



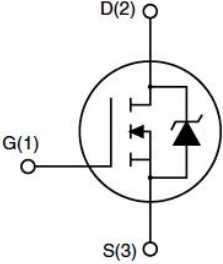


# 深圳市富满电子集团股份有限公司

SHEN ZHEN FINE MADE ELECTRONICS GROUP CO., LTD.

**6888K** (文件编号: S&CIC1741)

**68V N-channel enhancement mode MOSFET**

<p><b>Features</b></p> <ul style="list-style-type: none"> <li>Extremely Low RDS(on): Typ.RDS(on) = 7.9mΩ @VGS=10 V,Id=30 A</li> <li>Low gate charge ( typical 75 nC)</li> <li>Fast switching</li> <li>100% avalanche tested</li> </ul>	<p><b>General Description</b></p> <p>The 6888K uses advanced trench Technology and design to provide excellent RDS(ON) with low gate charge. It can be use in a wide variety of applications.</p>
<p><b>Package</b></p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Marking and pin assignment</p> </div> <div style="text-align: center;">  <p>TO-252top view</p> </div> <div style="text-align: center;">  <p>Schematic diagram</p> </div> </div>	

## Absolute Maximum Ratings (T<sub>C</sub>=25°C unless otherwise specified)

Symbol	Parameter	Value	Units
V <sub>DS</sub>	Drain-Source Voltage	68	V
I <sub>D</sub>	Drain Current - Continuous (T <sub>C</sub> = 25°C) - Continuous (T <sub>C</sub> = 70° C)	80	A
		52*	A
I <sub>DM</sub>	Drain Current - Pulsed (Note 1)	208*	A
V <sub>GS</sub>	Gate-Source Voltage	± 20	V
E <sub>AS</sub>	Single Pulsed Avalanche Energy (Note 2)	285	mJ
E <sub>AR</sub>	Repetive Avalanche Energy (Note 1)	40	mJ
dv/dt	Peak diode recovery dv/dt (note 3)	5.5	V/ns
P <sub>D</sub>	Power Dissipation (T <sub>C</sub> = 25°C) - Derate above 25°C	108	W
		1.6	W/°C
T <sub>J</sub> , T <sub>stg</sub>	Operating and Storage Temperature Range	-55 to +150	°C
T	Maximum lead temperature for soldering,purpose, 1/8 from case for 5 seconds	280	°C

\* Drain current limited by maximum junction temperature

## Thermal Characteristics

Symbol	Parameter	Value	Units
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case	0.58	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient	62.8	°C/W



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## Electrical Characteristics (T<sub>C</sub>=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
<b>Off Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	68			V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temperature Coefficient	I <sub>D</sub> = 250 μA, Referenced to 25°C		68		mV/°C
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 50 V, T <sub>C</sub> = 125°C			10	μA
I <sub>GSSF</sub>	Gate Leakage Current, Forward	V <sub>GS</sub> = 20 V, V <sub>DS</sub> = 0 V			100	nA
I <sub>GSSR</sub>	Gate Leakage Current, Reverse	V <sub>GS</sub> = -20 V, V <sub>DS</sub> = 0 V			-100	nA
<b>On Characteristics</b>						
V <sub>GS(TH)</sub>	Gate Threshold voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	2	3	4	V
R <sub>DS(on)</sub>	Drain-Source on-state resistance	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A		7.9	9.5	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 30 A(Note 3)		34.0		S
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input capacitance	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f = 1.0 MHz		3988		pF
C <sub>oss</sub>	Output capacitance			339		pF
C <sub>rss</sub>	Reverse transfer capacitance			312		pF
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn On Delay Time			22		ns
t <sub>r</sub>	Rising Time	V <sub>DD</sub> = 35 V, I <sub>D</sub> = 40 A, V <sub>GS</sub> = 10 V, R <sub>G</sub> = 4.7 Ω (Note 3, 4)		54		ns
t <sub>d(off)</sub>	Turn Off Delay Time			50		ns
t <sub>f</sub>	Fall Time			25		ns
Q <sub>g</sub>	Total Gate Charge		V <sub>DS</sub> = 35 V, I <sub>D</sub> = 40 A, V <sub>GS</sub> = 10 V (Note 3, 4)		78	
Q <sub>gs</sub>	Gate-Source Charge	V <sub>GS</sub> = 10 V (Note 3, 4)		26		nC
Q <sub>gd</sub>	Gate-Drain Charge			22		nC
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> = 0 V, Scan F mode		2.4		Ω
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain-Source Diode Forward Current				80	A
I <sub>SM</sub>	Maximum Pulsed Drain-Source Diode Forward Current				208	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 40 A			1.2	V
I <sub>rrm</sub>	Reverse recovery current	I <sub>S</sub> = 40A, V <sub>GS</sub> = 0V, di/dt = 100A/us		-1.2		A
T <sub>rr</sub>	Reverse recovery time			25		ns
Q <sub>rr</sub>	Reverse recovery charge				19	

