

## Portable Equipment Application

### Features

- Low drain-source On-resistance:  
 $R_{DS(on)}=72m\Omega$  (Max.) @  $V_{GS}=-10V$ ,  $I_D=-2.7A$
- Low gate charge:  $Q_g=4.7nC$  (Typ.)
- High power and current handling capability
- RoHS compliant device

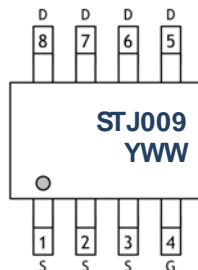


SOP-8

### Ordering Information

Part Number	Marking Code	Package	Packaging
STJ009	STJ009	SOP-8	Tape & Reel

### Marking and Pin Assignment



Column 1: Device Code  
 Column 2: Production Information  
 - YWW: Year & Week Code

### Absolute Maximum Ratings ( $T_{amb}=25^{\circ}C$ , Unless otherwise noted)

Characteristic	Symbol	Ratings	Unit
Drain-source voltage	$V_{DSS}$	-30	V
Gate-source voltage	$V_{GSS}$	$\pm 16$	V
Drain current (DC) <sup>1)</sup>	$I_D$	-5.3	A
Drain current (Pulsed) <sup>1)</sup>	$I_{DP}$	-21.2	A
Power dissipation	$P_D$	2	W
Single avalanche current <sup>4)</sup>	$I_{AS}$	-5.3	A
Single avalanche energy <sup>4)</sup>	$E_{AS}$	33	mJ
Repetitive avalanche current <sup>3)</sup>	$I_{AR}$	-5.3	A
Repetitive avalanche energy <sup>3)</sup>	$E_{AR}$	1.6	mJ
Operating junction temperature	$T_j$	150	$^{\circ}C$
Storage temperature range	$T_{stg}$	-55 ~ 150	$^{\circ}C$

Note 1) Limited by maximum junction temperature

## Thermal Characteristics (T<sub>amb</sub>=25 °C, Unless otherwise noted)

Characteristic	Symbol	Ratings	Unit
Thermal resistance, junction to ambient <sup>2)</sup>	R <sub>th(j-a)</sub>	62.5	°C/W

Note 2) Device mounted on FR-4 board with recommended pad layout.

## Electrical Characteristics (T<sub>amb</sub>=25 °C, Unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV <sub>DSS</sub>	I <sub>D</sub> =-250uA, V <sub>GS</sub> =0	-30	-	-	V
Gate threshold voltage	V <sub>GS(th)</sub>	I <sub>D</sub> =-250uA, V <sub>DS</sub> =V <sub>GS</sub>	-1	-	-3	V
Drain-source cut-off current	I <sub>DSS</sub>	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V	-	-	-1	uA
Gate leakage current	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V	-	-	±100	nA
Drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-2.7A	-	66	72	mΩ
		V <sub>GS</sub> =-5V, I <sub>D</sub> =-2.7A	-	77	83	
Forward transfer conductance <sup>6)</sup>	g <sub>fs</sub>	V <sub>DS</sub> =-5V, I <sub>D</sub> =-5.3A	-	11	-	S
Input capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =-10V, f=1MHz	-	390	590	pF
Output capacitance	C <sub>oss</sub>		-	97	150	
Reverse transfer capacitance	C <sub>rss</sub>		-	37	60	
Turn-on delay time <sup>5,6)</sup>	t <sub>d(on)</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-5.3A, R <sub>G</sub> =10Ω	-	1.2	-	ns
Rise time <sup>5,6)</sup>	t <sub>r</sub>		-	1.1	-	
Turn-off delay time <sup>5,6)</sup>	t <sub>d(off)</sub>		-	2.5	-	
Fall time <sup>5,6)</sup>	t <sub>f</sub>		-	1.1	-	
Total gate charge <sup>5,6)</sup>	Q <sub>g</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =-5V, I <sub>D</sub> =-5.3A	-	4.7	7	nC
Gate-source charge <sup>5,6)</sup>	Q <sub>gs</sub>		-	1.4	2.1	
Gate-drain charge <sup>5,6)</sup>	Q <sub>gd</sub>		-	1.7	2.5	

