

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

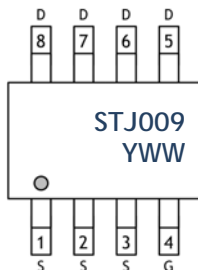


SOP-8

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}	± 16	V
Drain current (DC) ¹⁾	I_D	-5.3	A
Drain current (Pulsed) ¹⁾	I_{DP}	-21.2	A
Power dissipation	P_D	2	W
Single avalanche current ⁴⁾	I_{AS}	-5.3	A
Single avalanche energy ⁴⁾	E_{AS}	33	mJ
Repetitive avalanche current ³⁾	I_{AR}	-5.3	A
Repetitive avalanche energy ³⁾	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 ($T_{amb}=25^{\circ}\text{C}$, Unless otherwise noted)

Characteristic	Symbol	Ratings	Unit
Thermal resistance, junction to ambient ²⁾	$R_{th(j-a)}$	62.5	$^{\circ}\text{C}/\text{W}$

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

Electrical Characteristics ($T_{amb}=25^{\circ}\text{C}$, Unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	$I_D=-250\mu\text{A}$, $V_{GS}=0$	-30	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D=-250\mu\text{A}$, $V_{DS}=V_{GS}$	-1	-	-3	V
Drain-source cut-off current	I_{DSS}	$V_{DS}=-30\text{V}$, $V_{GS}=0\text{V}$	-	-	-1	μA
Gate leakage current	I_{GSS}	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$	-	-	± 100	nA
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=-10\text{V}$, $I_D=-2.7\text{A}$	-	66	72	m Ω
		$V_{GS}=-5\text{V}$, $I_D=-2.7\text{A}$	-	77	83	
Forward transfer conductance ⁶⁾	g_{fs}	$V_{DS}=-5\text{V}$, $I_D=-5.3\text{A}$	-	11	-	S
Input capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=-10\text{V}$, $f=1\text{MHz}$	-	390	590	pF
Output capacitance	C_{oss}		-	97	150	
Reverse transfer capacitance	C_{rss}		-	37	60	
Turn-on delay time ^{5,6)}	$t_{d(on)}$	$V_{DS}=-15\text{V}$, $I_D=-5.3\text{A}$, $R_G=10\Omega$	-	1.2	-	ns
Rise time ^{5,6)}	t_r		-	1.1	-	
Turn-off delay time ^{5,6)}	$t_{d(off)}$		-	2.5	-	
Fall time ^{5,6)}	t_f		-	1.1	-	
Total gate charge ^{5,6)}	Q_g	$V_{DS}=-15\text{V}$, $V_{GS}=-5\text{V}$, $I_D=-5.3\text{A}$	-	4.7	7	nC
Gate-source charge ^{5,6)}	Q_{gs}		-	1.4	2.1	
Gate-drain charge ^{5,6)}	Q_{gd}		-	1.7	2.5	

Source-Drain Diode Rating and Characteristics ($T_{amb}=25^{\circ}\text{C}$, Unless otherwise specified)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current (DC)	I_S	Integral reverse diode in the MOSFET	-	-	-1.5	A
Source current (Pulsed) ³⁾	I_{SM}		-	-	-6	
Forward voltage ⁶⁾	V_{SD}	$V_{GS}=0\text{V}$, $I_S=-1.5\text{A}$	-	-	-1.2	V
Reverse recovery time	t_{rr}	$I_S=-1.5\text{A}$	-	90	-	ns
Reverse recovery charge	Q_{rr}	$di_f/dt=-100\text{A}/\mu\text{s}$	-	0.5	-	μC

Note:

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

4) $L=2\text{mH}$, $I_{AS}=-5\text{A}$, $V_{DD}=-15\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$

5) Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

6) Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 $I_D - V_{DS}$

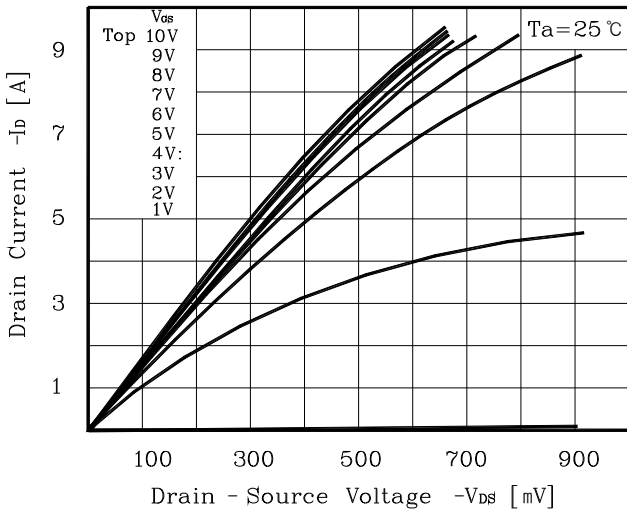


Fig. 2 $I_D - V_{GS}$

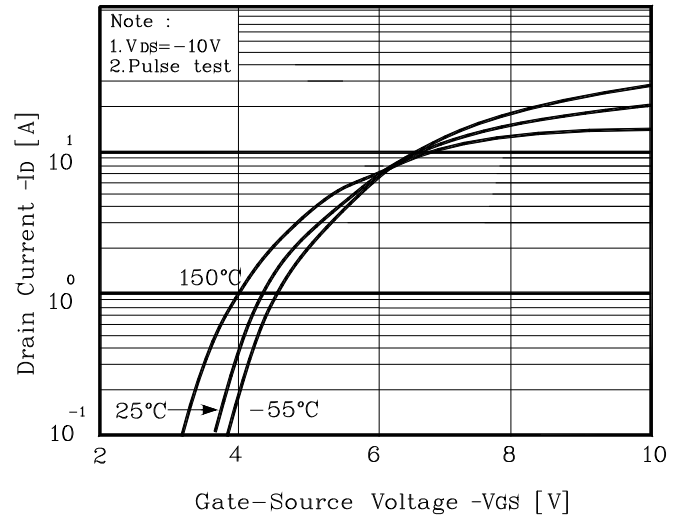


