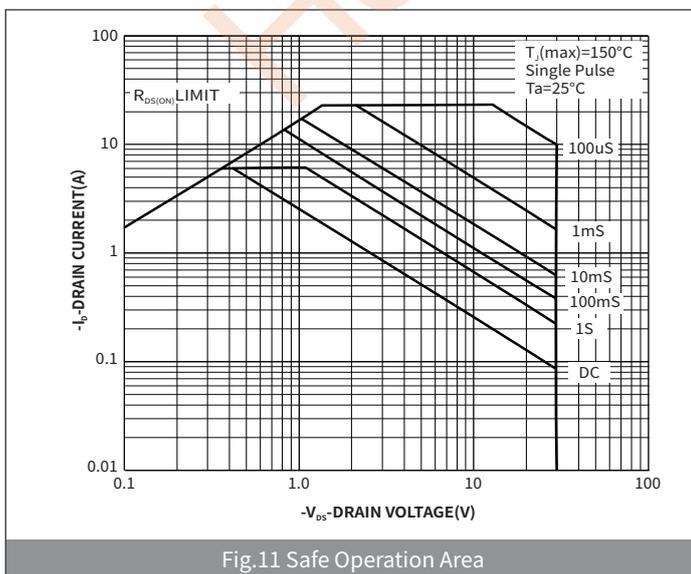
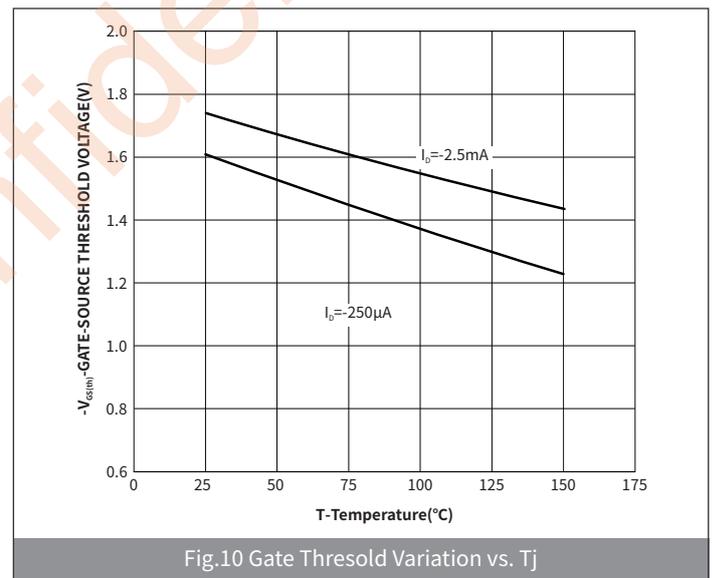
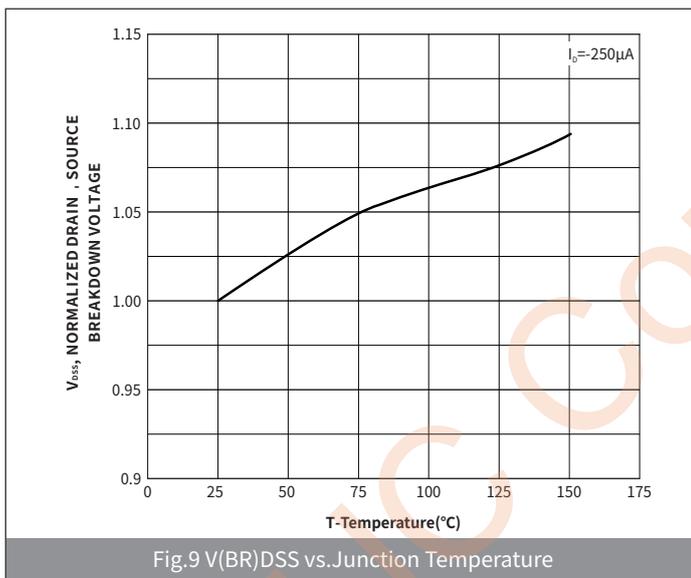