## Source-Drain Diode Rating and Characteristics (T<sub>amb</sub>=25 °C, Unless otherwise specified)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current (DC)	I <sub>S</sub>	Integral reverse diode in the MOSFET	-	-	-1.5	A
Source current (Pulsed) <sup>3)</sup>	I <sub>SM</sub>		-	-	-6	
Forward voltage <sup>6)</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =-1.5A	-	-	-1.2	V
Reverse recovery time	t <sub>rr</sub>	I <sub>S</sub> =-1.5A, dI <sub>F</sub> /dt=-100A/us	-	90	-	ns
Reverse recovery charge	Q <sub>rr</sub>		-	0.5	-	uC

Note:

3) Repetitive rating: Pulse width limited by maximum junction temperature

4) L=2mH, I<sub>AS</sub>=-5A, V<sub>DD</sub>=-15V, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25 °C

5) Pulse Test: Pulse width≤300us, Duty cycle≤2%

6) Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1  $I_D - V_{DS}$

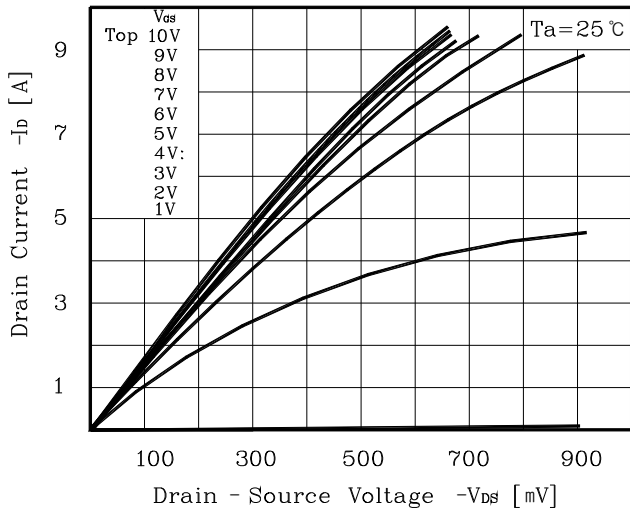


Fig. 2  $I_D - V_{GS}$

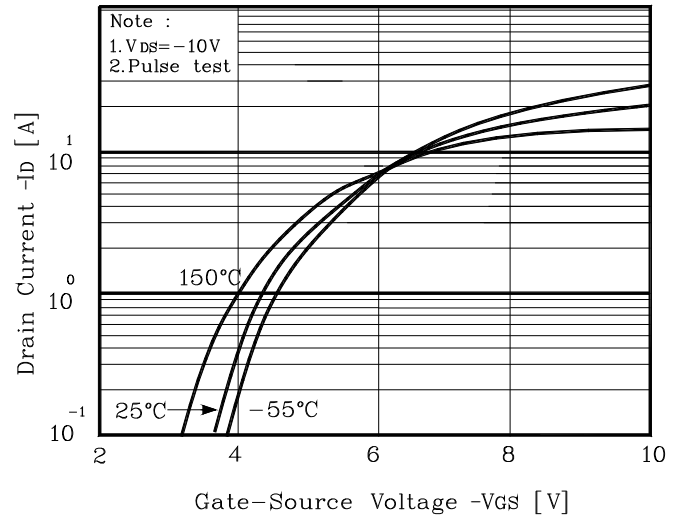


Fig. 3  $R_{DS(on)} - I_D$

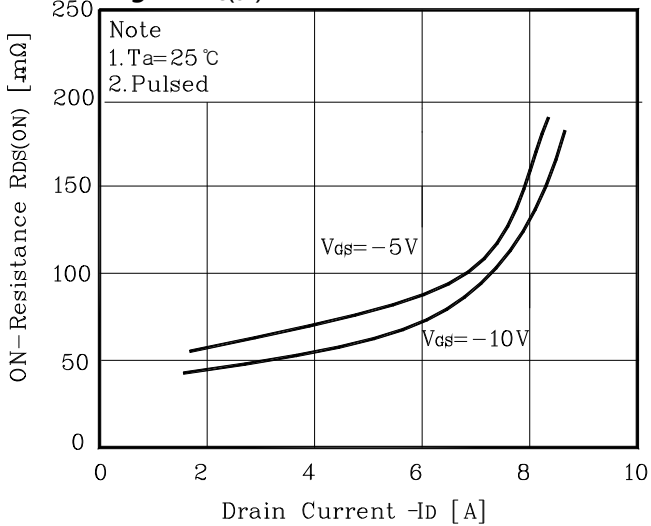


Fig. 4  $I_S - V_{SD}$

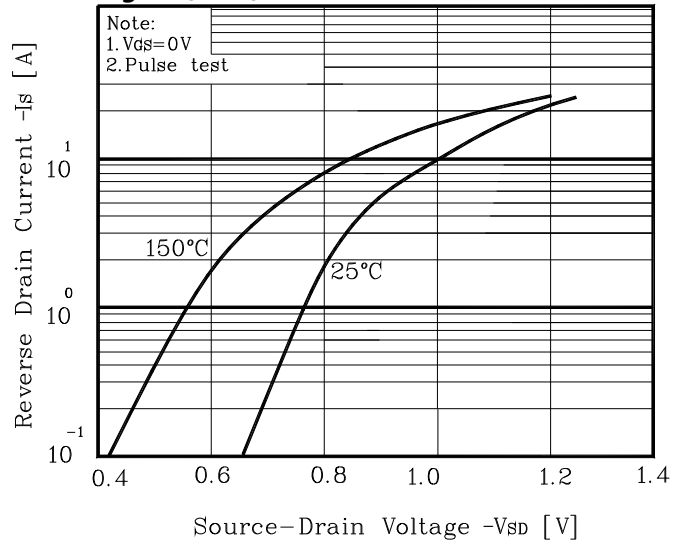


Fig. 5 Capacitance -  $V_{DS}$

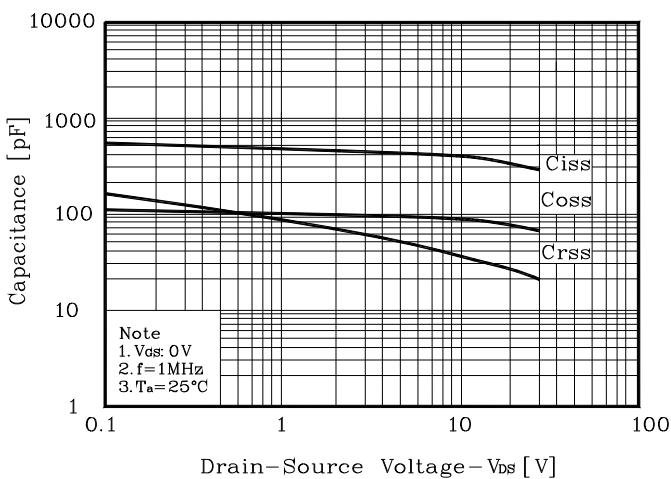
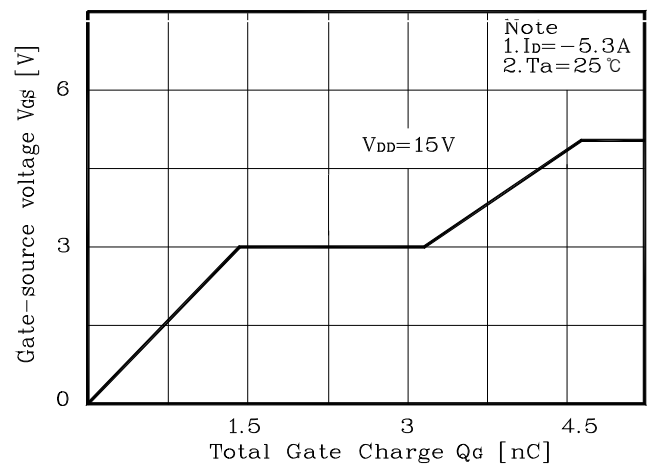