Fig. 3 $R_{DS(on)} - I_D$

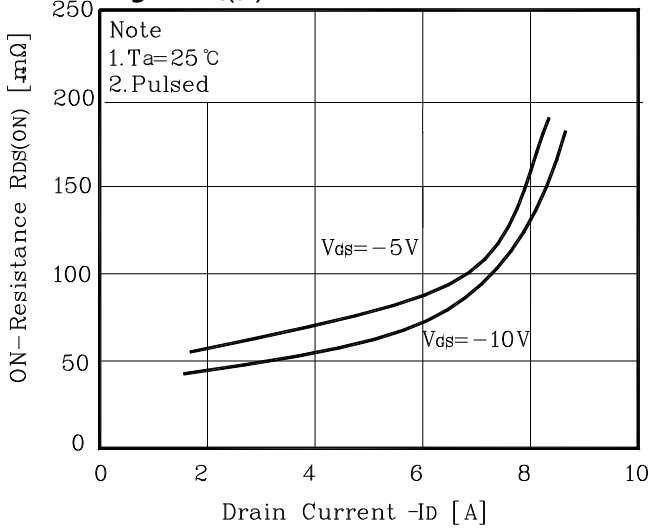


Fig. 4 $I_S - V_{SD}$

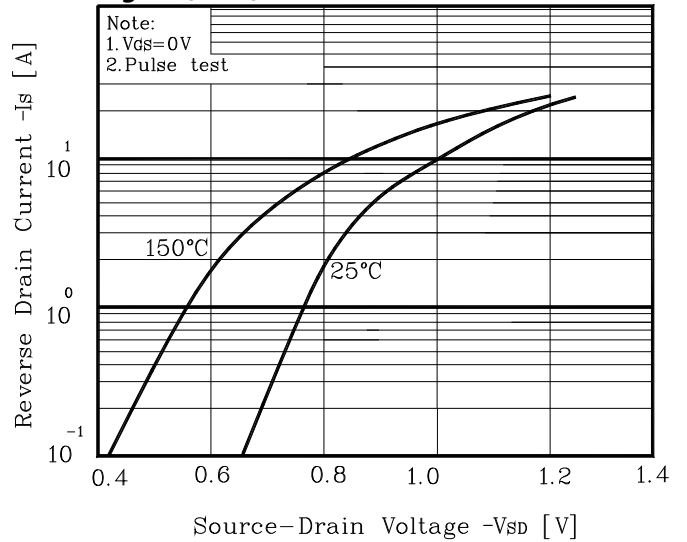


Fig. 5 Capacitance - V_{DS}

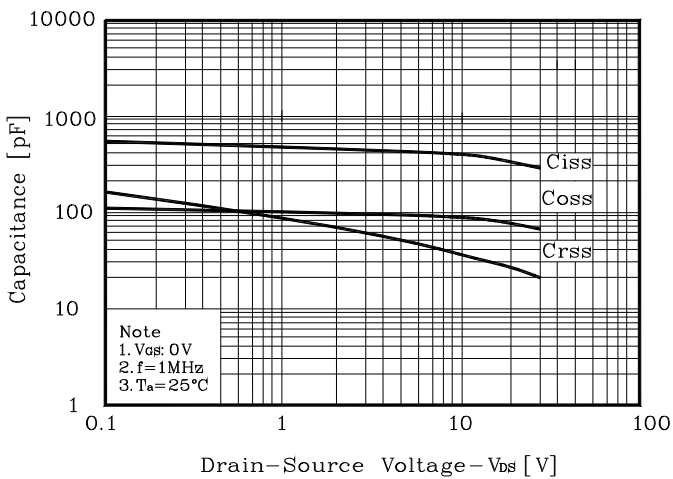
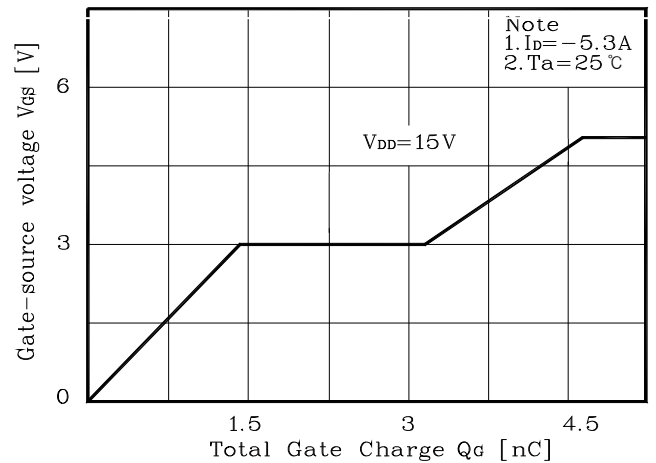


