HT06P460S

P-CHANNEL MOSFET

SOT-223 Plastic-Encapsulate MOSFETS

● Features

- V_{DS}=-60V
- I_D=-8A
- $R_{DS(on)}$@V_{GS}=-10V < 46mΩ
- $R_{DS(on)}$@V_{GS}=-4.5V < 52mΩ
- High power and current handing capability
- High density cell design for ultra low Rdson
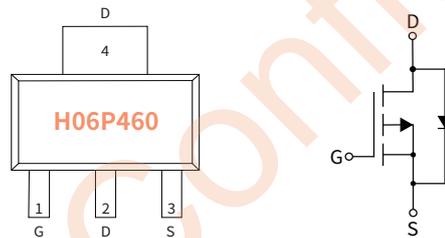- Excellent package for good heat dissipation

● 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

Drain-source Voltage
-60 V
Drain Current
-8 Ampere

SOT-223

● 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℃ Unless otherwise specified)

PARAMETER	SYMBOL	UNIT	VALUE
Drain-source Voltage	V_{DS}	V	-60
Gate-source Voltage	V_{GS}	V	±20
Drain Current	I_D	A	-8
Pulsed Drain Current [1]	I_{DM}	A	-32
Single Pulse Avalanche Energy[2]	EAS	mJ	64
Total Power Dissipation	P_D	W	3.0
Junction temperature	T_J	℃	-55 ~+150
Storage temperature	T_{stg}	℃	-55 ~+150
Thermal Resistance Junction-to-Ambient @ Steady State	$R_{\theta JA}$	℃ / W	42

● Static Parameter Characteristics (Tj=25℃ Unless otherwise specified)

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}= 0V, I_D=-250μA	V	-60	—	—
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-60V, V_{GS}=0V	μA	—	—	-1.0
Gate-Body Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}=0V	nA	—	—	±100
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=-250μA	V	-1.0	-1.5	-2.2
Static Drain-Source On-Resistance [3]	$R_{DS(ON)}$	V_{GS}= -10V, I_D=-5A	mΩ	—	26	46
		V_{GS}= -4.5V, I_D=-5A		—	30	52
Forward Transconductance	g_{FS}	V_{DS}=-5.0V, I_D=-5A	S	—	10	—

● Dynamic Parameters

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Input Capacitance	C_{iss}	V_{DS}=-30V, V_{GS}=0V, f=1MHZ	pF	—	2150	—
Output Capacitance	C_{oss}			—	150	—
Reverse Transfer Capacitance	C_{rss}			—	130	—

● Switching Parameters

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=-10V, V_{DD}=-30V, I_D=-5A ,R_{GEN}=3Ω	nS	—	11	—
Turn-on Rise Time	t_r		nS	—	14	—
Turn-off Delay Time	$t_{D(off)}$		nS	—	33	—
Turn-off fall Time	t_f		nS	—	13	—
Total Gate Charge	Q_g	V_{DS}=-30V, I_D=-5A V_{GS}=-10V	nC	—	37.6	—
Gate-Source Charge	Q_{gs}		nC	—	4.3	—
Gate-Drain Charge	Q_{gd}		nC	—	7.2	—

● Drian-Source Diode Characteristics

PARAMETER	SYMBOL	Condition	UNIT	Min	Typ	Max
Diode Forward Voltage	V_{SD}	I_S=-5A, V_{GS}=0V	V	—	—	-1.2
Maximum Body-Diode Continuous Current	I_S	—	A	—	—	-8
Reverse Recovery Time	T_{rr}	Tj=25℃，I_F=-5A di/dt=-100A/μs[3]	nS	—	35	—
Reverse Recovery Charge	Q_{rr}		nC	—	38	—

Note :

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

(2)EAS condition : Tj=25℃ ,VDD=-25V,VG=-10V,L=0.5mH,IAS=-16.1A.

(3)Pulse test: Pulse width ≤ 300us, duty cycle ≤ 2%.

