

MX8080

80V N-channel enhancement mode MOSFET

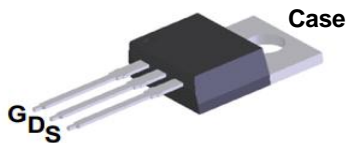
Features

- Extremely Low RDS(on):
Typ.RDS(on) = 7 mΩ @V_{GS}=10 V,I_d=40 A
- Low gate charge (typical 106 nC)
- Fast switching
- 100% avalanche tested

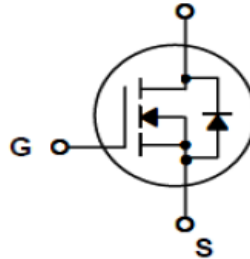
General Description

The MX8080 uses advanced trench technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

TO-220-3L Package



D / Case



Symbol	Parameter	Value	Units
V _{DS}	Drain-Source Voltage	80	V
I _D	Drain Current - Continuous (TC= 25°C) - Continuous (TC= 100°C)	80	A
		68*	A
I _{DM}	Drain Current - Pulsed (Note 1)	320*	A
V _{GS}	Gate-Source Voltage	± 20	V
E _{AS}	Single Pulsed Avalanche Energy (Note 2)	602	mJ
E _{AR}	Repetive Avalanche Energy (Note 1)	50	mJ
dv/dt	Peak diode recovery dv/dt (note 3)	5	V/ns
P _D	Power Dissipation (TC = 25°C) - Derate above 25°C	255	W
		2.0	W/°C
T _J , T _{stg}	Operating and Storage Temperature Range	-55 to +150	°C
T _L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds	300	°C

* Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	Value	Units
R _{θJC}	Thermal Resistance, Junction-to-Case	0.49	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	57.6	°C/W

Electrical Characteristics <small>TC = 25°C unless otherwise noted</small>						
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	80	88		V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$, Referenced to 25°C		75.8		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 80\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 64\text{ V}, T_C = 125^\circ\text{C}$			10	μA
I_{GSSF}	Gate Leakage Current, Forward	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$			100	nA
I_{GSSR}	Gate Leakage Current, Reverse	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$			-100	nA
On Characteristics						
$V_{GS(TH)}$	Gate Threshold voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	2	3	4	V
$R_{DS(On)}$	Drain-Source on-state resistance	$V_{GS} = 10\text{ V}, I_D = 40\text{ A}$		7	8	m Ω
g_{FS}	Forward Transconductance	$V_{DS} = 10\text{ V}, I_D = 40\text{ A}$ (Note 3)		37.5		S
Dynamic Characteristics						
C_{ISS}	Input capacitance	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$		6663		pF
C_{OSS}	Output capacitance			381		pF
C_{RSS}	Reverse transfer capacitance			284		pF
Switching Characteristics						
$t_{d(on)}$	Turn On Delay Time	$V_{DD} = 40\text{ V}, I_D = 40\text{ A},$ $V_{GS} = 10\text{ V}, R_G = 4.7\ \Omega$ (Note 3, 4)		28		ns
t_r	Rising Time			55		ns
$t_{d(off)}$	Turn Off Delay Time			69		ns
t_f	Fall Time			27		ns
Q_g	Total Gate Charge	$V_{DS} = 40\text{ V}, I_D = 40\text{ A},$ $V_{GS} = 10\text{ V}$ (Note 3, 4)		106		nC
Q_{gs}	Gate-Source Charge			35		nC
Q_{gd}	Gate-Drain Charge			25.5		nC
R_g	Gate Resistance	$V_{DS} = 0\text{ V}$, Scan F mode		0.74		Ω
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current				80	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current				320	A
V_{SD}	Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 40\text{ A}$			1.2	V
I_{rrm}	Reverse recovery current	$I_S = 40\text{ A}, V_{GS} = 0\text{ V},$ $di_F/dt = 100\text{ A}/\mu\text{s}$		-2.8		A
T_{rr}	Reverse recovery time			37		ns
Q_{rr}	Reverse recovery charge			52		nC
Notes: 1. Repetitive Rating : Pulse width limited by maximum junction temperature 2. $L = 1.54\text{ mH}, I_{AS} = 28\text{ A}, V_{DD} = 10\text{ V}, R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$ 3. $I_{SD} \leq 40\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$ 4. Pulse Test : Pulse width $\leq 300\ \mu\text{s}$, Duty cycle $\leq 2\%$ 5. Essentially independent of operating temperature						