Fig. 6  $V_{GS} - Q_G$



Electrical Characteristic Curves

Fig. 7  $V_{DSS} - T_J$

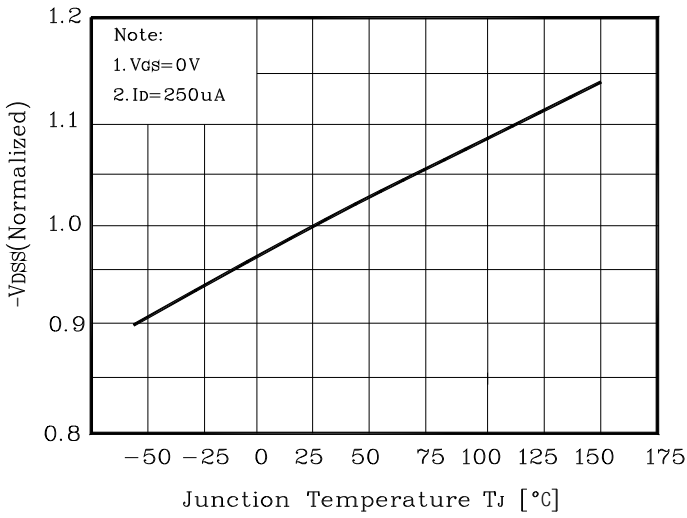


Fig. 8  $R_{DS(on)} - T_J$

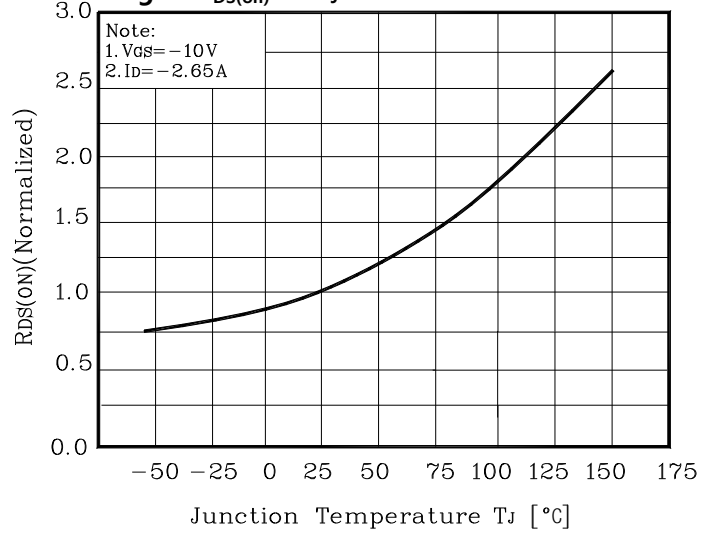


Fig. 9  $I_D - T_a$

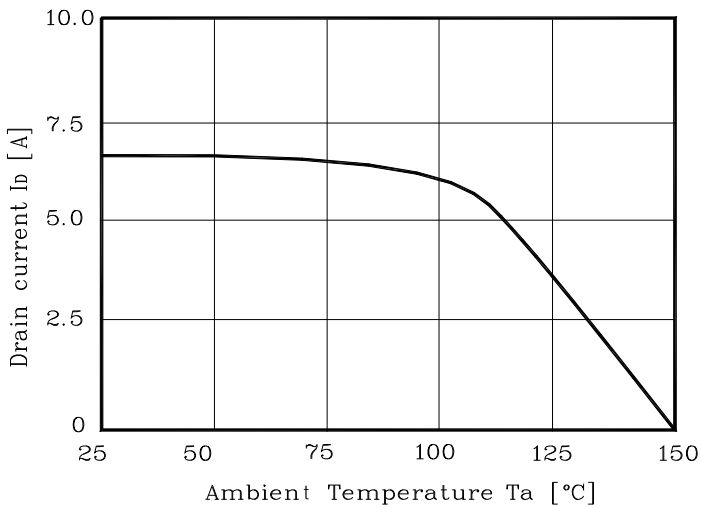


Fig. 10 Safe Operating Area