Notes:1. Repetitive Rating : Pulse width limited by maximum junction temperature

2. L = 0.95 mH, I<sub>AS</sub> = 32 A, V<sub>DD</sub> = 10V, R<sub>G</sub> = 25 Ω, Starting T<sub>J</sub> = 25°C

3. I<sub>SD</sub> ≤ 40A, di/dt = 100A/us, V<sub>DD</sub> ≤ BV<sub>DSS</sub>, Starting T<sub>J</sub> = 25°C

4. Pulse Test : Pulse width ≤ 300us, Duty cycle ≤ 2%

5. Essentially independent of operating temperature



### Typical Characteristics

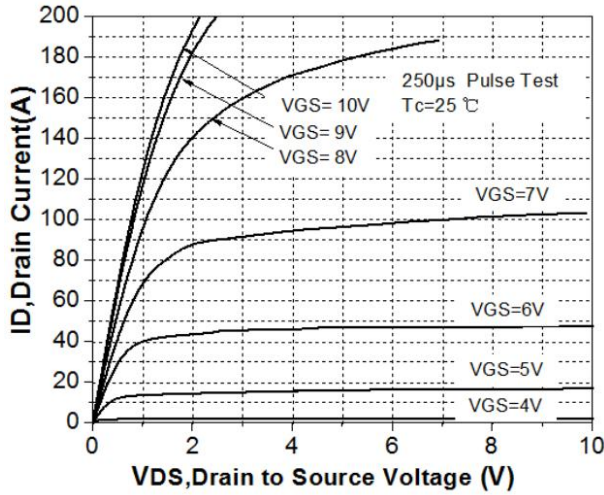


Figure 1. On-Region Characteristics