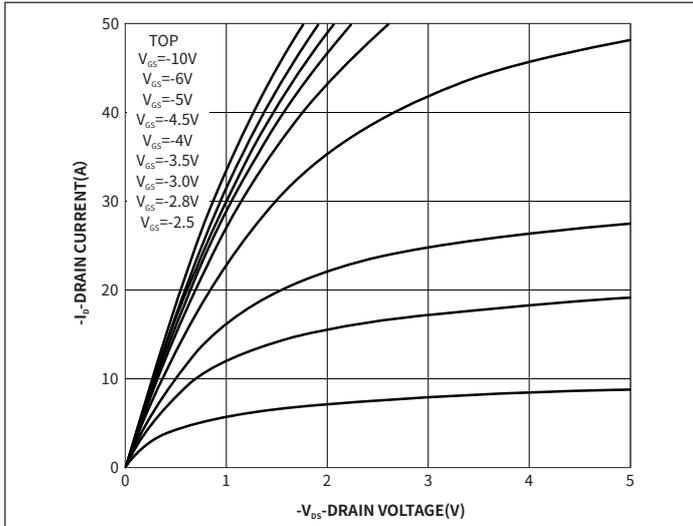## Ratings And Characteristics Curves (Ta=25℃ Unless otherwise specified)
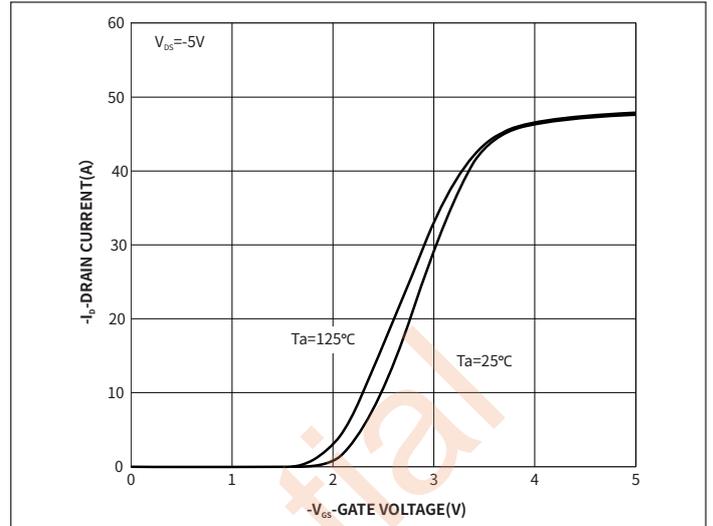
Fig.1 Output Characteristics

