

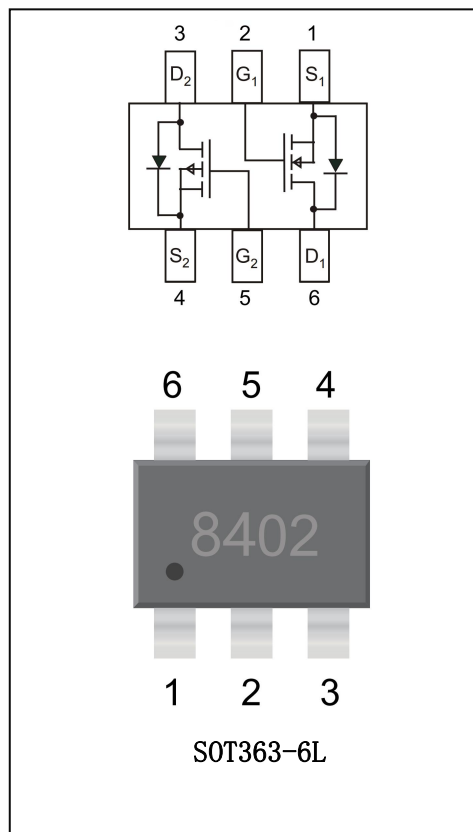
**N AND P-CHANNEL POWER MOSFET**

**GENERAL DESCRIPTION**

The SFH8402DW uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

**FEATURES**

- ◆ **N-CHANNEL**  
 $V_{DS}=50V, I_D=0.13A$   
 $R_{DS(ON)}=1.0\Omega(TYP@V_{GS}=10V)$   
 $R_{DS(ON)}=1.2\Omega(TYP@V_{GS}=4.5V)$
- ◆ **P-CHANNEL**  
 $V_{DS}=-50V, I_D=-0.13A$   
 $R_{DS(ON)}=1.6\Omega(TYP@V_{GS}=-10V)$   
 $R_{DS(ON)}=1.8\Omega(TYP@V_{GS}=-4.5V)$
- ◆ S-prefix for automotive and other applications requiring unique site and control change requirements; AEC-Q101 qualified and PPAP capable



**ORDERING INFORMATION**

Part No.	Package	Marking	Material	Packing
SFH8402DW	SOT363-6L	8402	Pb Free	Reel

## ABSOLUTE MAXIMUM RATINGS (T<sub>J</sub>=25°C unless otherwise noted)

Characteristics		Symbol	N-CHANNEL	P-CHANNEL	UNIT
Drain-Source Voltage		V <sub>DS</sub>	50	-50	V
Gate-Source Voltage		V <sub>GS</sub>	±20	±20	
Drain Current	TC=25°C	I <sub>D</sub>	0.13	-0.13	A
	TC=70°C		0.09	-0.09	
Pulsed Drain Current(note1)		I <sub>DM</sub>	0.52	-0.52	
Power Dissipation	TC=25°C	P <sub>D</sub>	0.4		W
<b>Thermal Characteristics</b>					
Maximum Junction-to-Lead		R <sub>θJL</sub>	312.5		°C/W
Junction and Storage Temperature Range		T <sub>J</sub> ,T <sub>stg</sub>	-55 to +150		°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		TL	300		

## N-CHANNEL ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain -Source Breakdown Voltage	B <sub>VDS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	50	--	-	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V	-	--	1.0	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =20V, V <sub>DS</sub> =0V	-	--	100	nA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V	-	--	-100	
<b>On Characteristics</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> =250μA	0.5	1.2	1.5	V
Static Drain- Source On State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =0.2A	-	1.0	1.5	Ω
		V <sub>GS</sub> =5.0V, I <sub>D</sub> =0.2A	-	1.2	1.7	
<b>Dynamic Characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V	-	42	-	pF
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> =0V	-	15	-	
Reverse Transfer Capacitance	C <sub>rss</sub>	f=1.0MHZ	-	3	-	
<b>Switching Characteristics</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =25V, V <sub>GS</sub> =10V R <sub>G</sub> =160Ω, I <sub>D</sub> =0.2A (Note 2.3)	-	17.8	-	ns
Turn-on Rise Time	t <sub>r</sub>		-	5.3	-	
Turn-off Delay Time	t <sub>d(off)</sub>		-	21.5	-	
Turn-off Fall Time	t <sub>f</sub>		-	3.6	-	