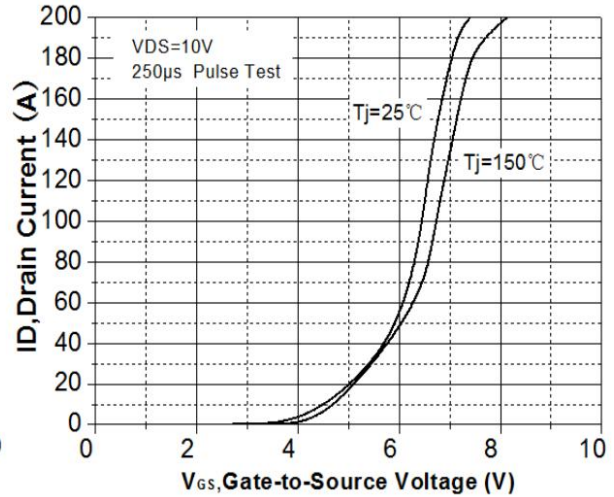


Figure 2. Transfer Characteristics

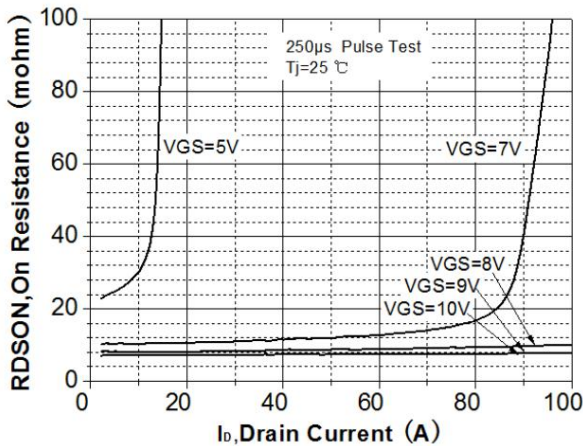


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

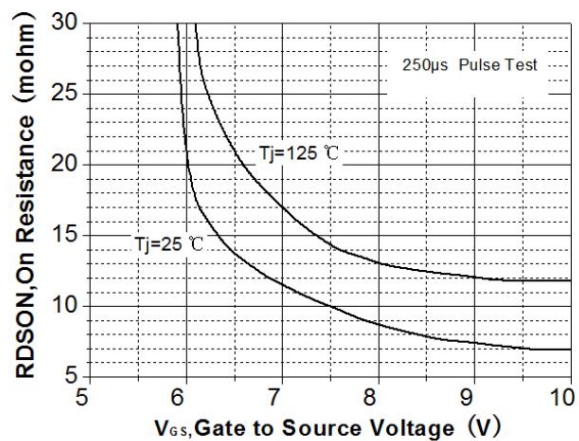


Figure 4. On-Resistance vs. Gate to Source Voltage

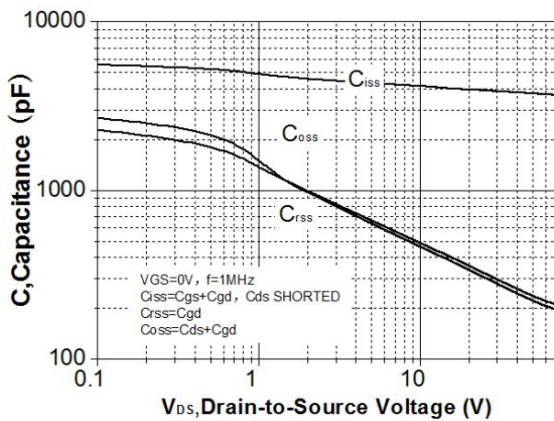


Figure 5. Capacitance Characteristics

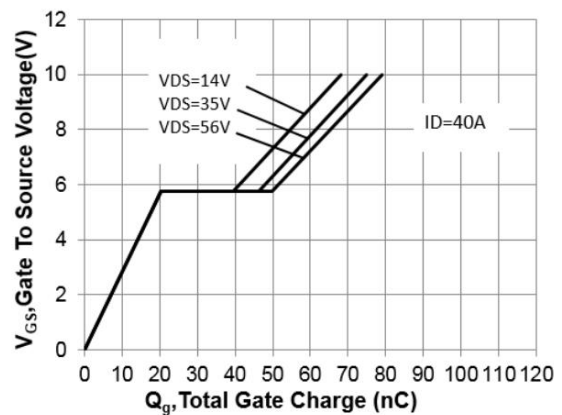


Figure 6. Gate Charge Characteristics



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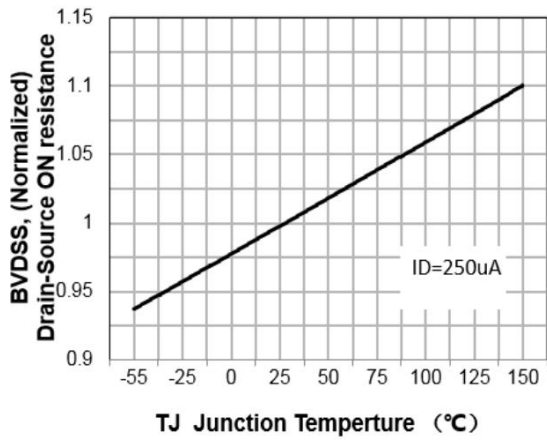