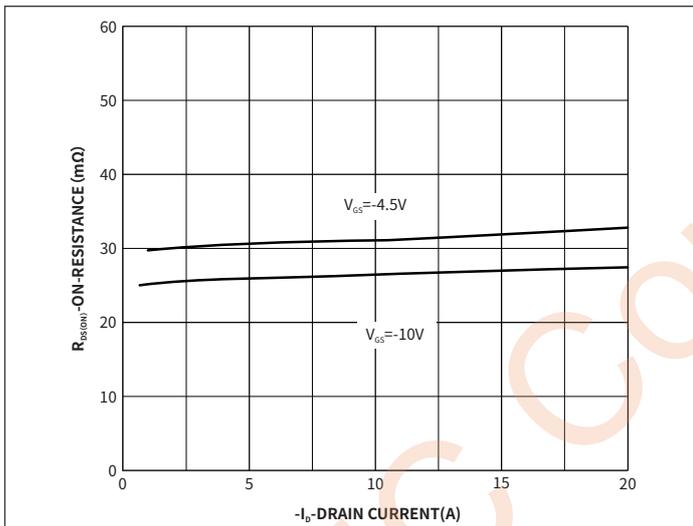Fig.2 Transfer Characteristics

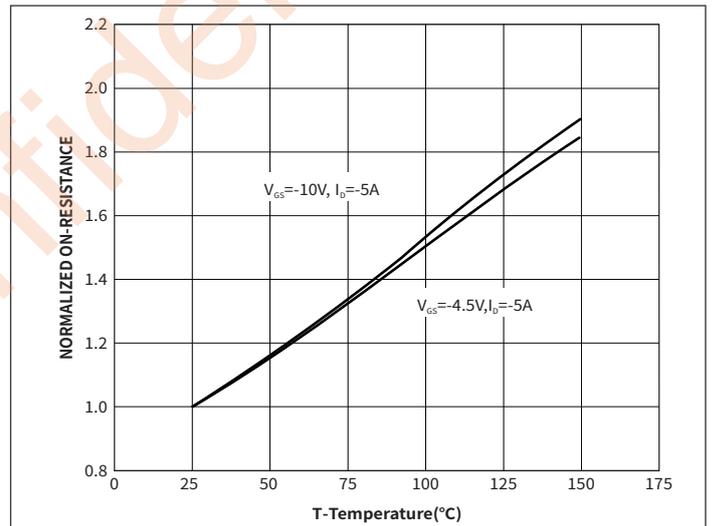Fig.3 On-Resistance vs. Drain Current and Gate Voltage
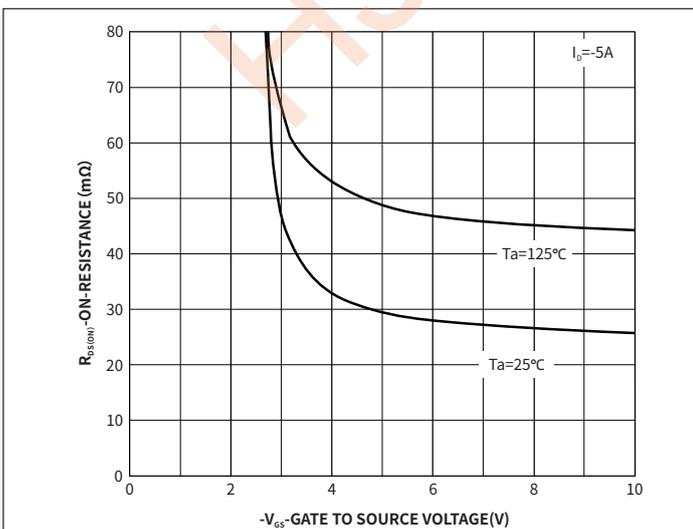
Fig.4 On-Resistance vs. Junction Temperature