## N-CHANNEL SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I <sub>S</sub>	Integral Reverse P-N Junction Diode in the MOSFET	-	-	0.13	A
Pulsed Source Current	I <sub>SM</sub>		-	-	0.52	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =0.2A, V <sub>GS</sub> =0V	-	0.8	1.2	V

**P-CHANNEL ELECTRICAL CHARACTERISTICS**

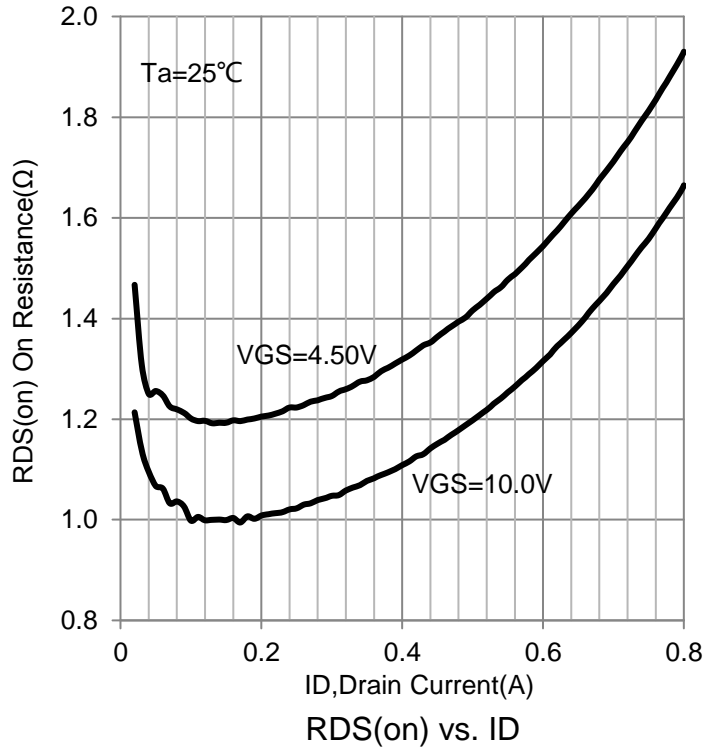
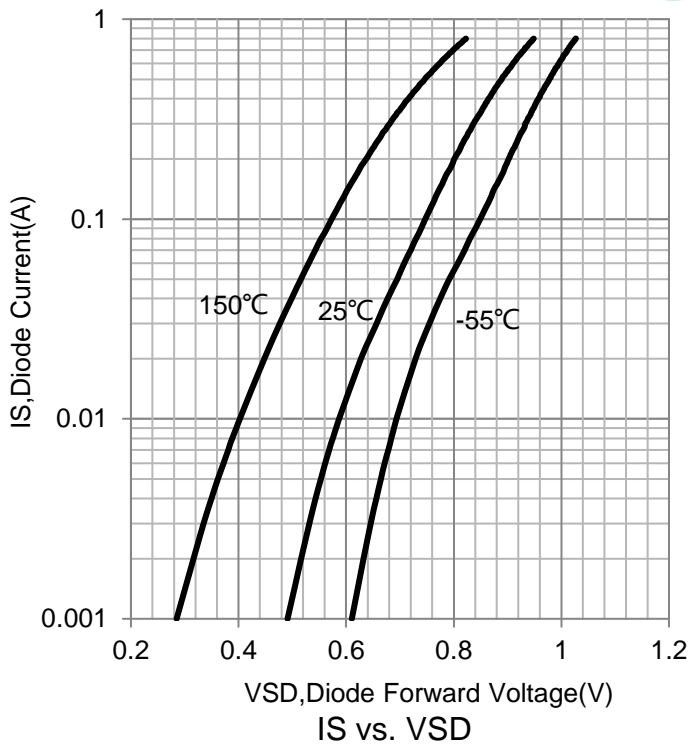
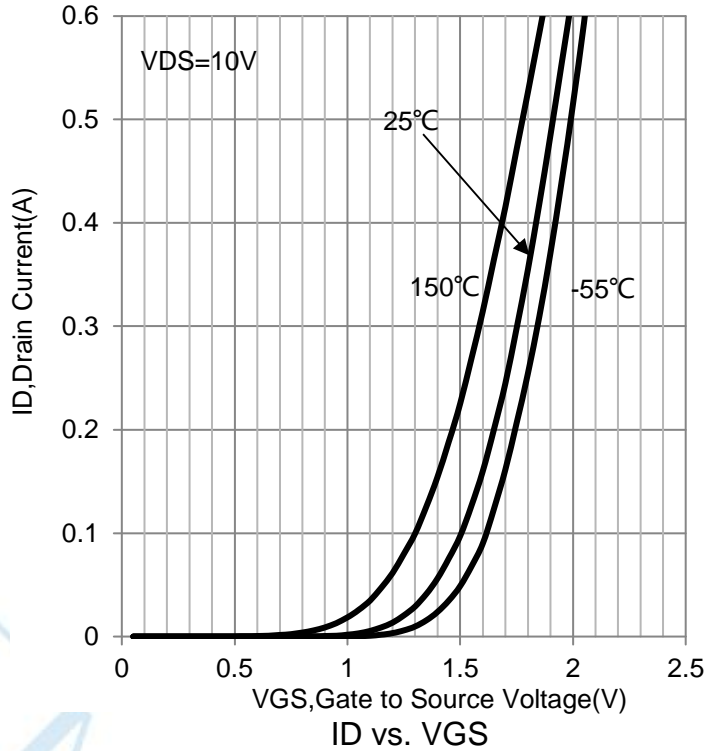
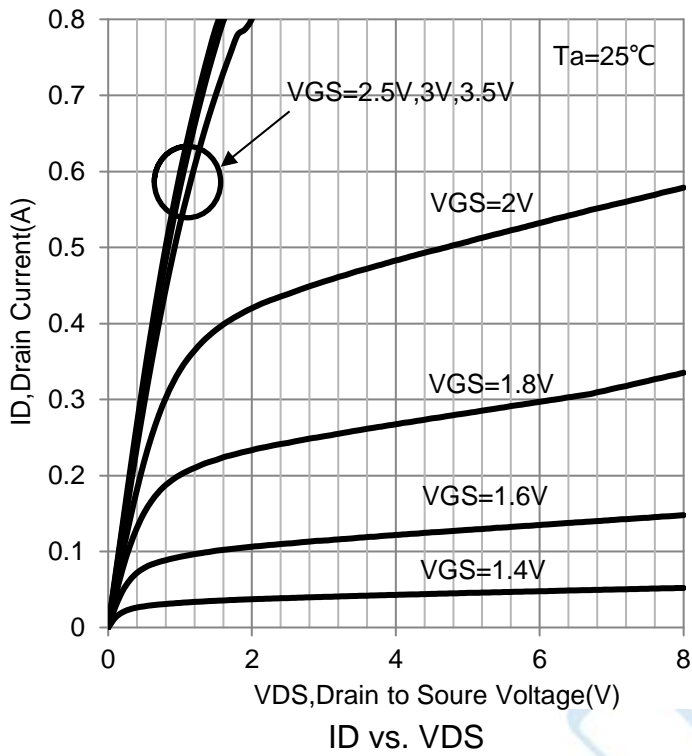
Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain -Source Breakdown Voltage	$B_{VDSS}$	$V_{GS}=0V, I_D=-250\mu A$	-50	-	-	V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-50V, V_{GS}=0V$	-	-	-1.0	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=20V, V_{DS}=0V$	-	-	100	nA
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=-20V, V_{DS}=0V$	-	-	-100	
<b>On Characteristics</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.45	-2.0	V
Static Drain- Source On State Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-0.1A$	-	1.6	2.5	$\Omega$
		$V_{GS}=-5.0V, I_D=-0.1A$	-	1.8	3.0	
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-25V$ $V_{GS}=0V$ $f=1.0MHZ$	-	30	-	pF
Output Capacitance	$C_{oss}$		-	10	-	
Reverse Transfer Capacitance	$C_{rss}$		-	5.0	-	
<b>Switching Characteristics</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-25V, V_{GS}=-10V$ $R_G=160\Omega, I_D=-0.1A$ (Note 2.3)	-	16.7	-	ns
Turn-on Rise Time	$t_r$		-	8.6	-	
Turn-off Delay Time	$t_{d(off)}$		-	17.9	-	
Turn-off Fall Time	$t_f$		-	5.3	-	