Figure 7. Breakdown Voltage Variation vs Temperature

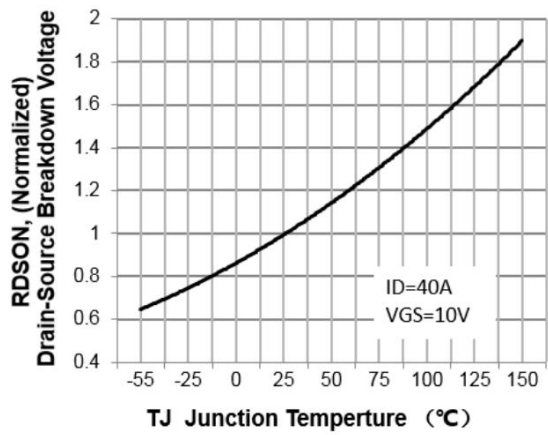


Figure 8. On-Resistance Variation vs Temperature

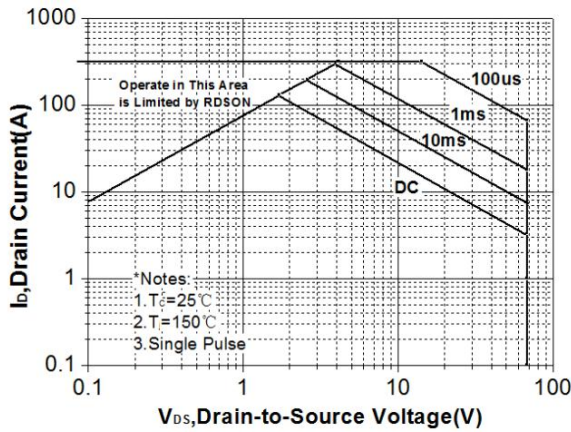


Figure 9. Maximum Safe Operating Area

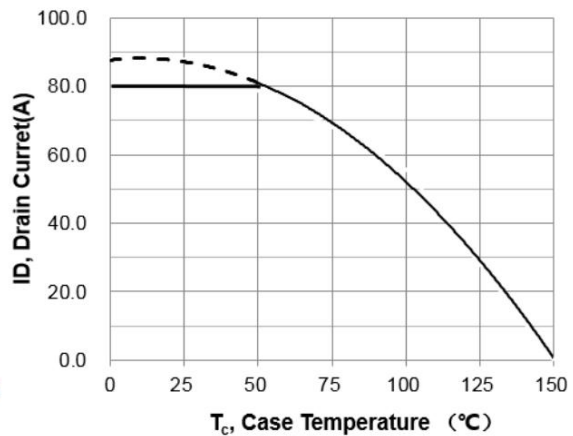


Figure 10. Maximum Drain Current vs Case Temperature

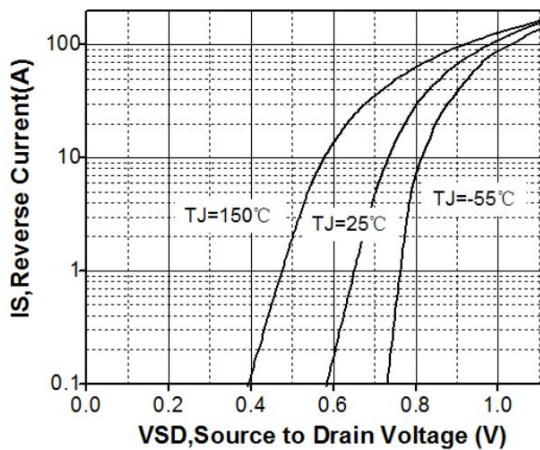


Figure 11. Body Diode Forward Voltage Vs Reverse Drain Current

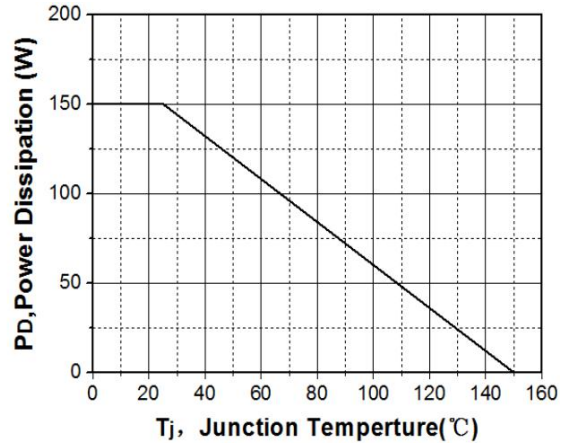


Figure 12. Power Dissipation vs Junction Temperature



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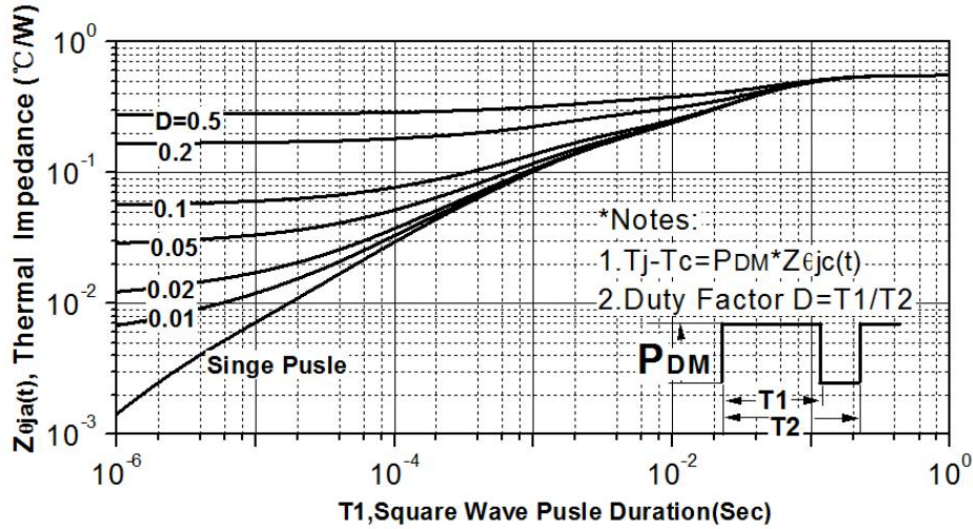