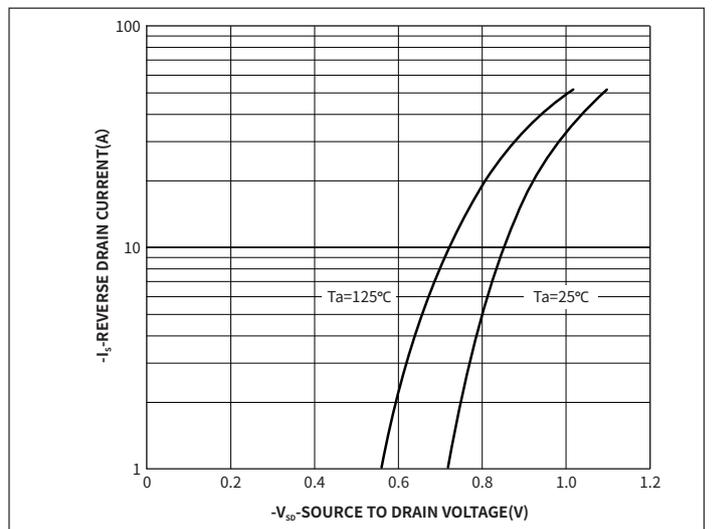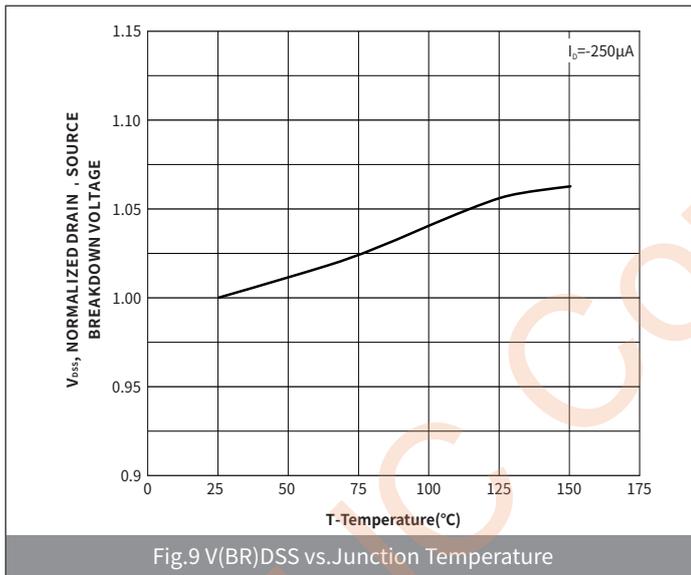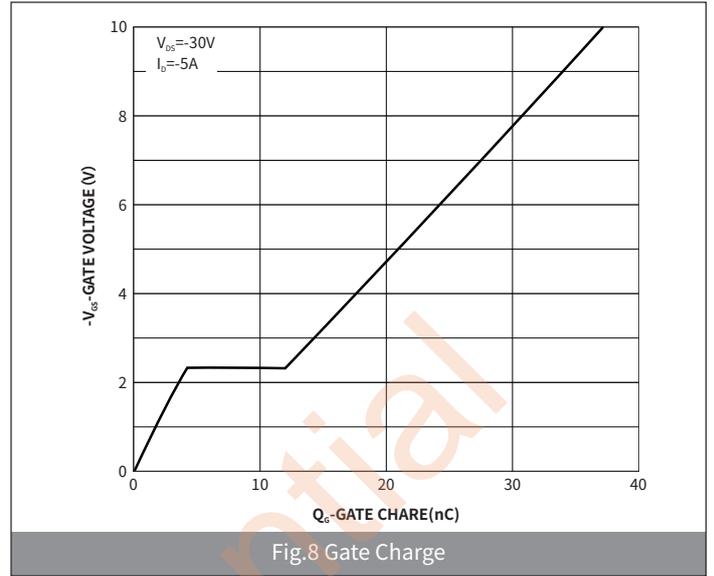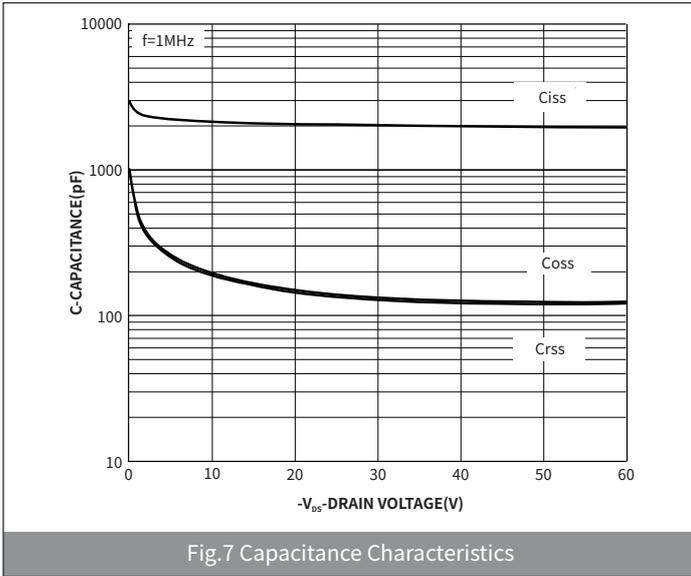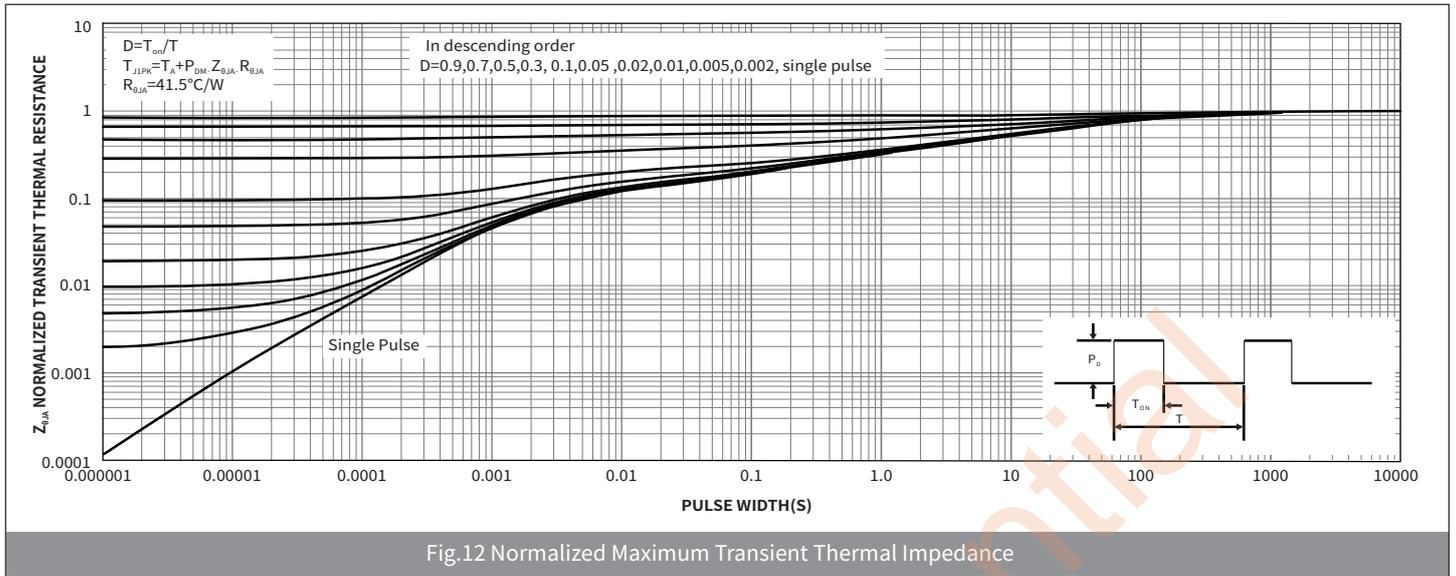
Fig.5 On-Resistance vs. Gate to Source Voltage

