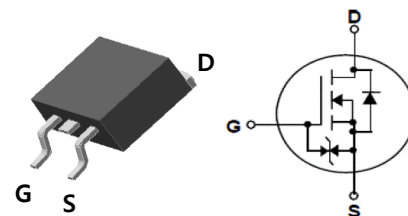


800V N-Channel Super Junction MOSFET

Features

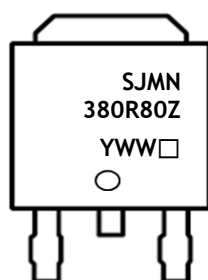
- Very Low FOM ($R_{DS(on)} \times Q_g$)
- Extremely low switching loss
- Excellent stability and uniformity
- 100% avalanche tested
- Built-in ESD Diode


TO-263 (D²-PAK)

Ordering Information

Part Number	Marking	Package
SJMN380R80ZB	SJMN380R80Z	TO-263 (D ² -PAK)

Marking Information



Column 1, 2: Device Code
Column 3: Production Information

e.g.) YWW□

-. YWW: Date Code (year, week)

-. □: Management Code

Absolute maximum ratings ($T_c=25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Rating	Unit
Drain-source voltage	V_{DS}	800	V
Gate-source voltage	V_{GS}	± 20	V
Drain current (DC) *	I_D	$T_c=25^\circ\text{C}$	13
		$T_c=100^\circ\text{C}$	8.2
Drain current (Pulsed) *	I_{DM}	39	A
Single pulsed avalanche energy (Note 2)	E_{AS}	183	mJ
Single pulsed avalanche current (Note 1)	I_{AS}	2	A
Repetitive avalanche energy (Note 1)	E_{AR}	11.4	mJ
Power dissipation	P_D	114	W
Gate to source ESD (Human Body Model)	$V_{ESD(G-S)}$	2000	V
Junction temperature	T_J	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55~150	$^\circ\text{C}$

* Limited only maximum junction temperature

Thermal Characteristics

Characteristic	Symbol	Rating	Unit
Thermal resistance, junction to case	$R_{th(j-c)}$	Max. 1.1	°C/W
Thermal resistance, junction to ambient	$R_{th(j-a)}$	Max. 62.5	

Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	$I_D=1\text{mA}$, $V_{GS}=0$	800	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D=480\mu\text{A}$, $V_{DS}=V_{GS}$	2	-	4	V
Drain-source cut-off current	I_{DSS}	$V_{DS}=800\text{V}$, $V_{GS}=0\text{V}$	-	-	1	μA
		$V_{DS}=800\text{V}$, $T_c=150^{\circ}\text{C}$	-	-	100	μA
Gate leakage current	I_{GSS}	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$	-	-	± 1	μA
Drain-source on-resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=3.4\text{A}$	-	0.33	0.38	Ω
Input capacitance	C_{iss}	$V_{DS}=200\text{V}$, $V_{GS}=0\text{V}$, $f=1.0\text{MHz}$	-	1180	-	pF
Output capacitance	C_{oss}		-	30	-	
Reverse transfer capacitance	C_{rss}		-	3	-	
Turn-on delay time (Note 3,4)	$t_{d(on)}$	$V_{DD}=400\text{V}$, $I_D=6.2\text{A}$, $R_G=25\Omega$	-	36	-	ns
Rise time (Note 3,4)	t_r		-	28	-	
Turn-off delay time (Note 3,4)	$t_{d(off)}$		-	72	-	
Fall time (Note 3,4)	t_f		-	24	-	
Total gate charge (Note 3,4)	Q_g	$V_{DS}=640\text{V}$, $V_{GS}=10\text{V}$, $I_D=6.2\text{A}$	-	37	-	nC
Gate-source charge (Note 3,4)	Q_{gs}		-	10.4	-	
Gate-drain charge (Note 3,4)	Q_{gd}		-	12.5	-	