Figure 13. Transient Thermal Response Curve

## Test Circuit

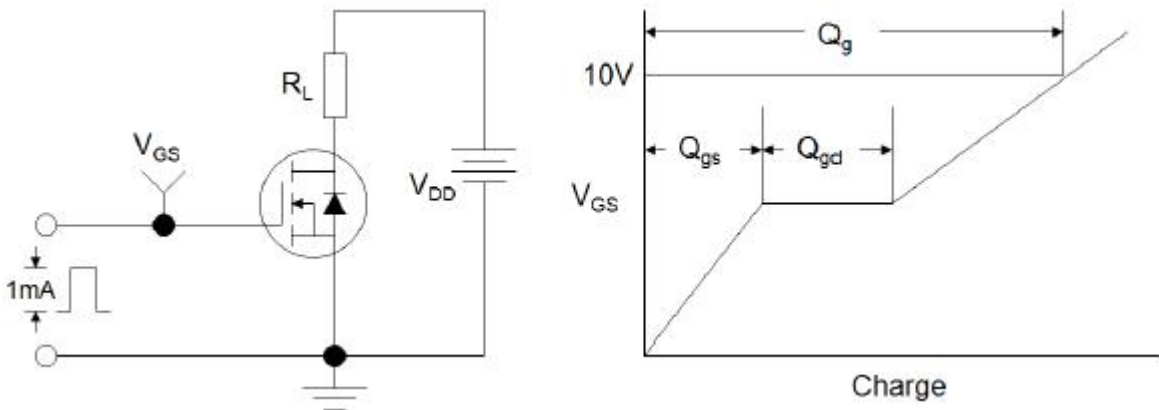


Figure 14. Gate Charge Test Circuit & Waveform

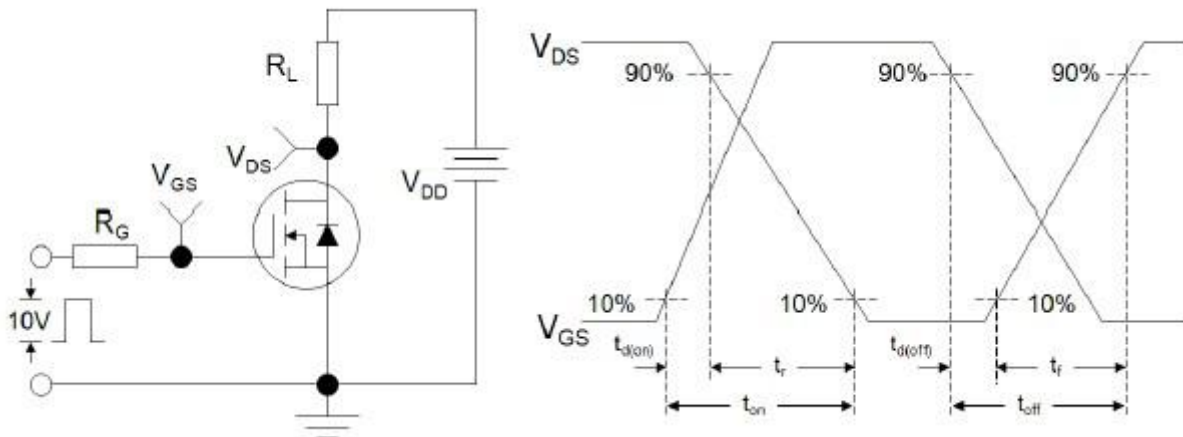


Figure 15. Switching time test circuit & waveform