Fig.6 Typical Body-Diode Forward Characteristics

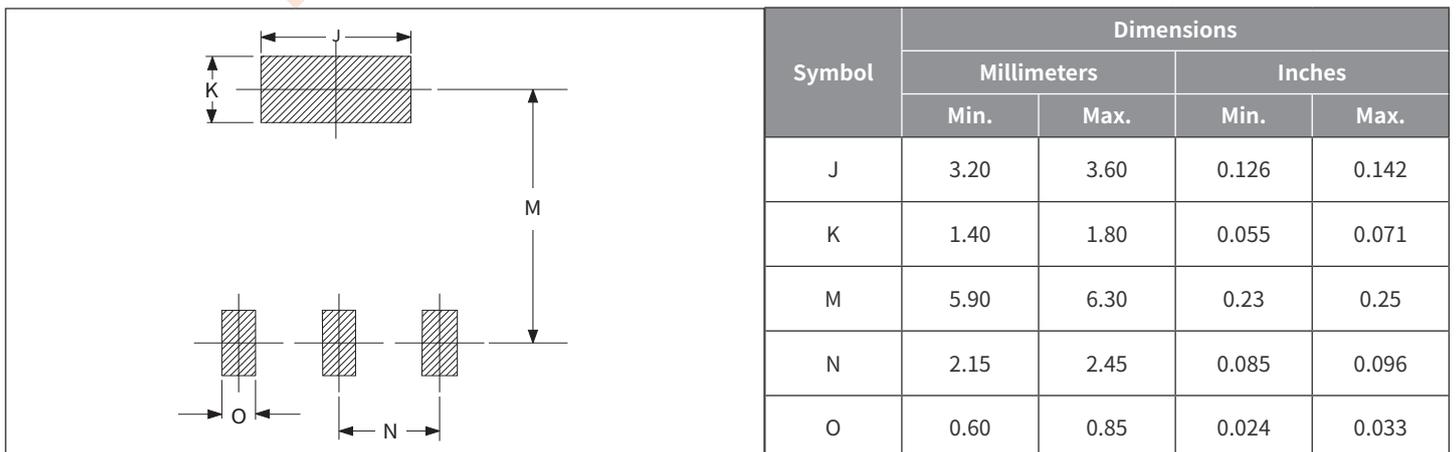## Ratings And Characteristics Curves (Ta=25℃ Unless otherwise specified)