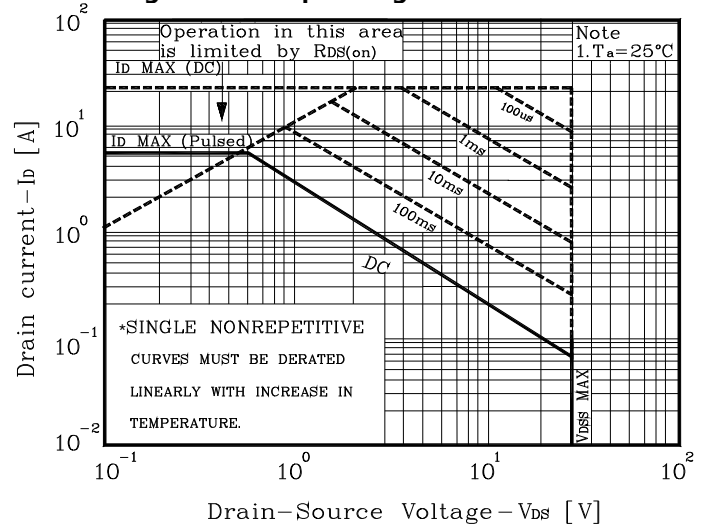


Fig. 11 Gate Charge Test Circuit & Waveform

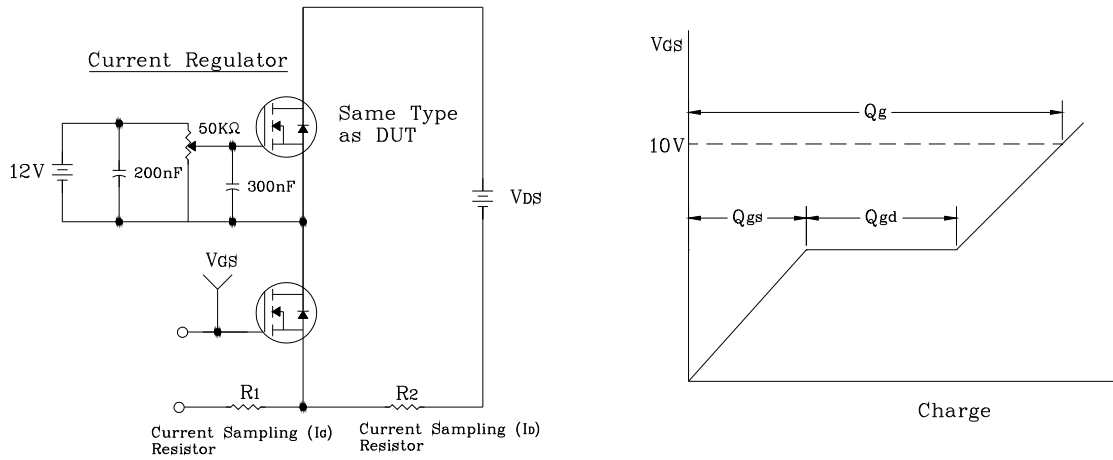


Fig. 12 Resistive Switching Test Circuit & Waveform

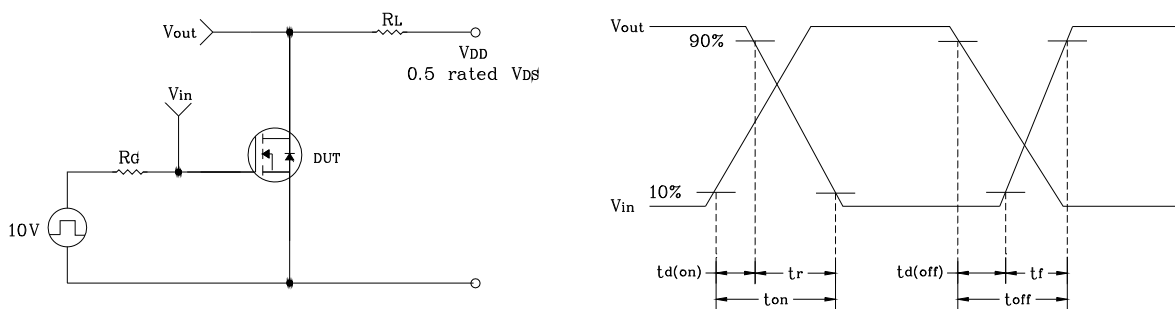


Fig. 13 E<sub>AS</sub> Test Circuit & Waveform

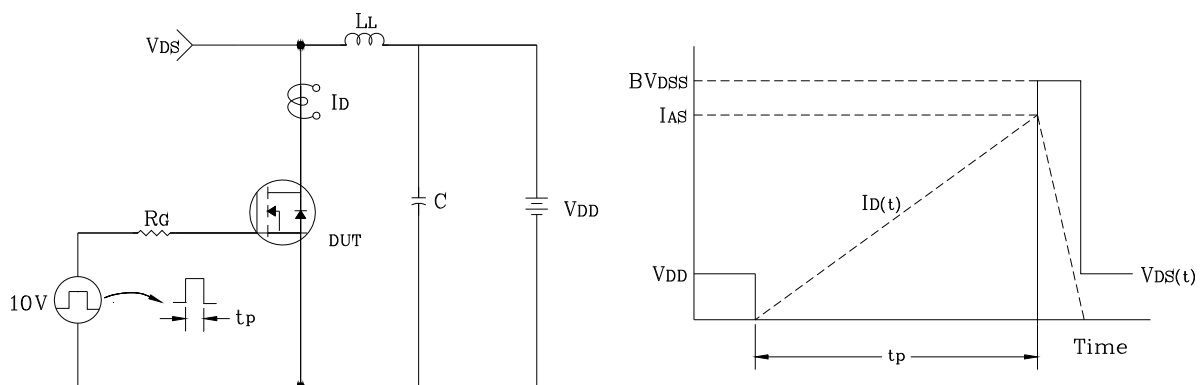
