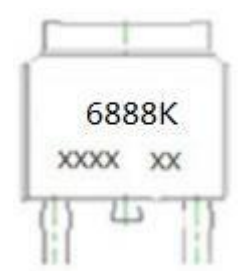

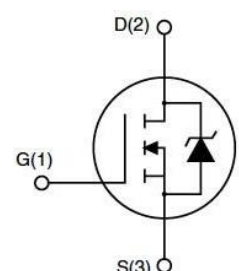


<p>Features</p> <ul style="list-style-type: none"> Extremely Low RDS(on): Typ.RDS(on) = 7.9mΩ @VGS=10 V,Id=30 A Low gate charge (typical 75 nC) Fast switching 100% avalanche tested 	<p>General Description</p> <p>The 6888K uses advanced trench Technology and design to provide excellent RDS(ON) with low gate charge. It can be use in a wide variety of applications.</p>
<p>Package</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div data-bbox="159 694 399 963">  <p>Marking and pin assignment</p> </div> <div data-bbox="606 716 909 918">  <p>TO-252top view</p> </div> <div data-bbox="1037 649 1276 918">  <p>Schematic diagram</p> </div> </div>	

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Symbol	Parameter	Value	Units
V _{DS}	Drain-Source Voltage	68	V
I _D	Drain Current - Continuous (TC= 25°C) - Continuous (TC= 70° C)	80	A
		52*	A
I _{DM}	Drain Current - Pulsed (Note 1)	208*	A
V _{GS}	Gate-Source Voltage	± 20	V
E _{AS}	Single Pulsed Avalanche Energy (Note 2)	285	mJ
E _{AR}	Repetive Avalanche Energy (Note 1)	40	mJ
dv/dt	Peak diode recovery dv/dt (note 3)	5.5	V/ns
P _D	Power Dissipation (TC = 25°C) - Derate above 25°C	108	W
		1.6	W/°C
T _j , T _{stg}	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 _{θJC}	Thermal Resistance, Junction-to-Case	0.58	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient	62.8	°C/W

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units	
Off Characteristics							
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	68			V	
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$, Referenced to 25°C		68		$\text{mV}/^\circ\text{C}$	
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			1	μA	
		$V_{DS} = 50\text{ V}, T_C = 125^\circ\text{C}$			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	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$		7.9	9.5	$\text{m}\Omega$	
g_{FS}	Forward Transconductance	$V_{DS} = 10\text{ V}, I_D = 30\text{ A}$ (Note 3)		34.0		S	
Dynamic Characteristics							
C_{iss}	Input capacitance	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$		3988		pF	
C_{oss}	Output capacitance				339		pF
C_{rss}	Reverse transfer capacitance				312		pF
Switching Characteristics							
$t_{d(on)}$	Turn On Delay Time			22		ns	
t_r	Rising Time			54		ns	
$t_{d(off)}$	Turn Off Delay Time	$V_{DD} = 35\text{ V}, I_D = 40\text{ A},$ $V_{GS} = 10\text{ V}, R_G = 4.7\ \Omega$ (Note 3, 4)		50		ns	
t_f	Fall Time			25		ns	
Q_g	Total Gate Charge	$V_{DS} = 35\text{ V}, I_D = 40\text{ A},$ $V_{GS} = 10\text{ V}$ (Note 3, 4)		78		nC	
Q_{gs}	Gate-Source Charge			26		nC	
Q_{gd}	Gate-Drain Charge			22		nC	
R_g	Gate Resistance		$V_{DS} = 0\text{ V}, \text{Scan F mode}$		2.4		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				208	A	
V_{SD}	Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 40\text{ A}$			1.2	V	
I_{rrm}	Reverse recovery current	$I_S = 40\text{ A}, V_{GS} = 0\text{ V},$ $di/dt = 100\text{ A}/\mu\text{s}$		-1.2		A	
T_{rr}	Reverse recovery time				25		ns
Q_{rr}	Reverse recovery charge				19		nC

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

2. $L = 0.95\text{ mH}, I_{AS} = 32\text{ A}, V_{DD} = 10\text{ V}, R_G = 25\ \Omega$, 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