Fig.7 Capacitance Characteristics

Fig.8 Gate Charge

Fig.9 V(BR)DSS vs.Junction Temperature

Fig.10 Gate Thresold Variation vs. Tj

Fig.11 Safe Operation Area

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

$D=T_{on}/T$
$T_{J1PK}=T_A+P_{DM}\cdot Z_{\theta JA}\cdot R_{\theta JA}$
$R_{\theta JA}=41.5℃/W$

In descending order
D=0.9,0.7,0.5,0.3, 0.1,0.05 ,0.02,0.01,0.005,0.002, single pulse
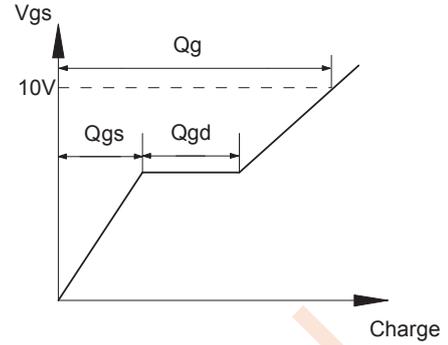
Single Pulse

Fig.12 Normalized Maximum Transient Thermal Impedance
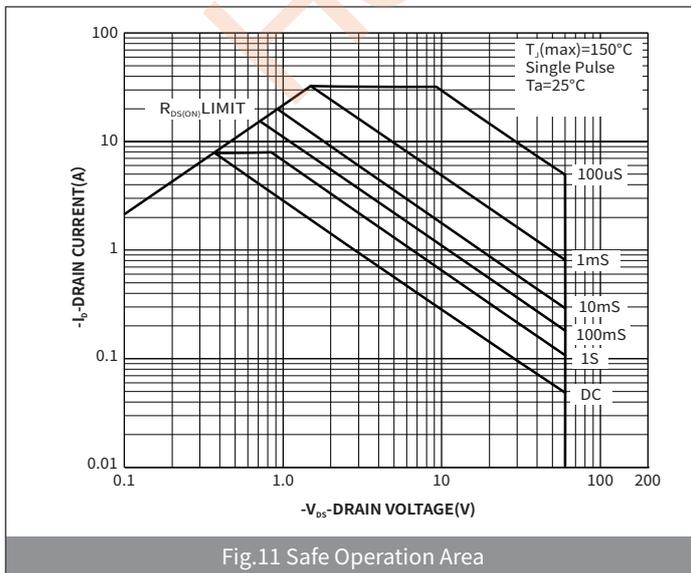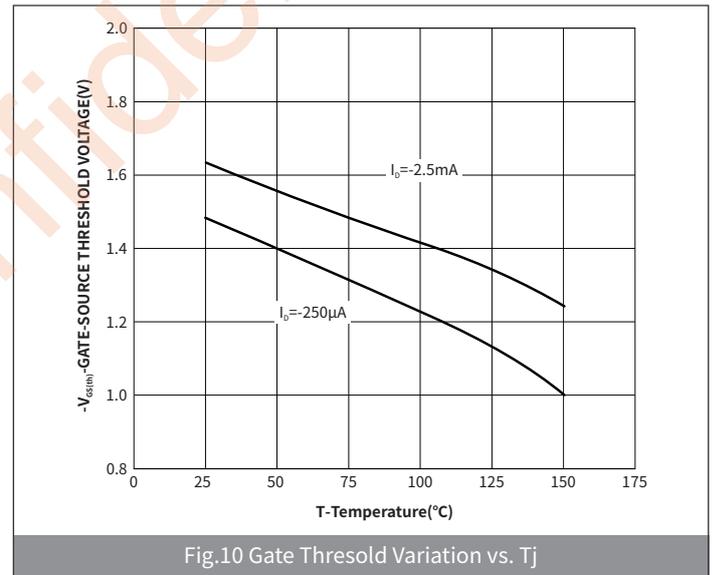
● Package Outline Dimensions (SOT-223)