Typical Characteristics

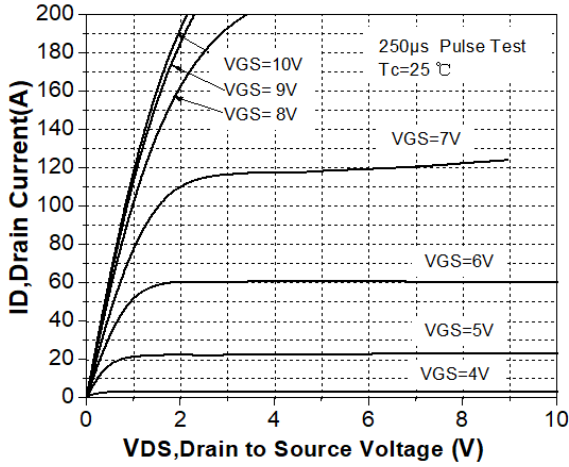


Figure 1. On-Region Characteristics

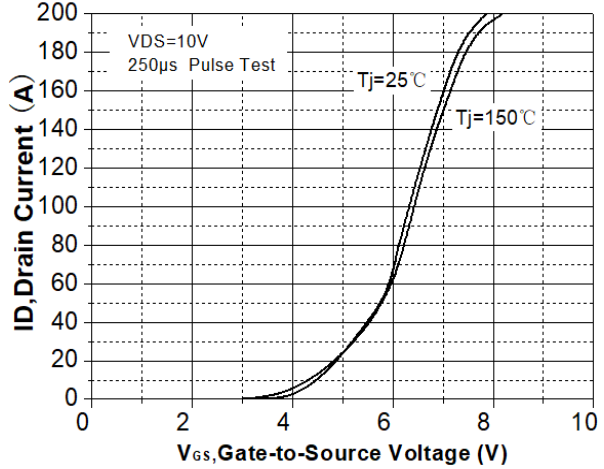


Figure 2. Transfer Characteristics

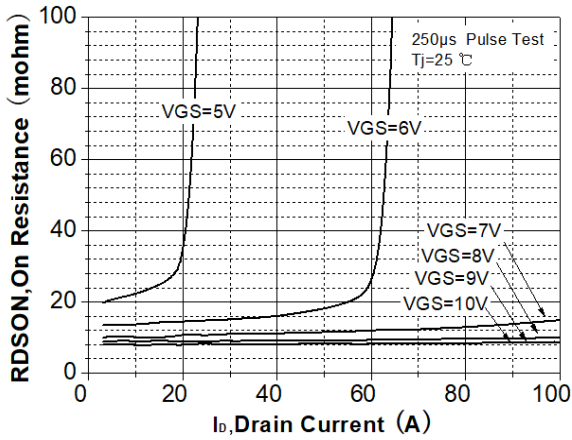


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

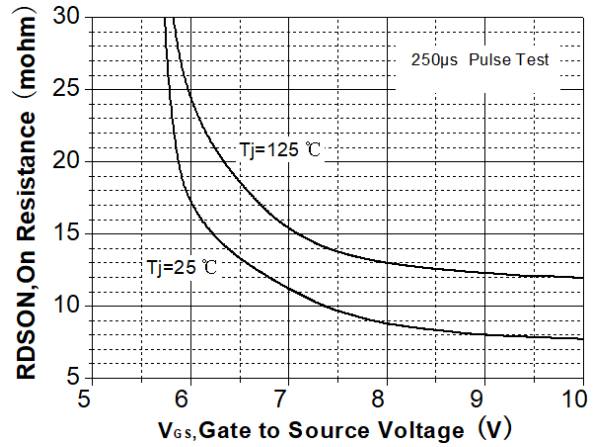


Figure 4. On-Resistance vs. Gate to Source Voltage