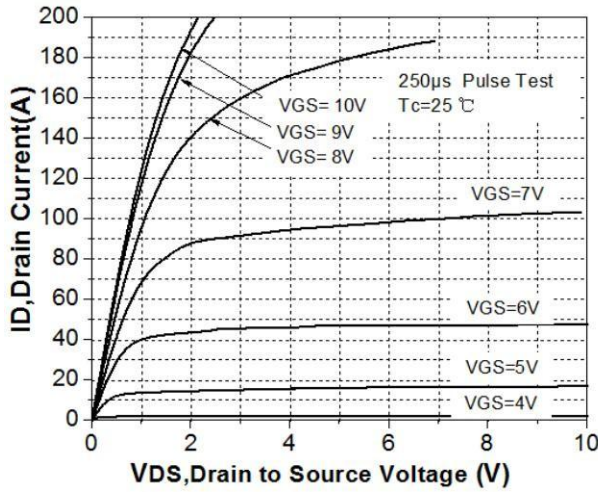


Figure 1. On-Region Characteristics

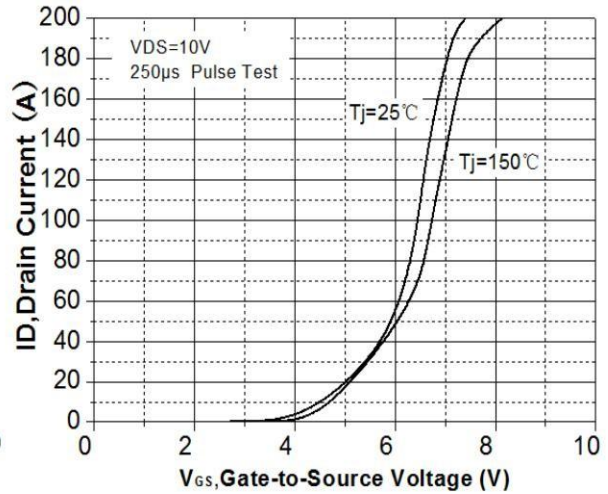


Figure 2. Transfer Characteristics

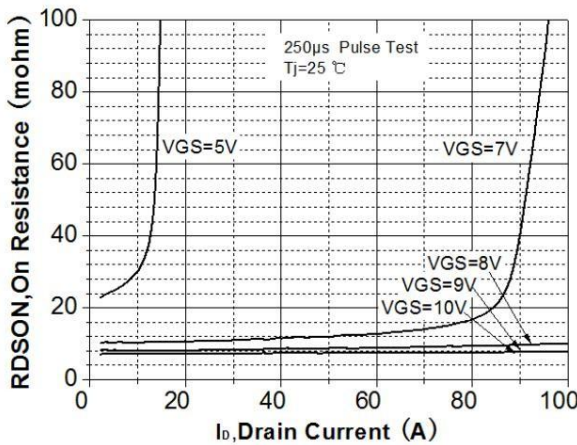


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

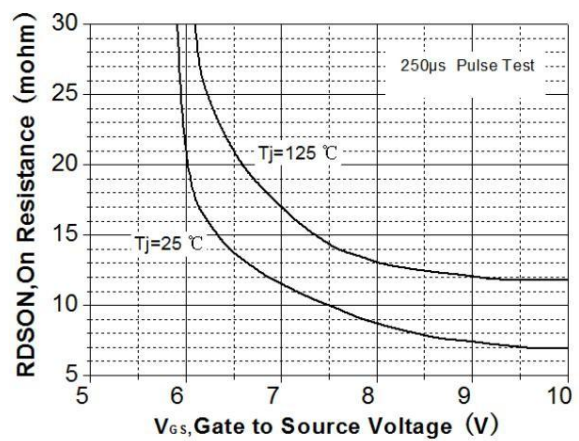


Figure 4. On-Resistance vs. Gate to Source Voltage

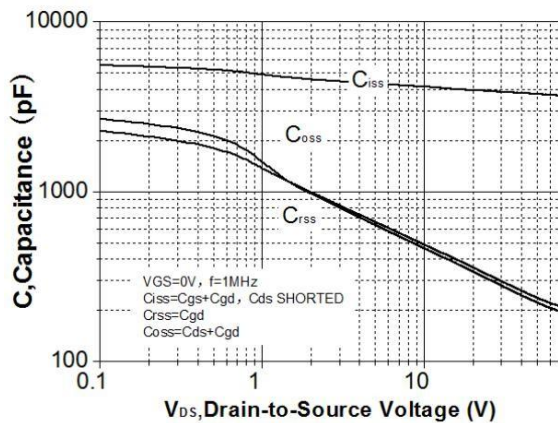


Figure 5. Capacitance Characteristics

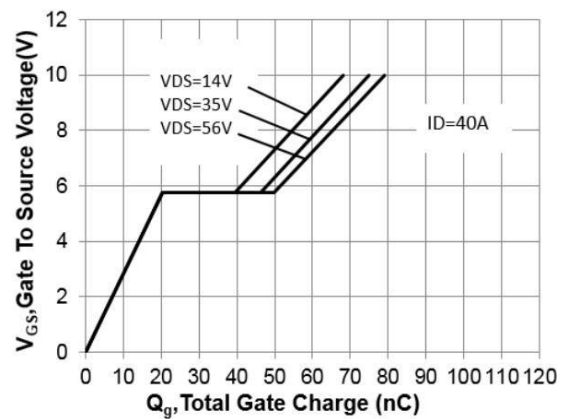


Figure 6. Gate Charge Characteristics

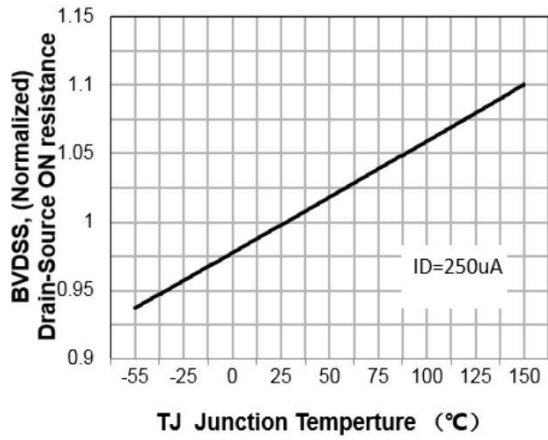