Fig. 6 $V_{GS} - Q_G$



Electrical Characteristic Curves

Fig. 7 $V_{DSS} - T_J$

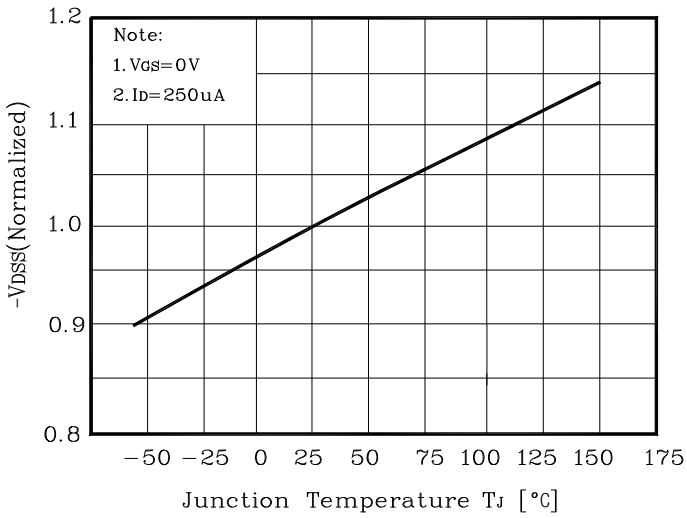


Fig. 8 $R_{DS(on)} - T_J$

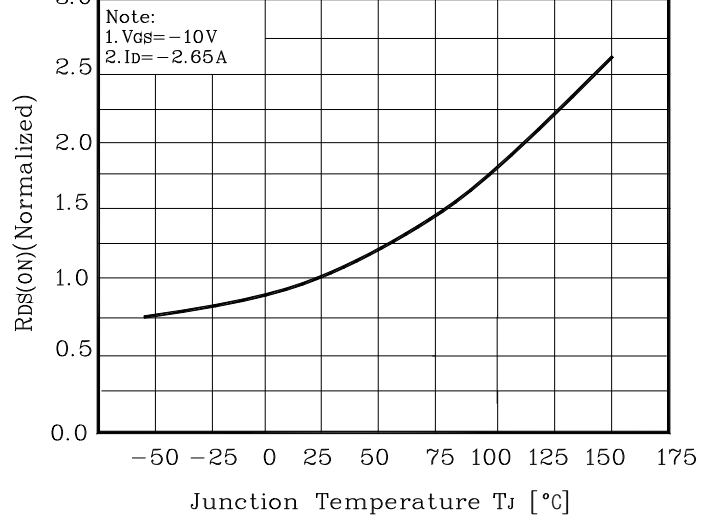


Fig. 9 $I_D - T_a$