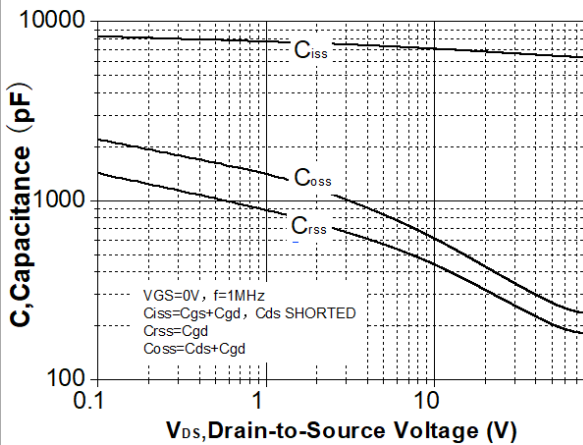


Figure 5. Capacitance Characteristics

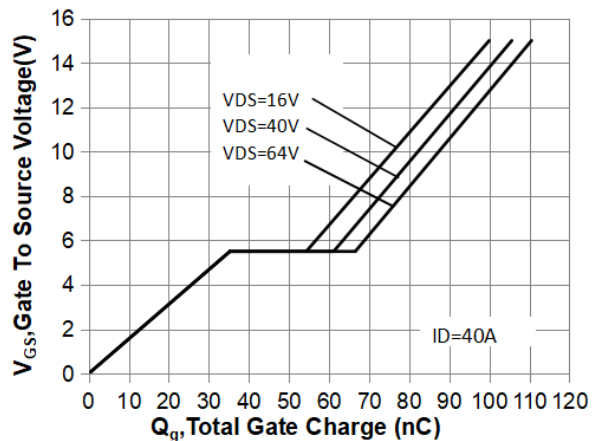


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

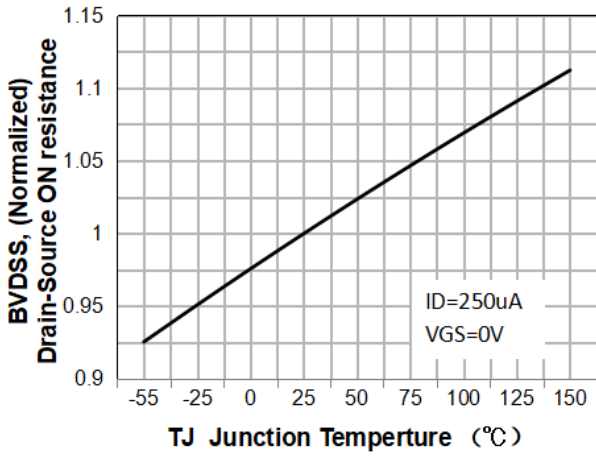


Figure 7. Breakdown Voltage Variation vs Temperature

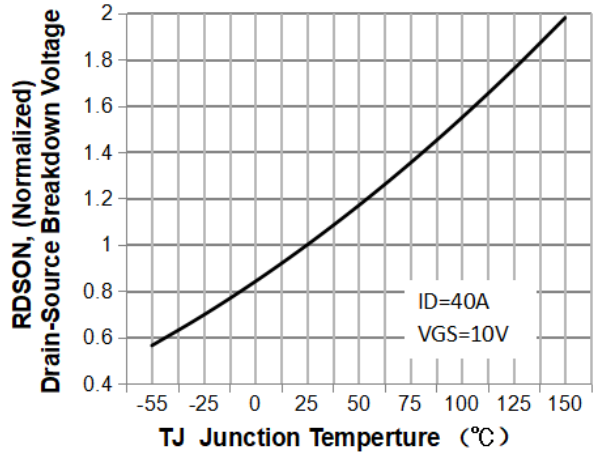


Figure 8. On-Resistance Variation vs Temperature

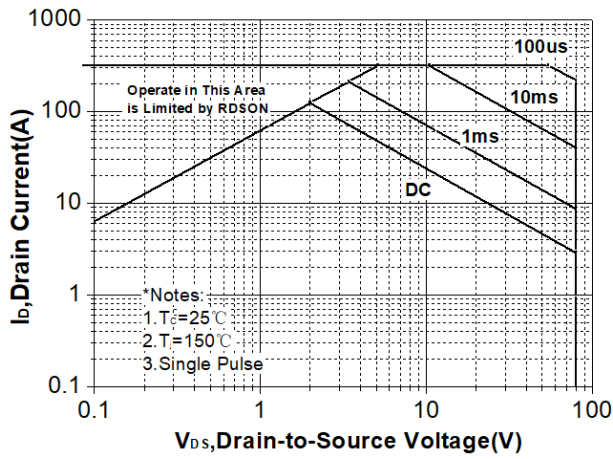