**P-CHANNEL SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS**

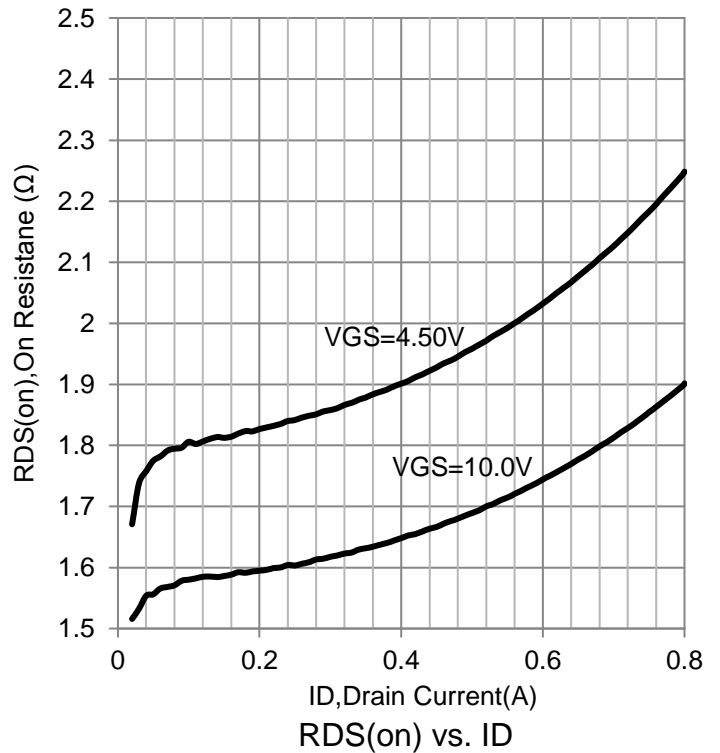
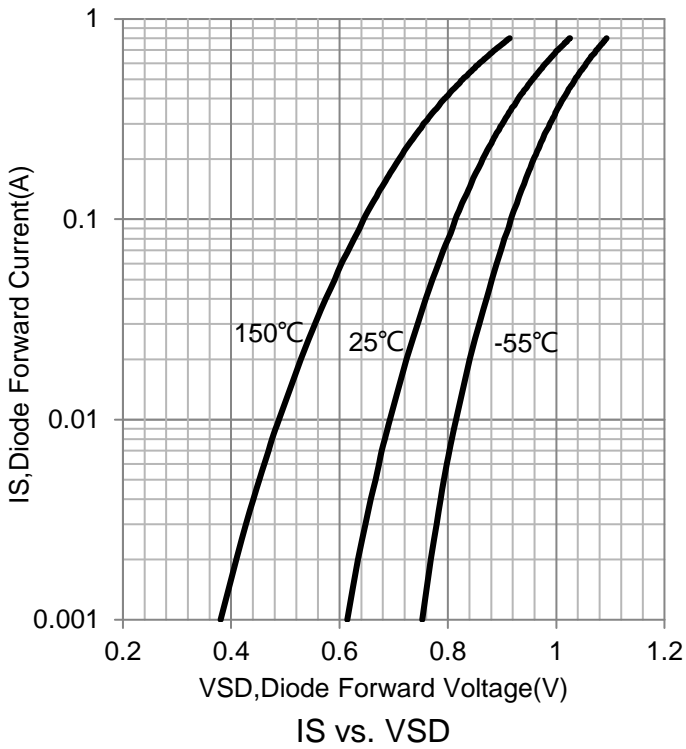
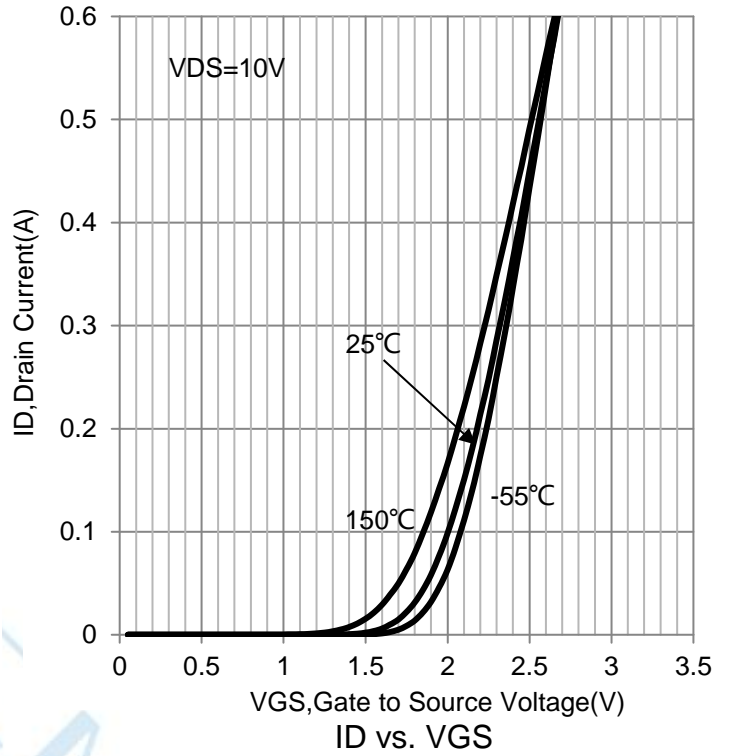
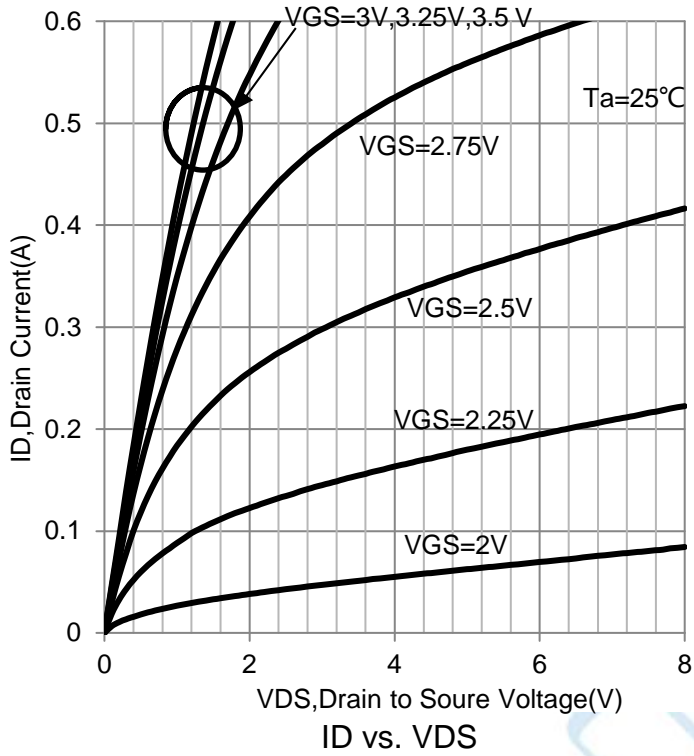
Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	$I_S$	Integral Reverse P-N Junction Diode in the MOSFET	-	-	-0.13	A
Pulsed Source Current	$I_{SM}$		-	-	-0.52	
Diode Forward Voltage	$V_{SD}$	$I_S=-0.2A, V_{GS}=0V$	-	-0.8	-1.2	V