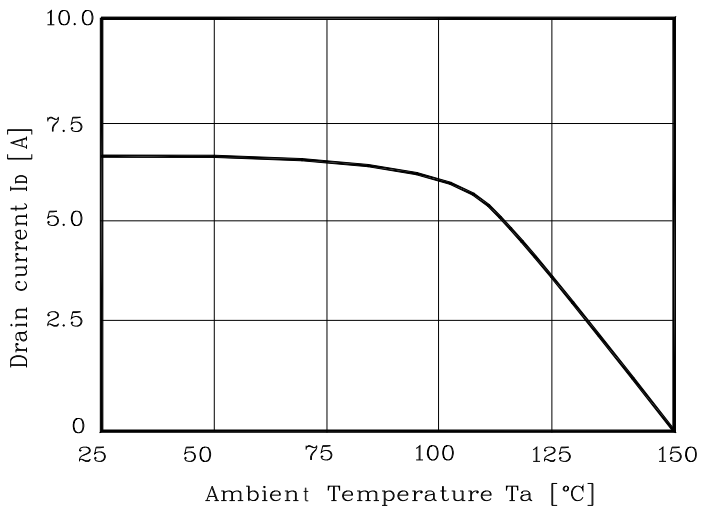


Fig. 10 Safe Operating Area

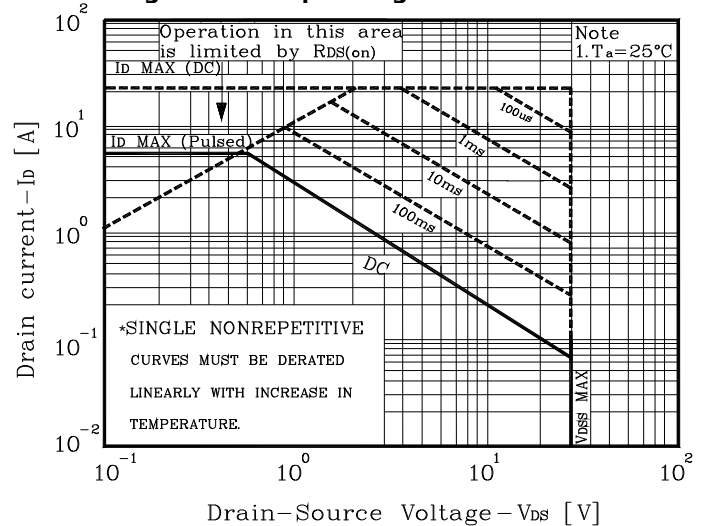


Fig. 11 Gate Charge Test Circuit & Waveform

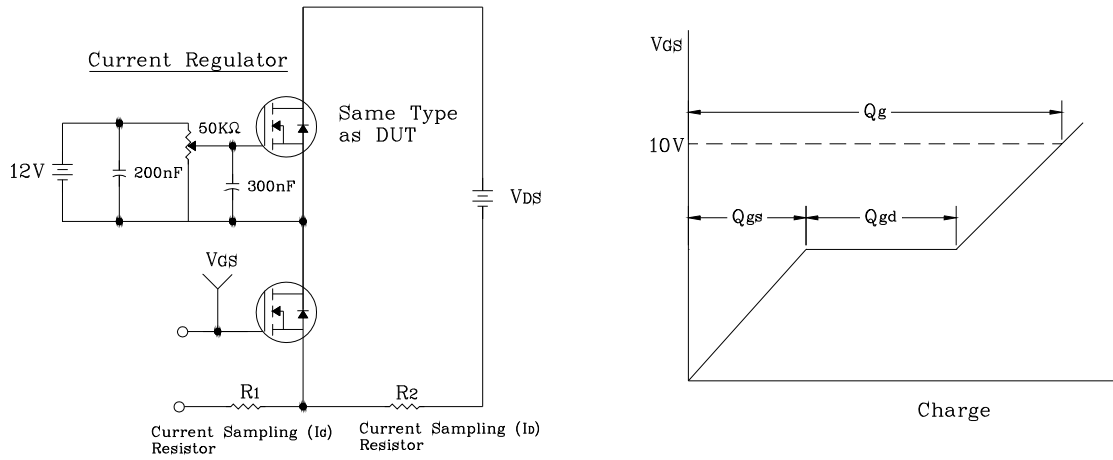


Fig. 12 Resistive Switching Test Circuit & Waveform