Figure 9. Maximum Safe Operating Area

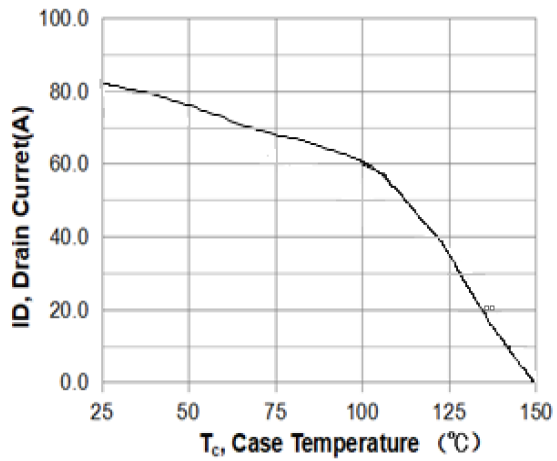


Figure 10. Maximum Drain Current vs Case Temperature

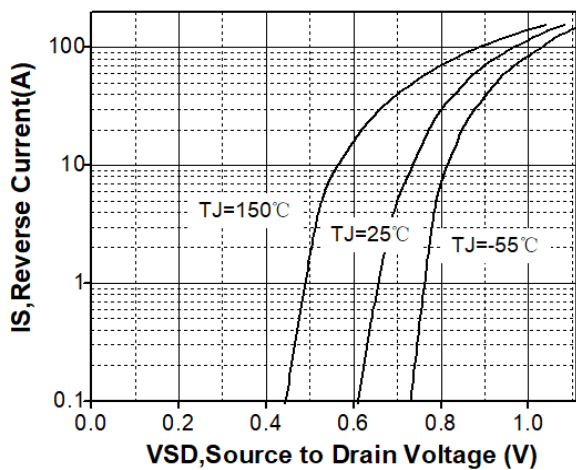


Figure 11. Body Diode Forward Voltage Vs Reverse Drain Current

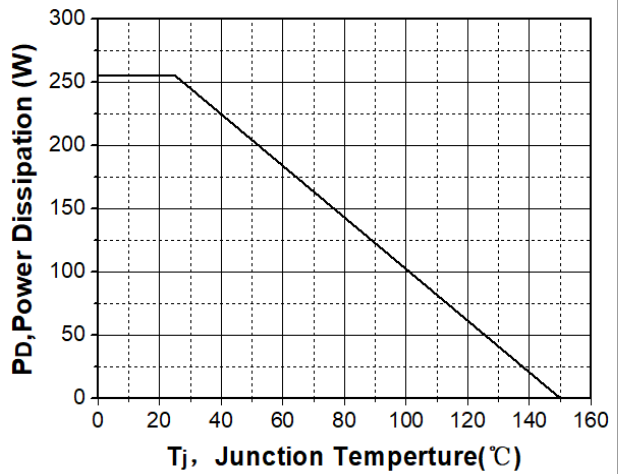


Figure 12. Power Dissipation vs Junction Temperature

Typical Characteristics (Continued)