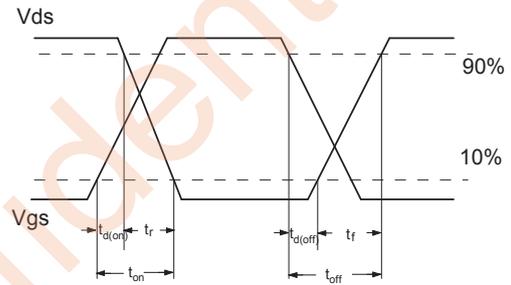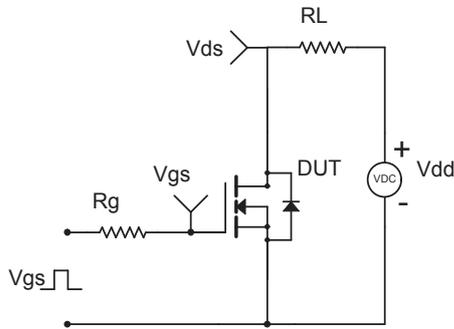| Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	-	1.8	-	0.071
A1	0.020	0.100	0.001	0.004
A2	1.50	1.700	0.059	0.067
b	0.660	0.840	0.026	0.033
b1	2.900	3.100	0.114	0.122
c	0.230	0.350	0.009	0.014
D	6.300	6.700	0.248	0.264
E	6.700	7.300	0.264	0.287
E1	3.300	3.700	0.130	0.146
e	2.300(BSC)		0.091TYP	
L	0.750	-	0.030	-
θ	0°	10°	0°	10°

● Suggested Pad Layout

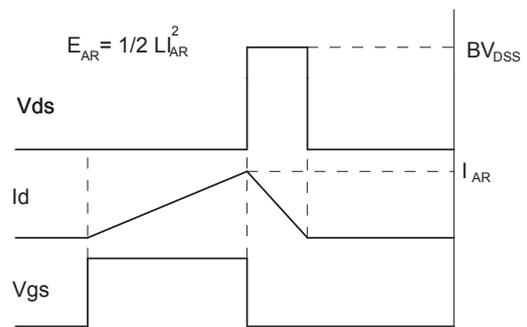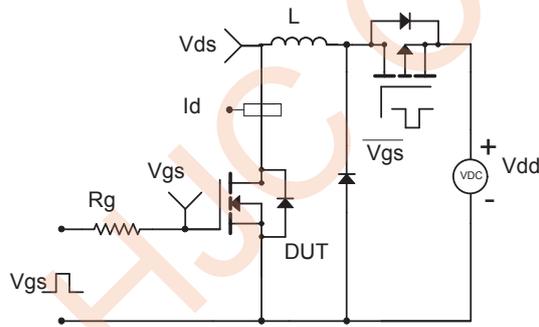| Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
J	3.20	3.60	0.126	0.142
K	1.40	1.80	0.055	0.071
M	5.90	6.30	0.23	0.25
N	2.15	2.45	0.085	0.096
O	0.60	0.85	0.024	0.033

1.Gate Charge Test Circuit & Waveforms
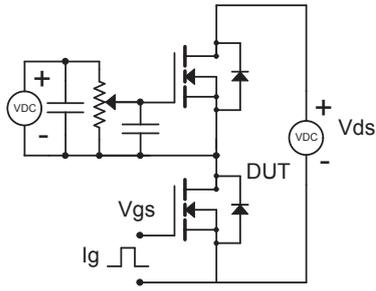
2. Resistive Switching Test Circuit & Waveforms

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

$$E_{AR} = 1/2\ LI_{AR}^2$$

4.Diode Recovery Test Circuit & Waveforms

$$Q_{rr} = -\int I dt$$