Source-Drain Diode Ratings and Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current (DC)	I_S	Integral reverse diode in the MOSFET	-	-	13	A
Source current (Pulsed)	I_{SM}		-	-	39	A
Forward voltage	V_{SD}	$V_{GS}=0\text{V}$, $I_S=6.2\text{A}$	-	-	1.3	V
Reverse recovery time (Note 3,4)	t_{rr}	$I_S=6.2\text{A}$, $V_{GS}=0\text{V}$ $dI_F/dt=-100\text{A}/\mu\text{s}$	-	394	-	ns
Reverse recovery charge (Note 3,4)	Q_{rr}		-	3.6	-	μC

Note:

1. Repeated rating: Pulse width limited by safe operating area
2. $I_{AS}=2\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$
3. Pulse test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
4. Essentially independent of operating temperature typical characteristics

Typical Characteristics Curve

Fig. 1 $I_D - V_{DS}$

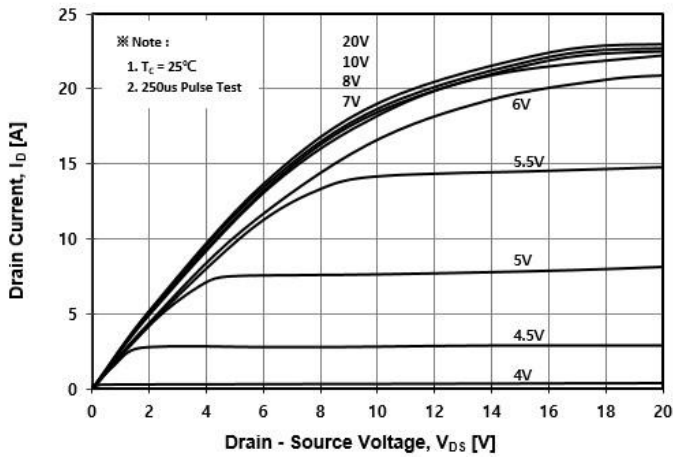


Fig. 2 $I_D - V_{GS}$

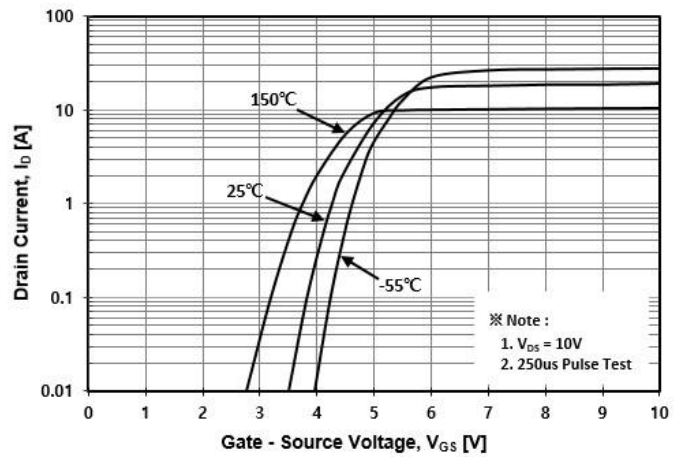


Fig. 3 $R_{DS(ON)} - I_D$

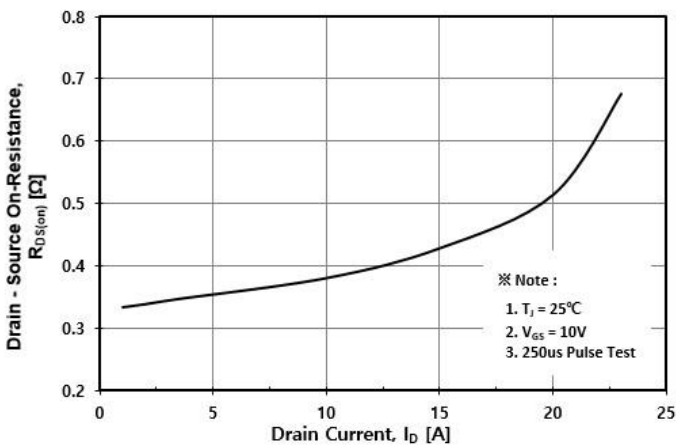


Fig. 4 $I_S - V_{SD}$

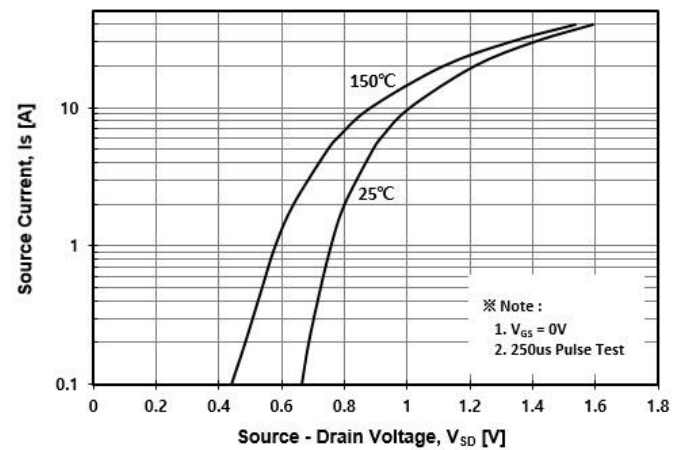


Fig. 5 Capacitance - V_{DS}

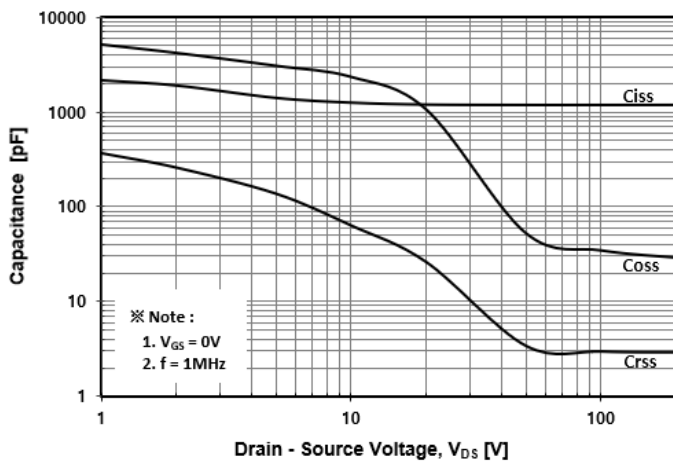
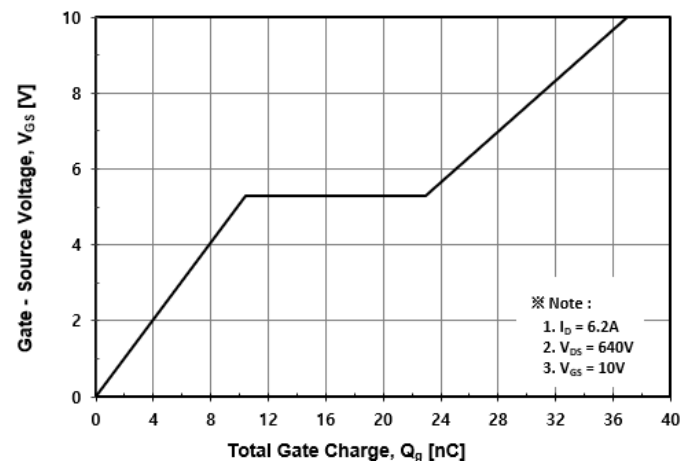


Fig. 6 $V_{GS} - Q_g$



Typical Characteristics Curve (Continue)