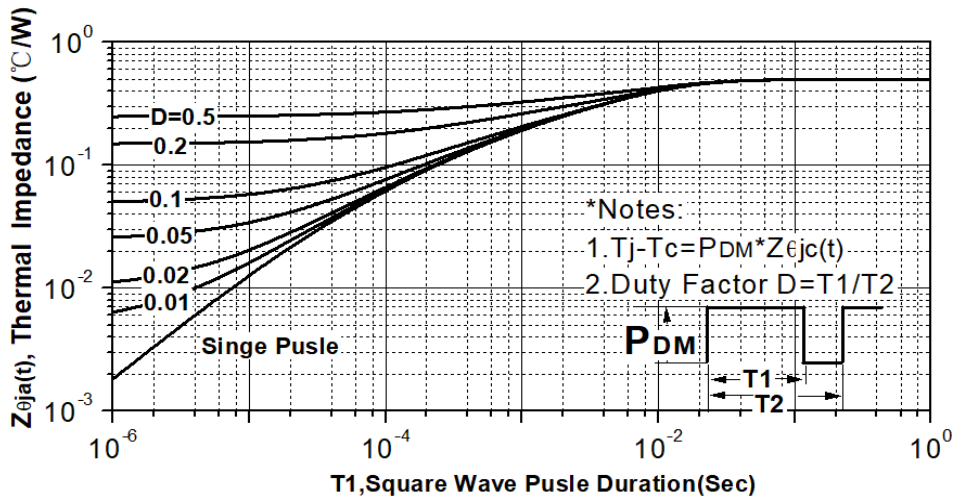


Figure 13. Transient Thermal Response Curve

Test Circuit & Waveform

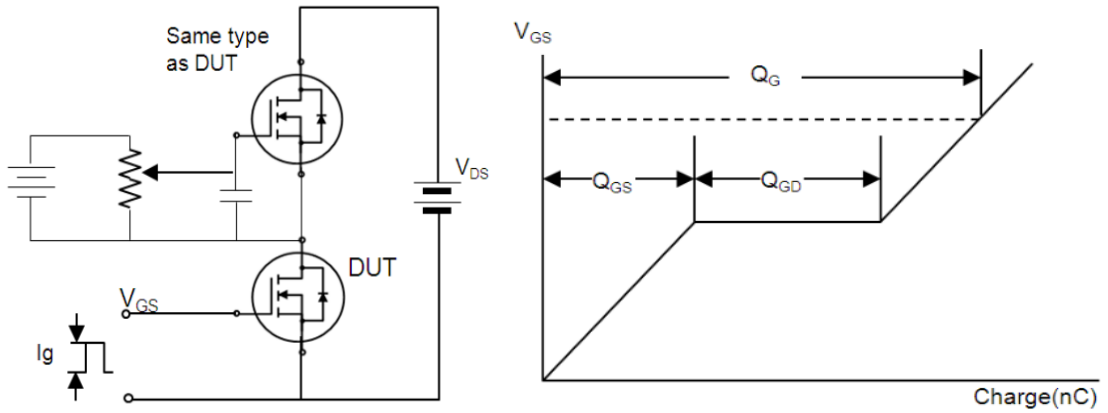


Figure 14. Gate charge test circuit & waveform

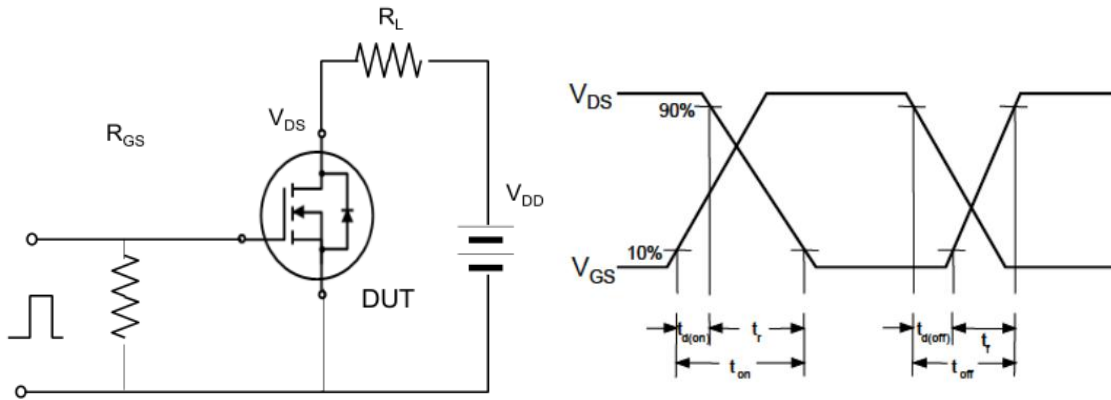


Figure 15. Switching time test circuit & waveform

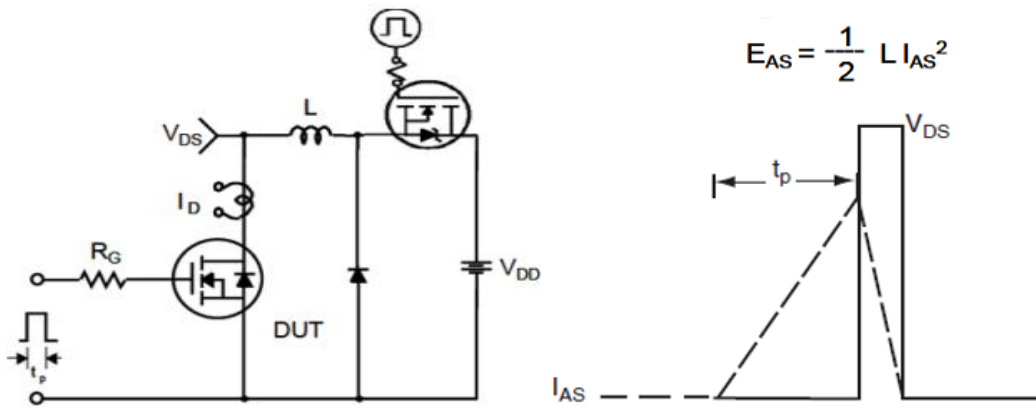