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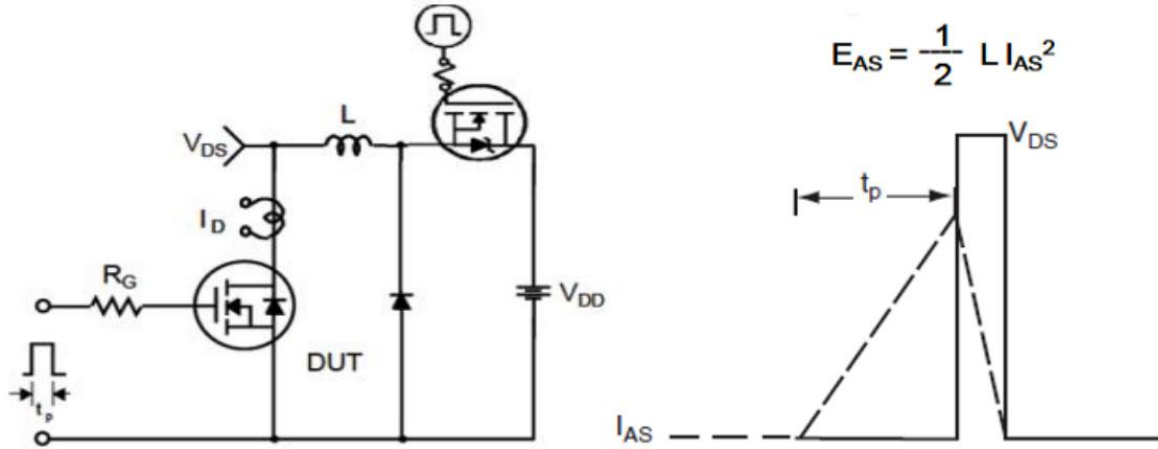


Figure 16. Unclamped Inductive switching test circuit & waveform

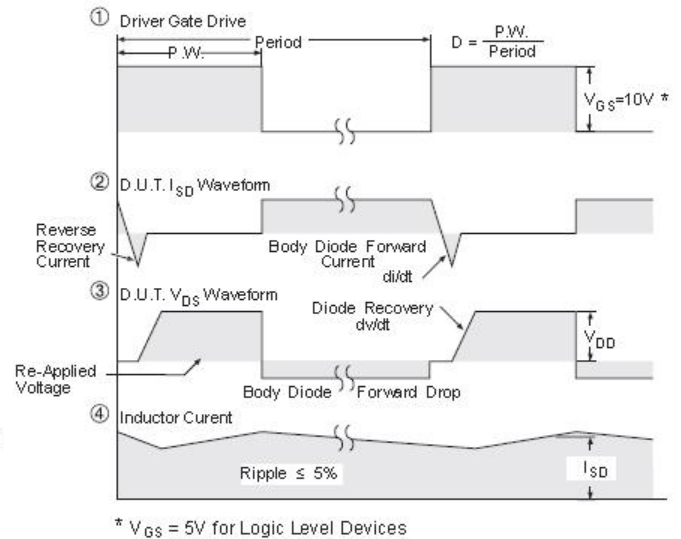
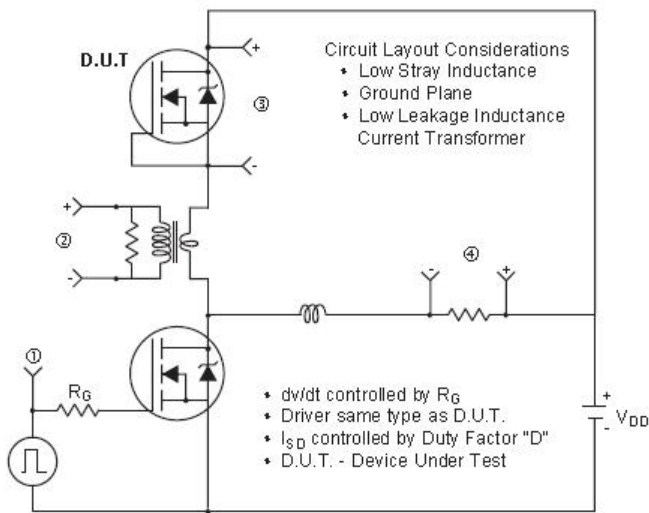