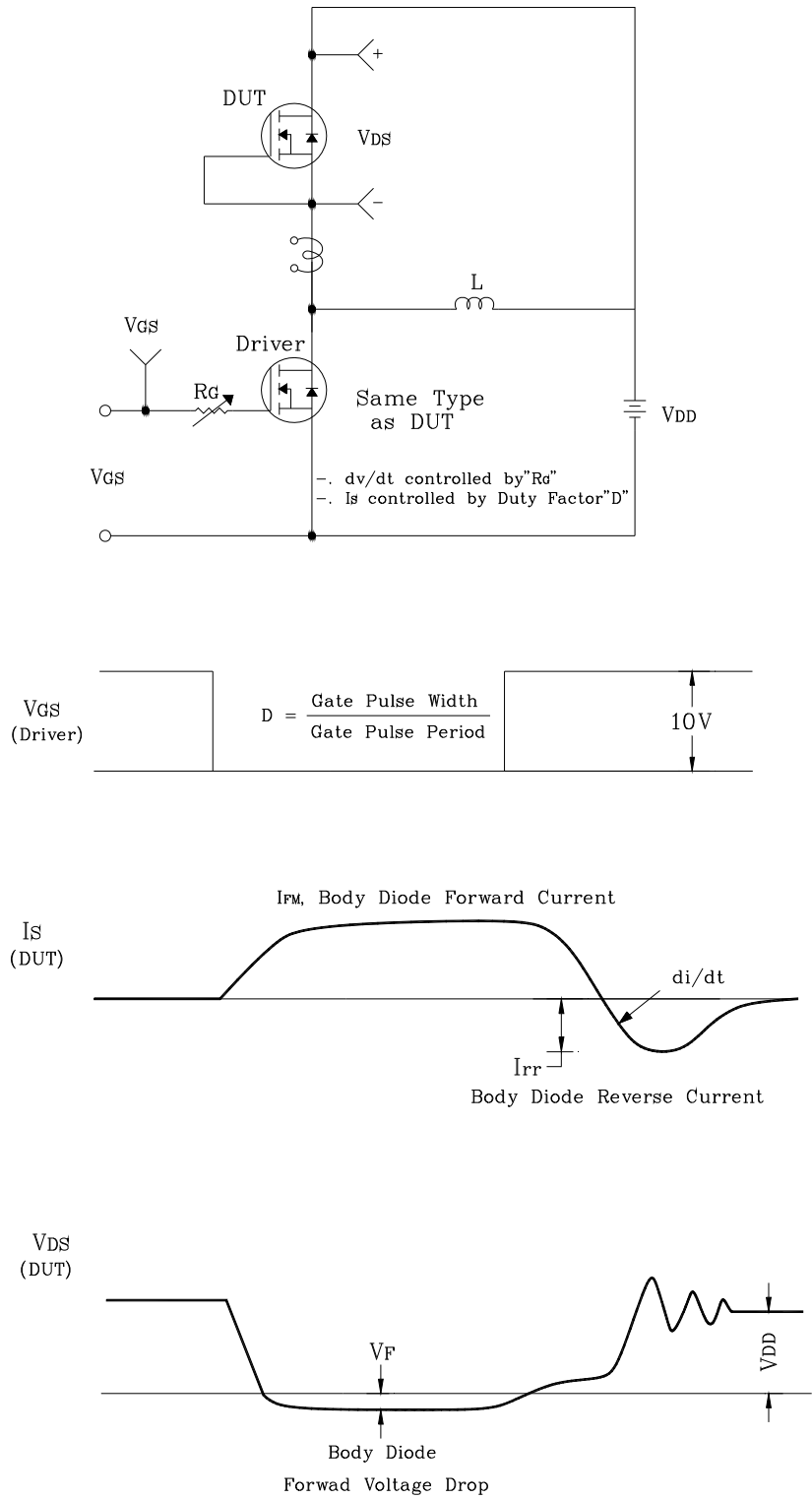
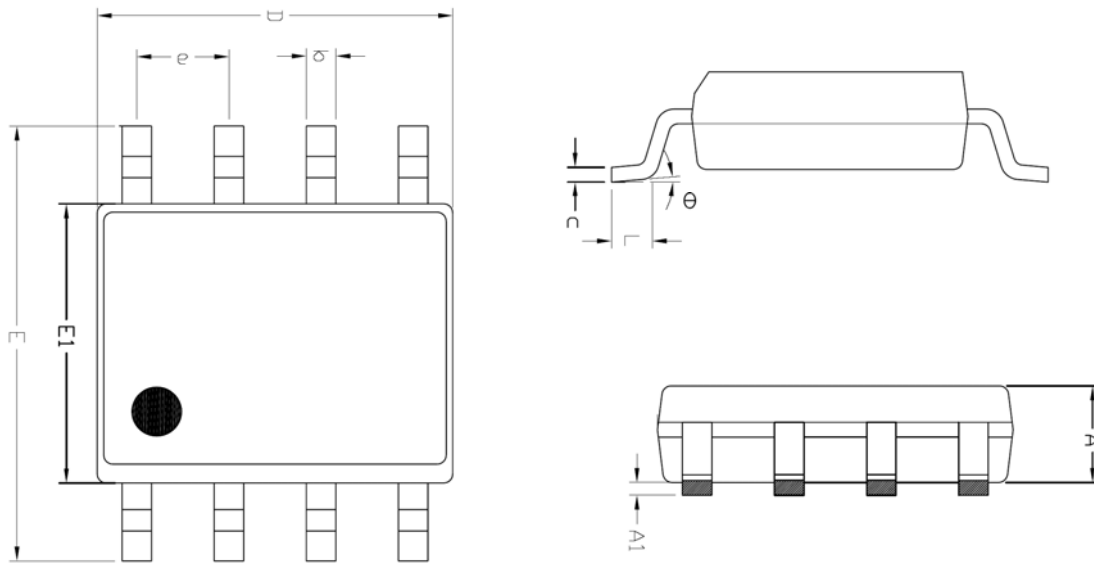


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform

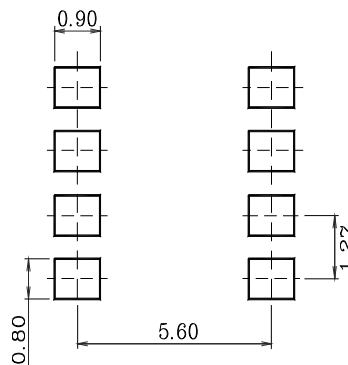


Package Outline Dimensions



SYMBOL	MILLIMETER(mm)			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	1.245	—	1.445	
A1	0.125	0.175	0.275	
b	0.320	0.420	0.520	
c	0.170	0.220	0.270	
D	4.802	4.902	5.002	
E	5.870	6.020	6.170	
E1	3.761	3.861	3.961	
e	1.270 BSC			
L	0.462	0.562	0.662	
theta	0 °	—	8 °	

※ Recommended Land Pattern [unit: mm]



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