Fig. 7 $BV_{DSS} - T_J$

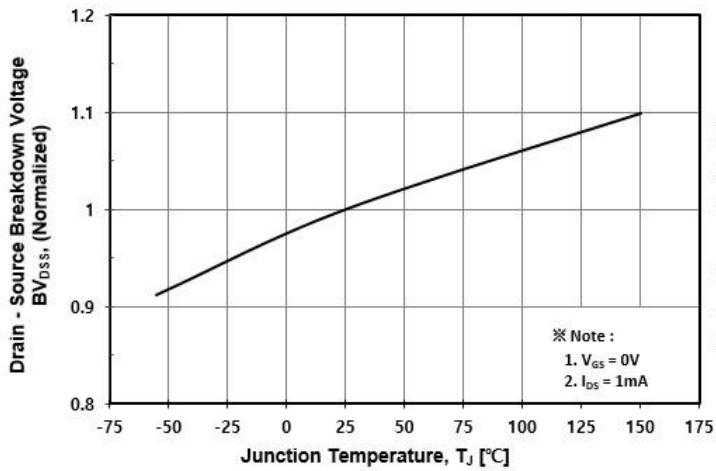


Fig. 8 $R_{DS(ON)} - T_J$

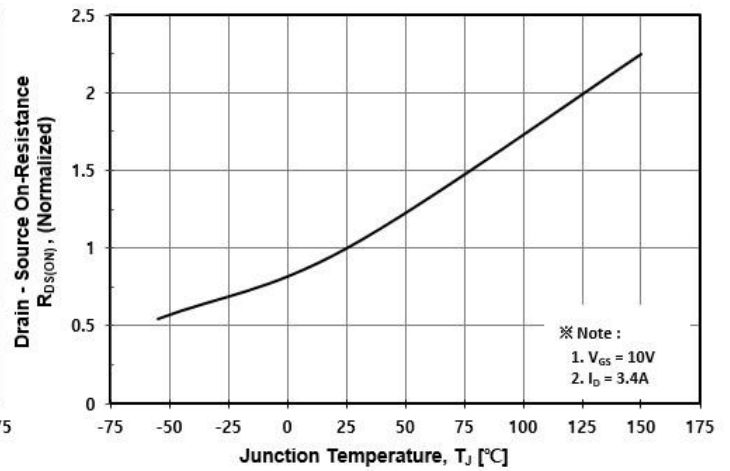


Fig. 9 $I_D - T_C$

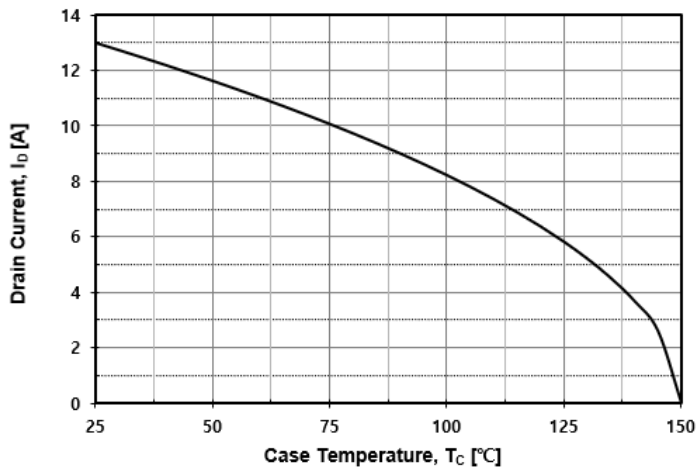


Fig. 10 Safe Operating Area

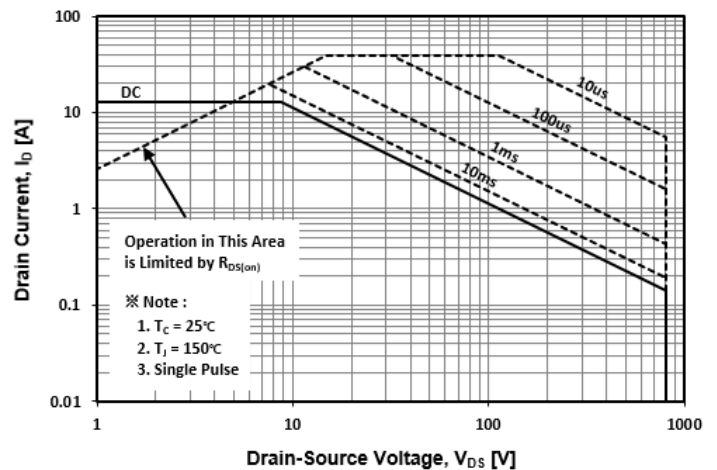


Fig. 11 Transient Thermal Impedance