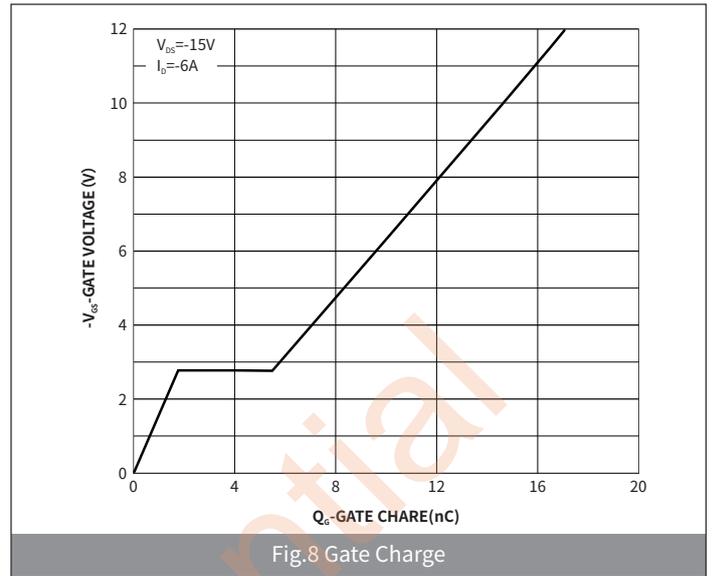
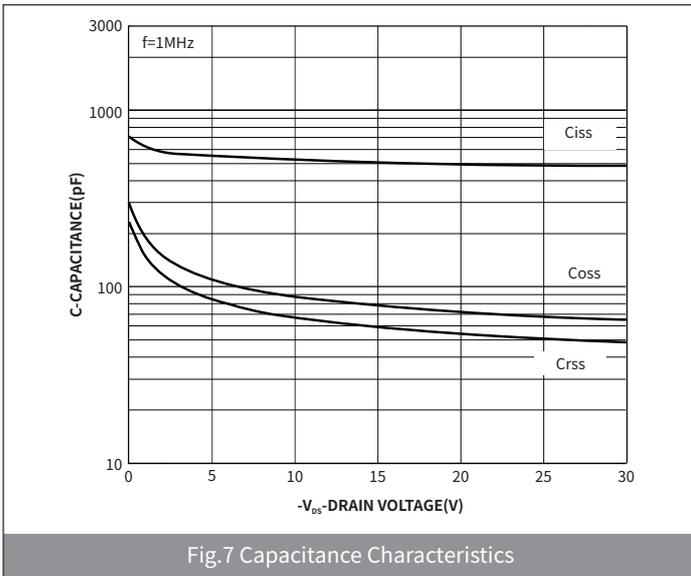
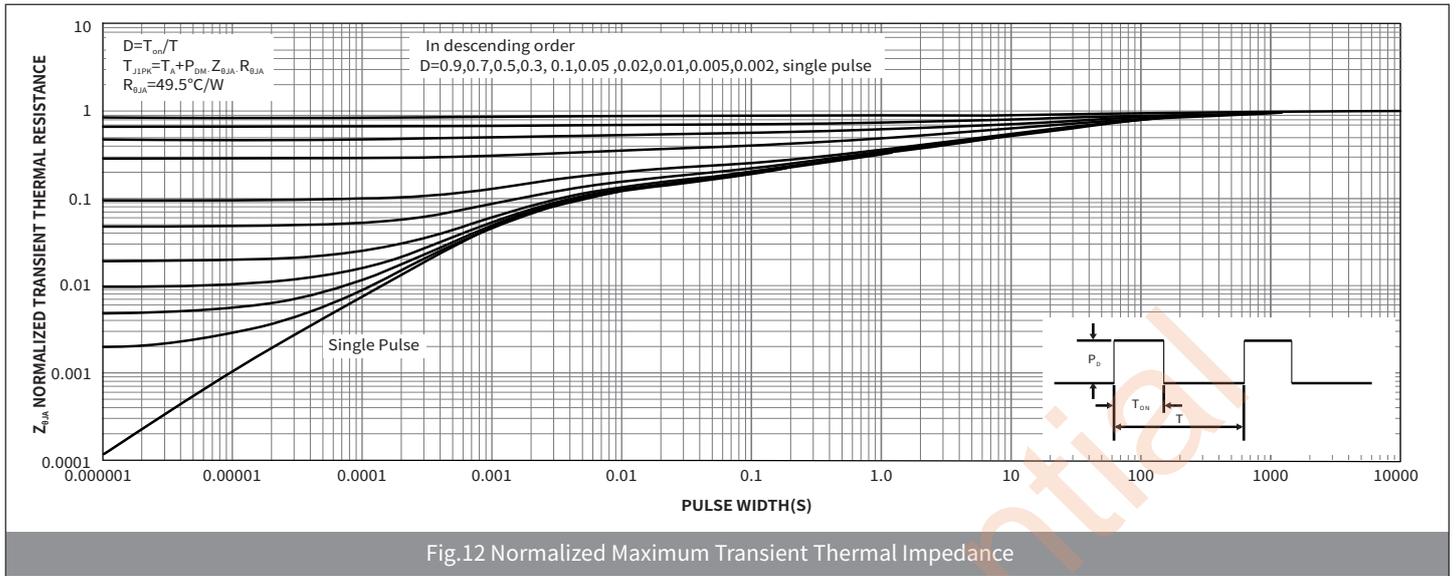