Figure 16. Unclamped Inductive switching test circuit & waveform

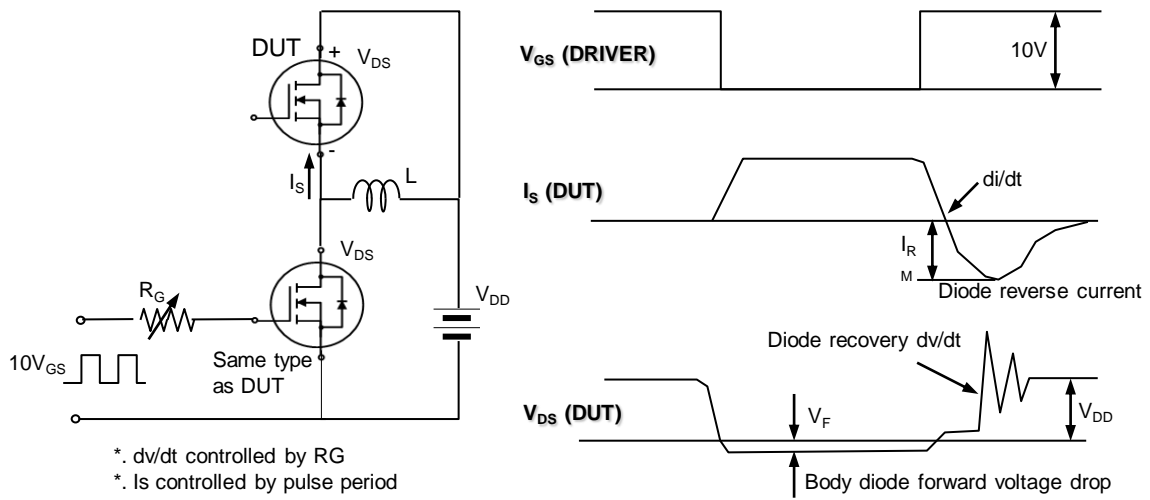
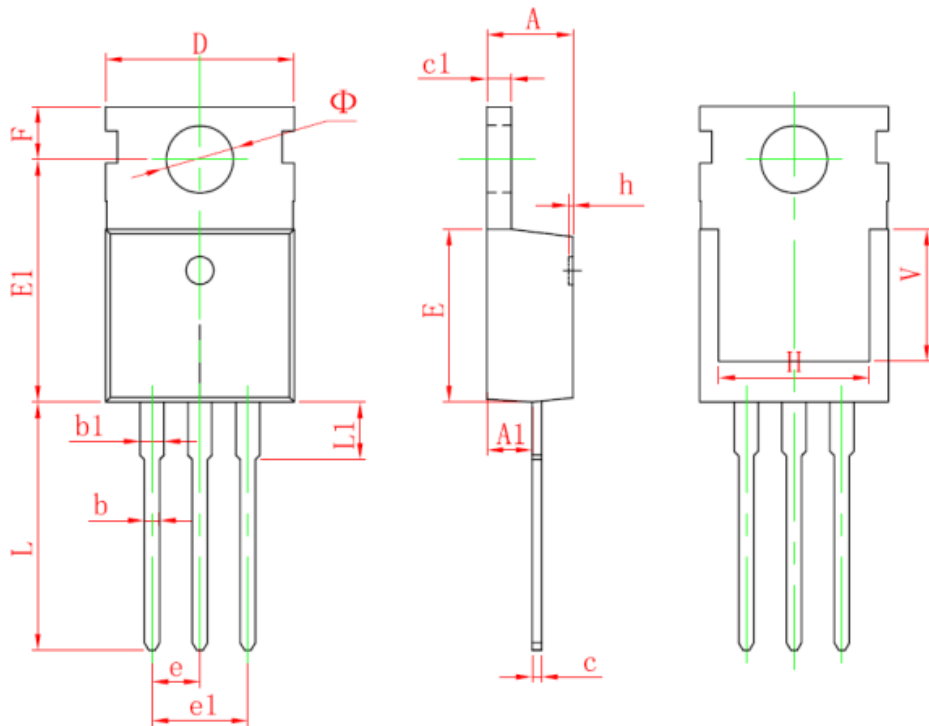


Figure 17. Peak diode recovery dv/dt test circuit & waveform

Package Dimensions : TO-220-3L(T0.5mm) PACKAGE



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150