- 1.Pulse width limited by maximum junction temperature
- 2.Pulse Test: Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$
- 3.Essentially independent of operating temperature

N-CHANNEL Typical Performance Characteristics

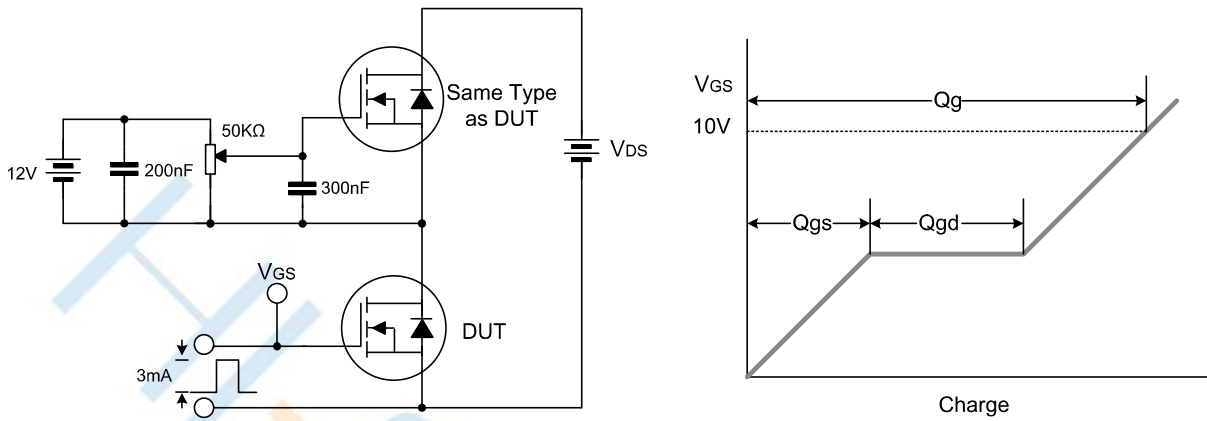


P-CHANNEL Typical Performance Characteristics

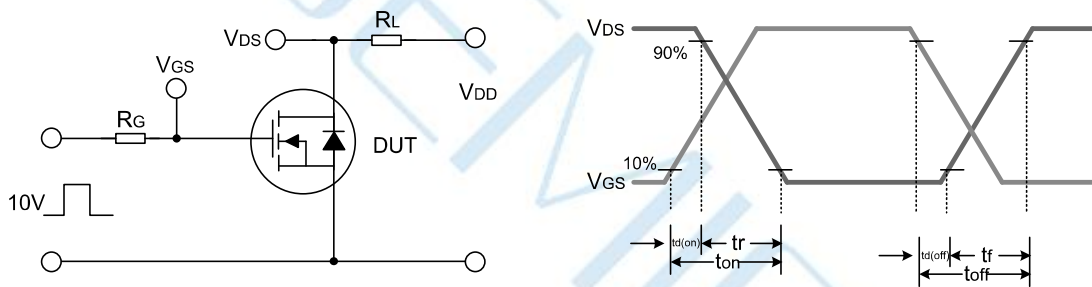


Test Circuit

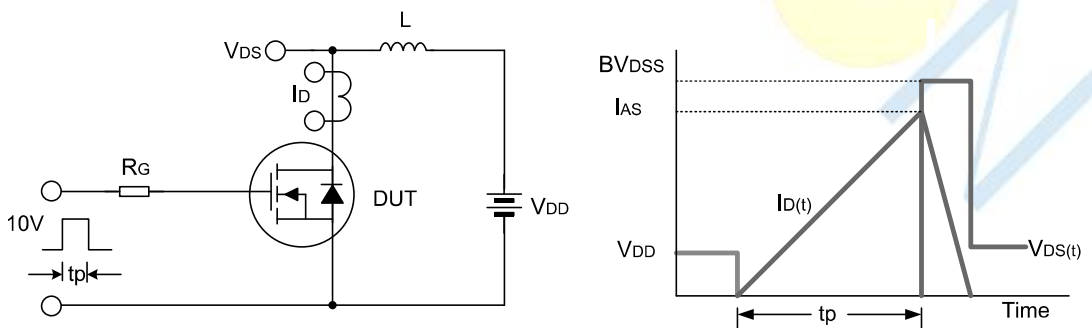
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