Figure 17. Peak diode recovery dv/dt test circuit & waveform



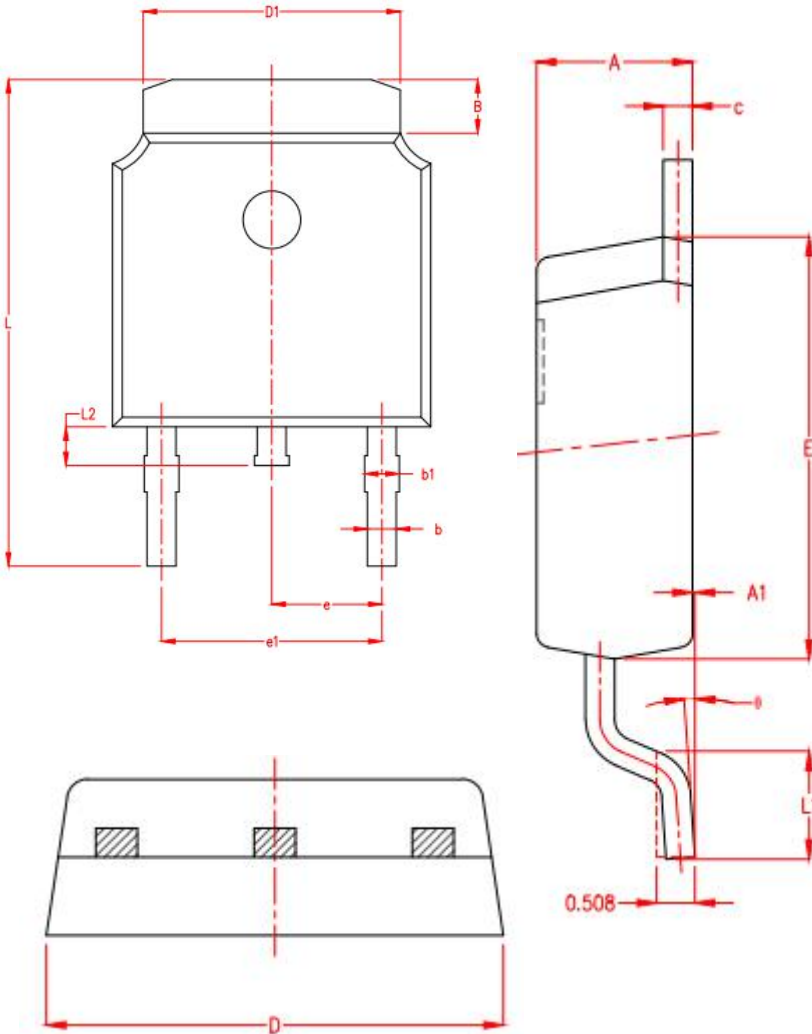
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## TO-252 Package Information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	2.15	2.25	2.35
A1	0.00	0.06	0.12
B	0.96	1.11	1.26
b	0.59	0.69	0.79
b1	0.69	0.81	0.93
c	0.34	0.42	0.50
D	6.45	6.60	6.75
D1	5.23	5.33	5.43
E	5.95	6.10	6.25
e	2.286TYP.		
e1	4.47	4.57	4.67
L	9.90	10.10	10.30
L1	1.40	1.55	1.70
L2	0.60	0.80	1.00
θ	0°	4°	8°

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