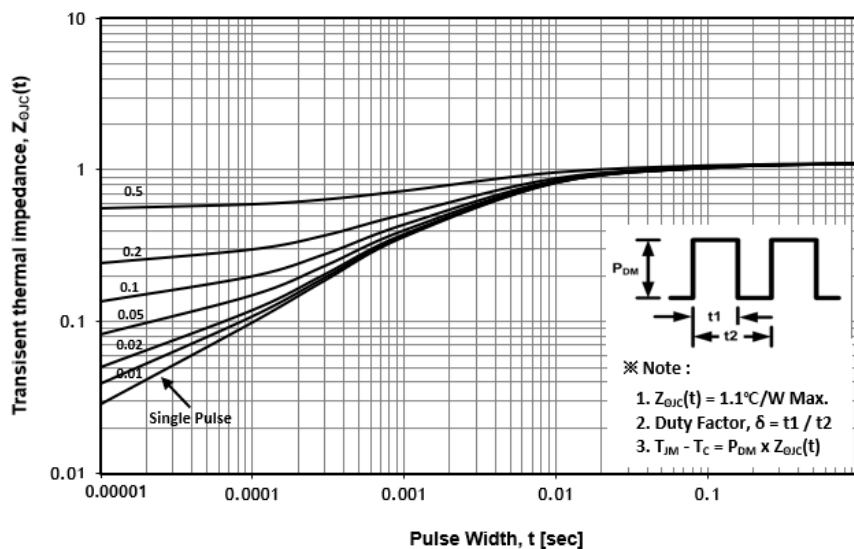


Fig. 12 Gate Charge Test Circuit & Waveform

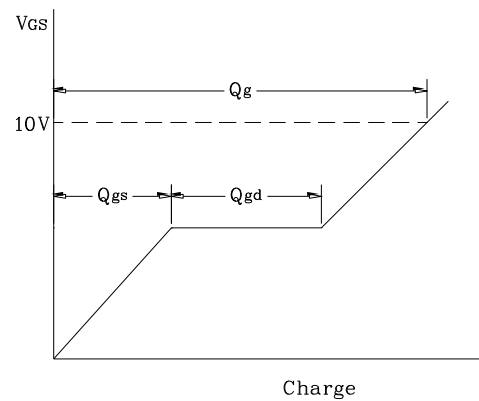
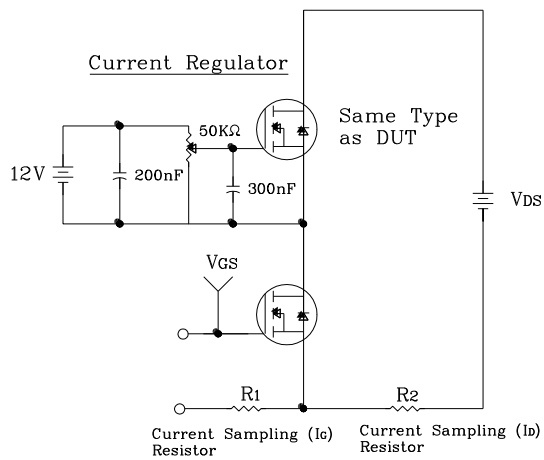


Fig. 13 Resistive Switching Test Circuit & Waveform

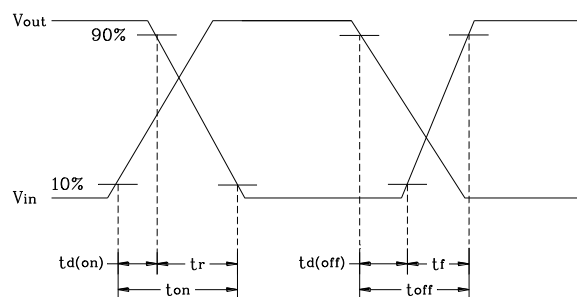
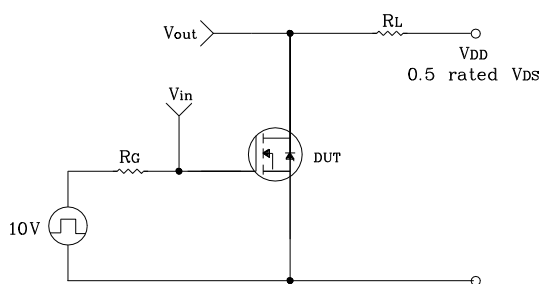