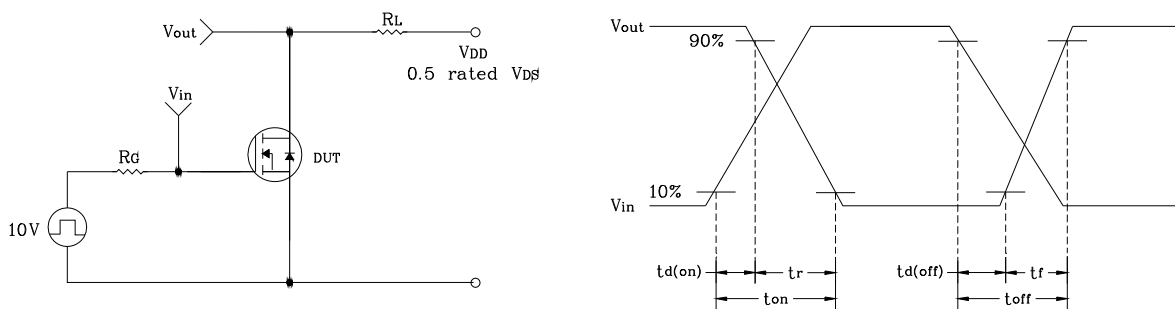


Fig. 13 E_{AS} Test Circuit & Waveform

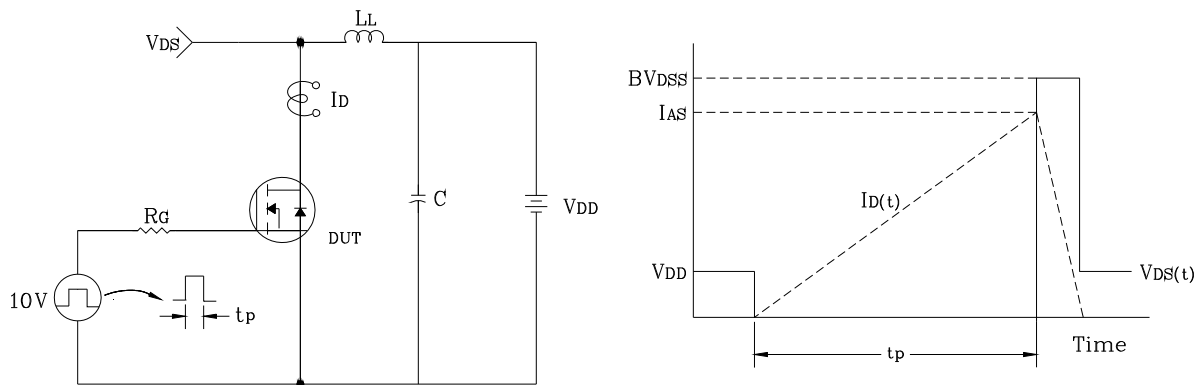
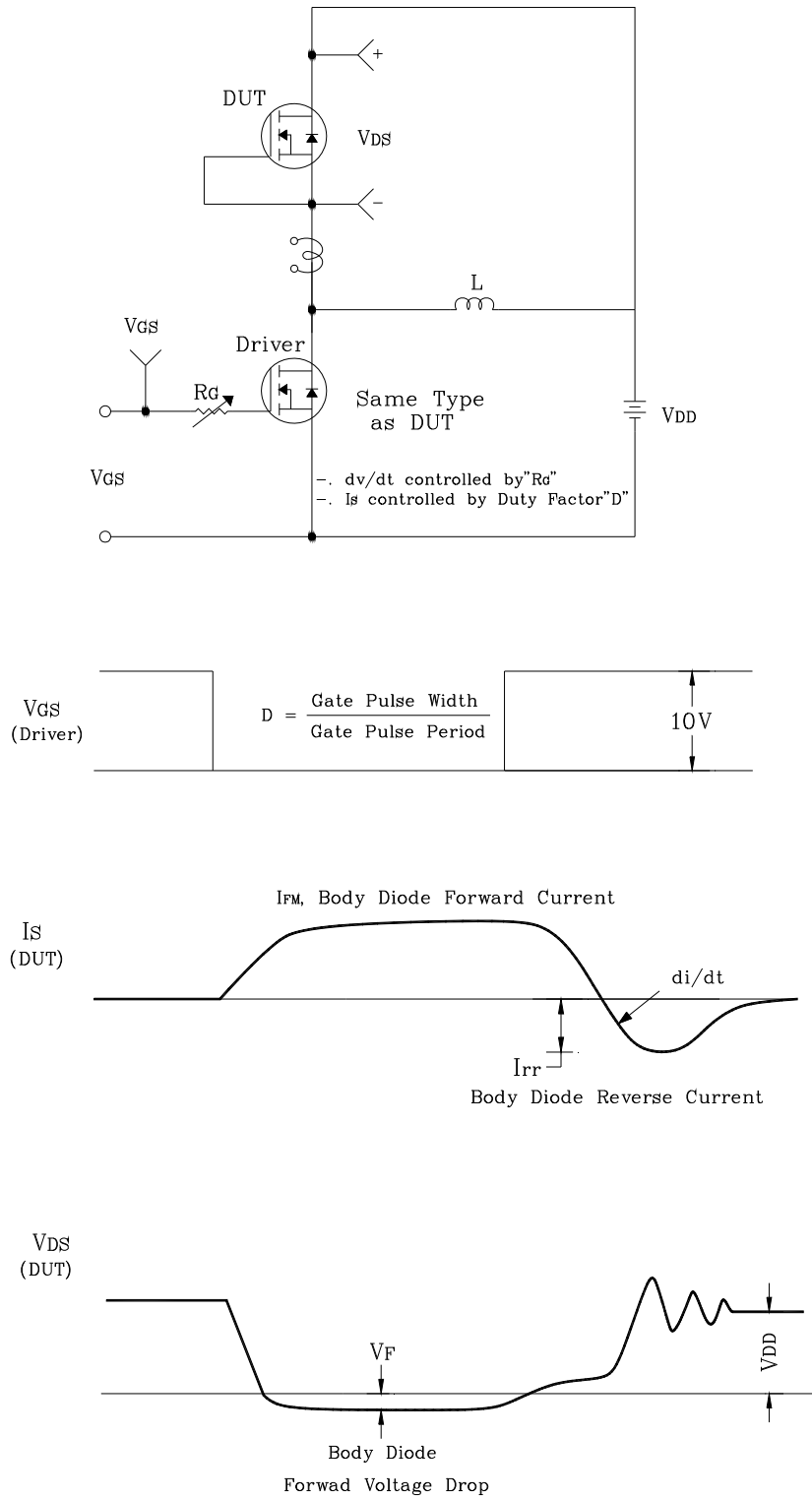
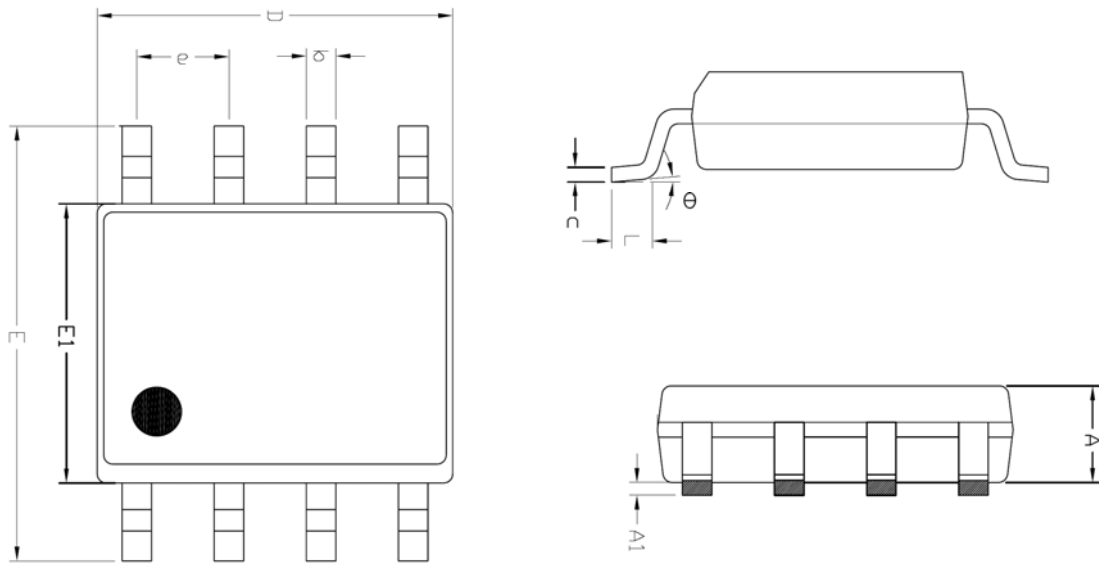


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform

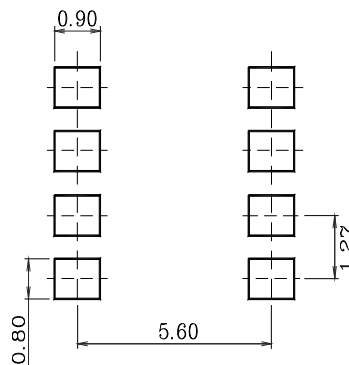


Package Outline Dimensions



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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