Fig.6 Typical Body-Diode Forward Characteristics

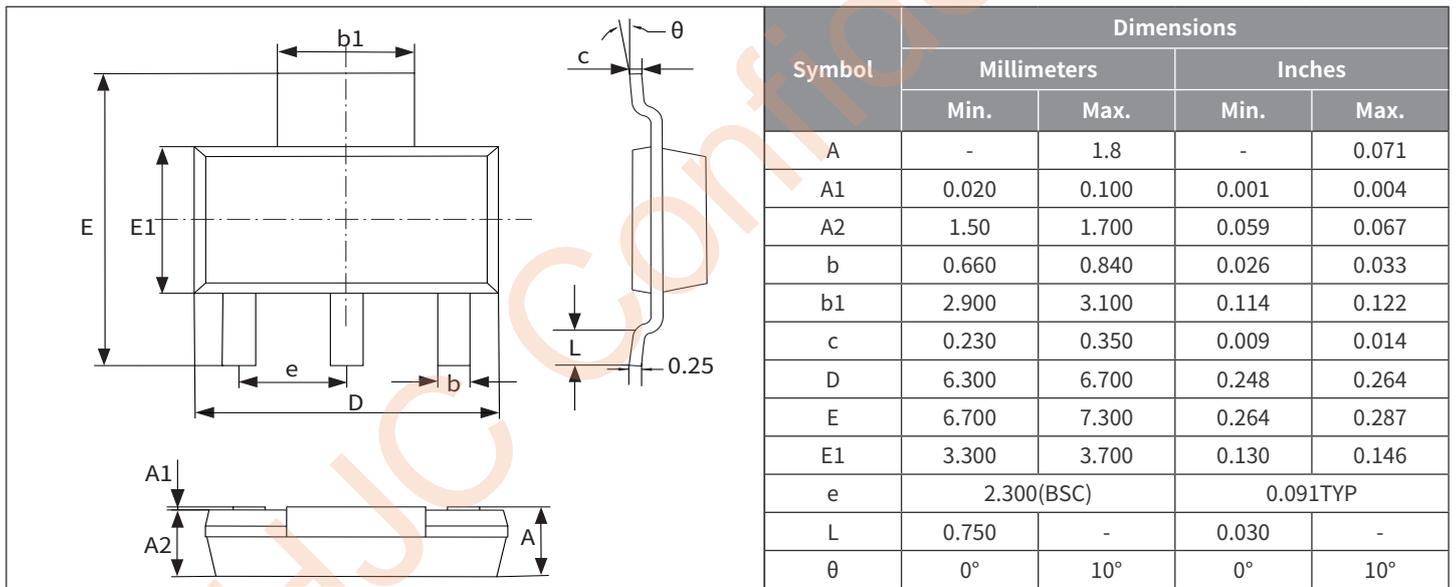
● Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)



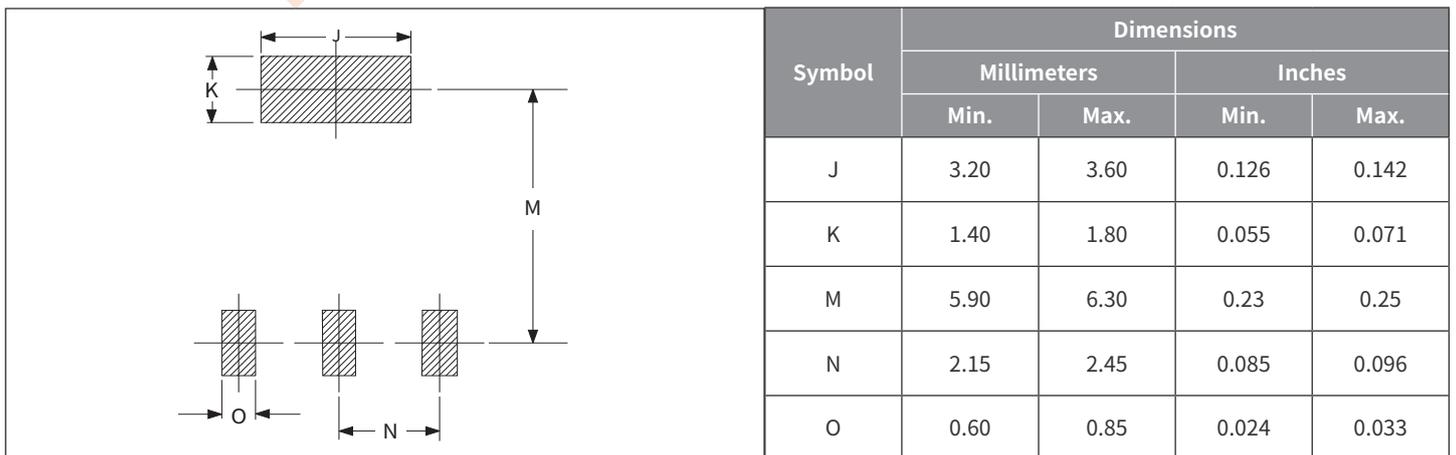
● Ratings And Characteristics Curves (Ta=25°C Unless otherwise specified)