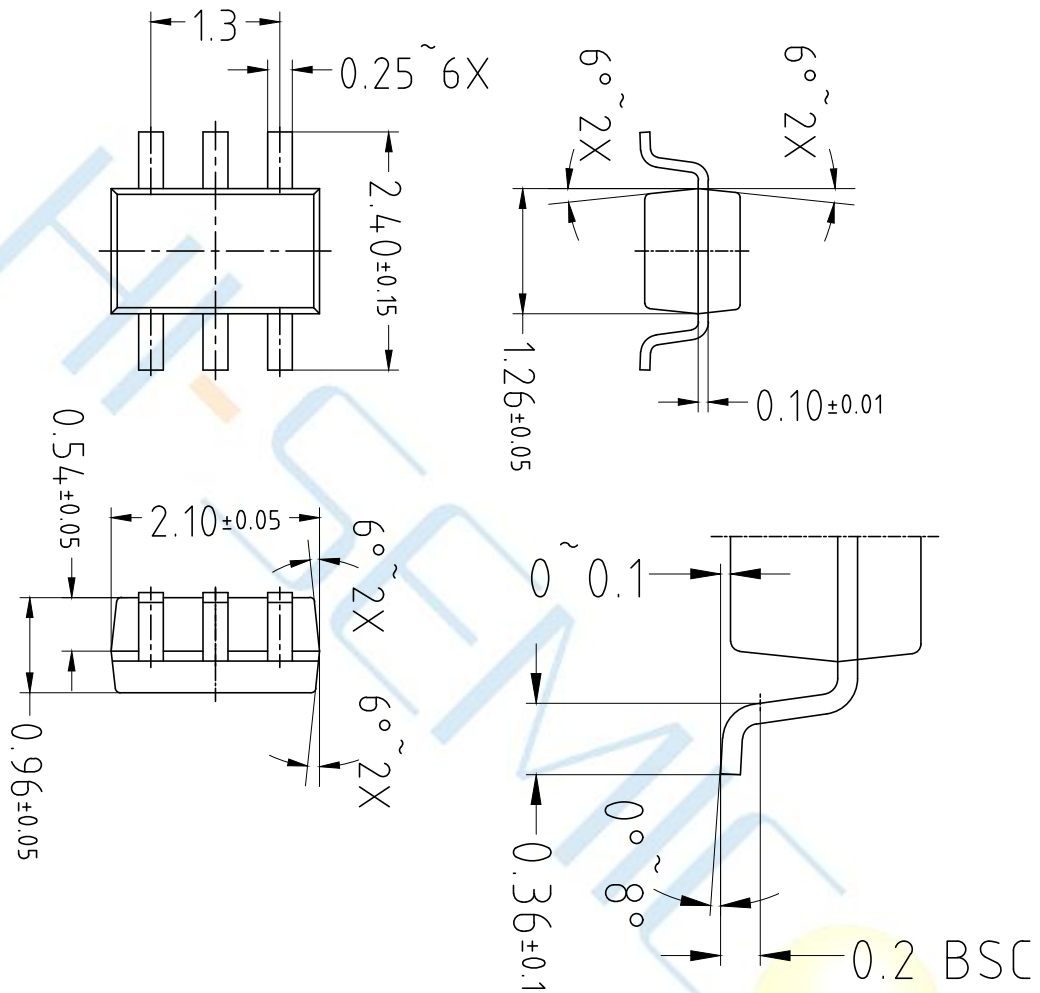


Unclamped Inductive Switching Test Circuit & Waveform



Package Dimensions of SOT363-6L

Unit:mm



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