Fig. 14 E_{AS} Test Circuit & Waveform

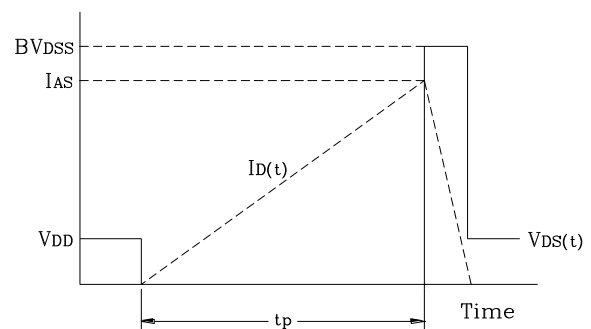
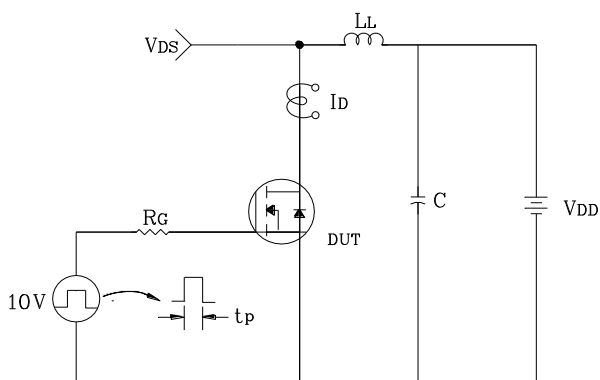
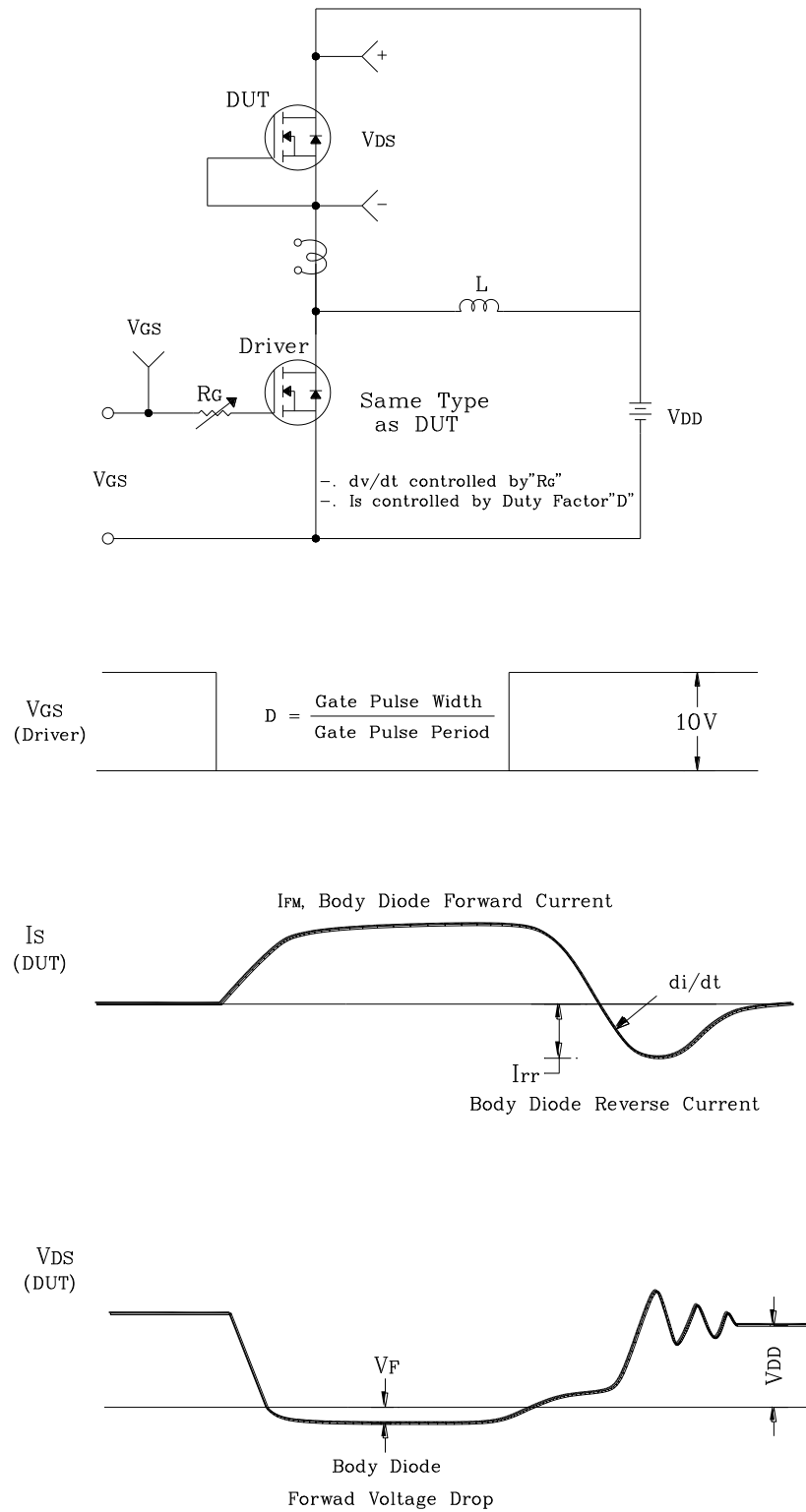
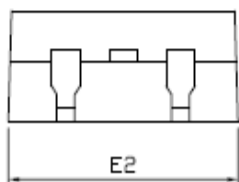
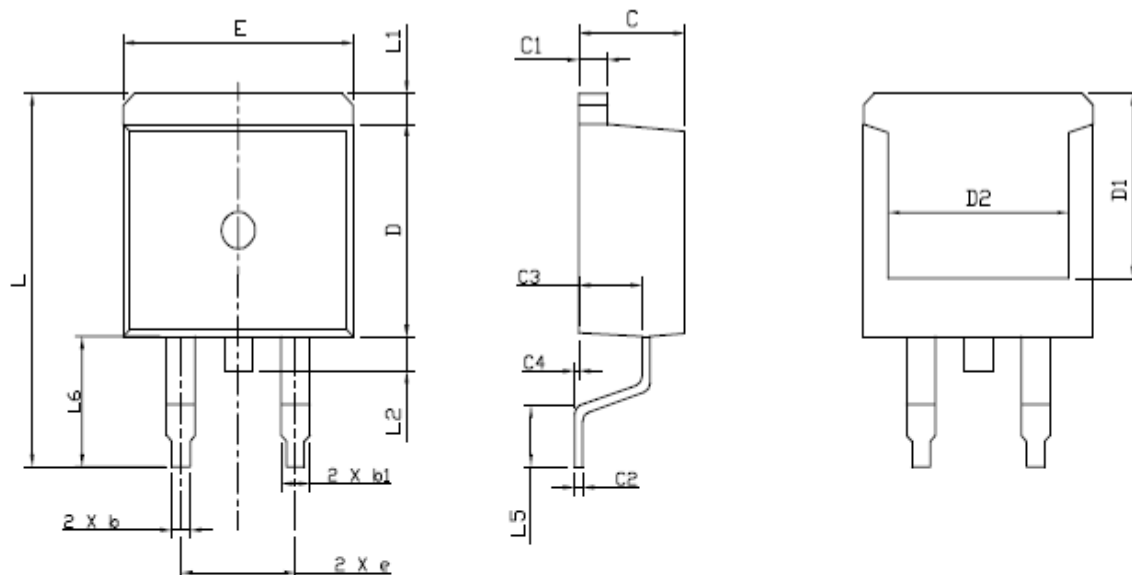


Fig. 15 Diode Reverse Recovery Time Test Circuit & Waveform



Package Outline Dimensions (Unit: mm)



SYMBOL	MILLIMETERS		
	MINIMUM	NOMINAL	MAXIMUM
b	0.73	0.80	0.87
b1	1.20	1.27	1.34
C	4.38	4.48	4.58
C1	1.23	1.30	1.37
C2	0.43	0.50	0.57
C3	2.25	2.40	2.55
C4	0.02	0.10	0.18
D	9.10	9.20	9.30
D2	7.90	8.00	8.10
E	9.78	9.88	9.98
e	4.98	5.08	5.18
E2	9.75	9.90	10.05
L	14.95	15.20	15.45
L1	1.15	1.30	1.45
L2	1.50	1.60	1.70
L5	2.25	2.40	2.55
L6	4.60	4.80	5.00

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