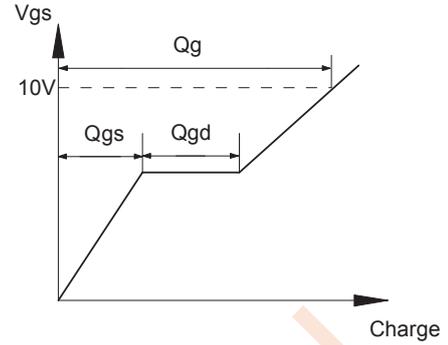
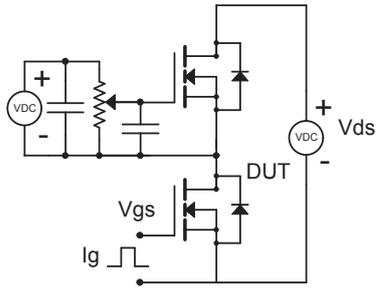
● Package Outline Dimensions (SOT-223)



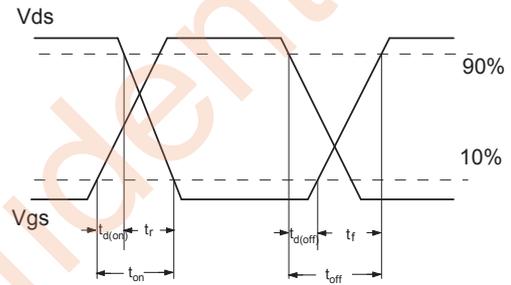
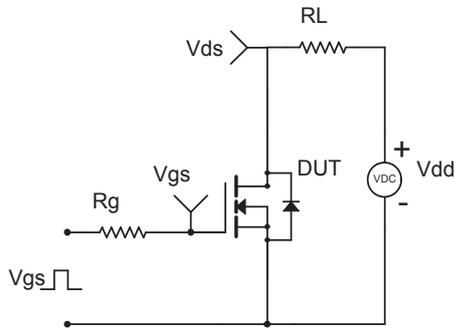
● Suggested Pad Layout



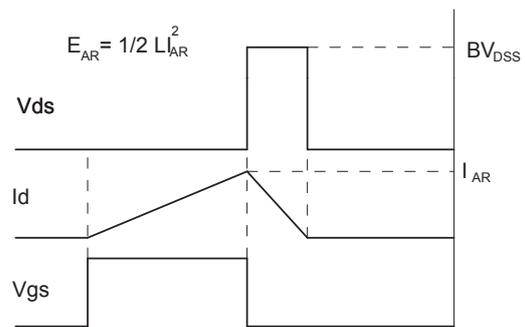
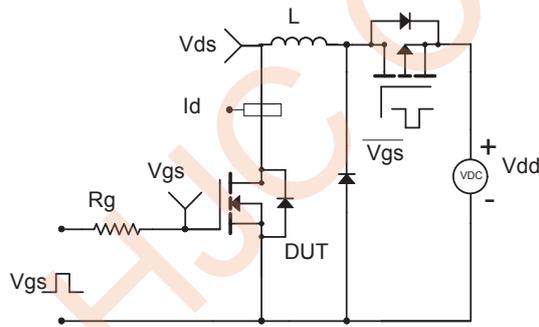
### 1. Gate Charge Test Circuit & Waveforms



### 2. Resistive Switching Test Circuit & Waveforms



### 3. Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



### 4. Diode Recovery Test Circuit & Waveforms