Figure 7. Breakdown Voltage Variation vs Temperature

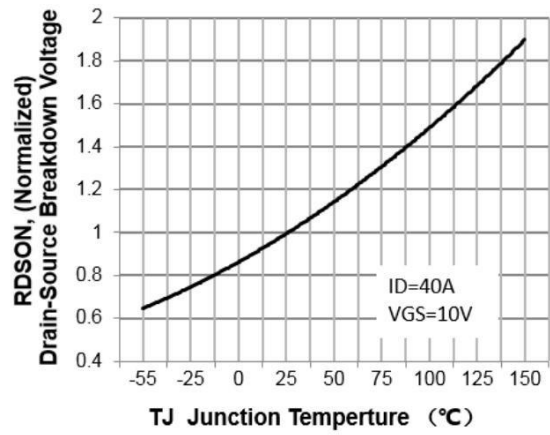


Figure 8. On-Resistance Variation vs Temperature

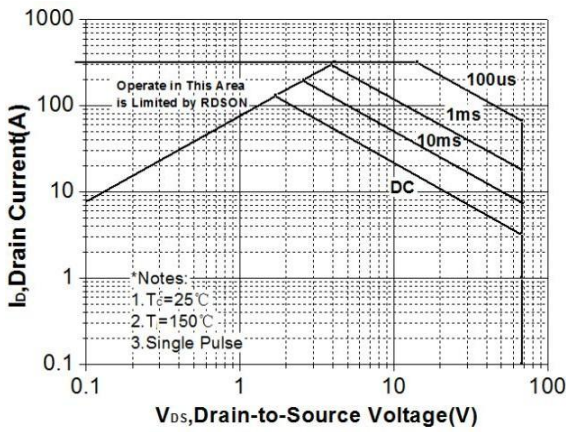


Figure 9. Maximum Safe Operating Area

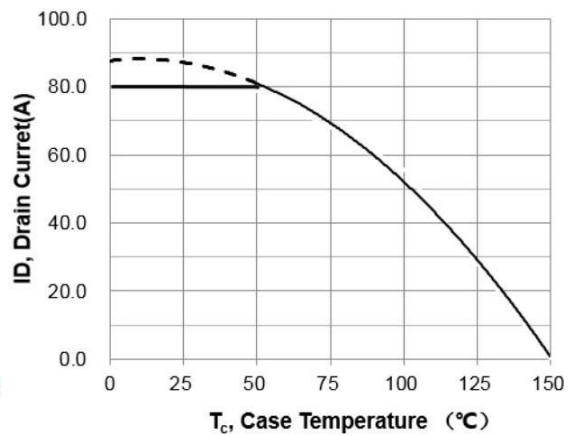


Figure 10. Maximum Drain Current vs Case Temperature

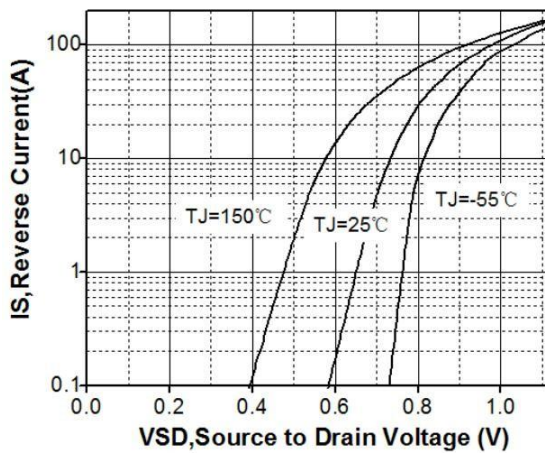


Figure 11. Body Diode Forward Voltage Vs Reverse Drain Current

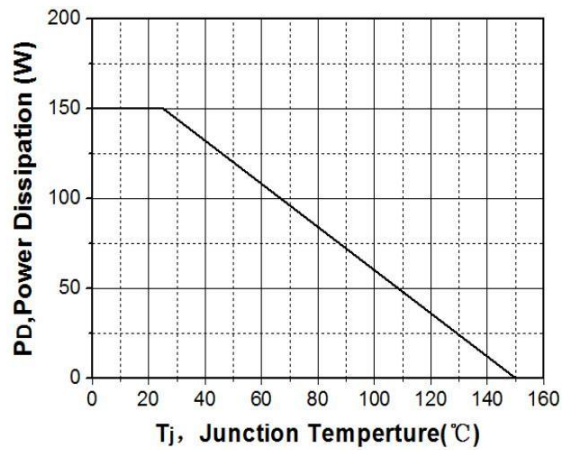


Figure 12. Power Dissipation vs Junction Temperature

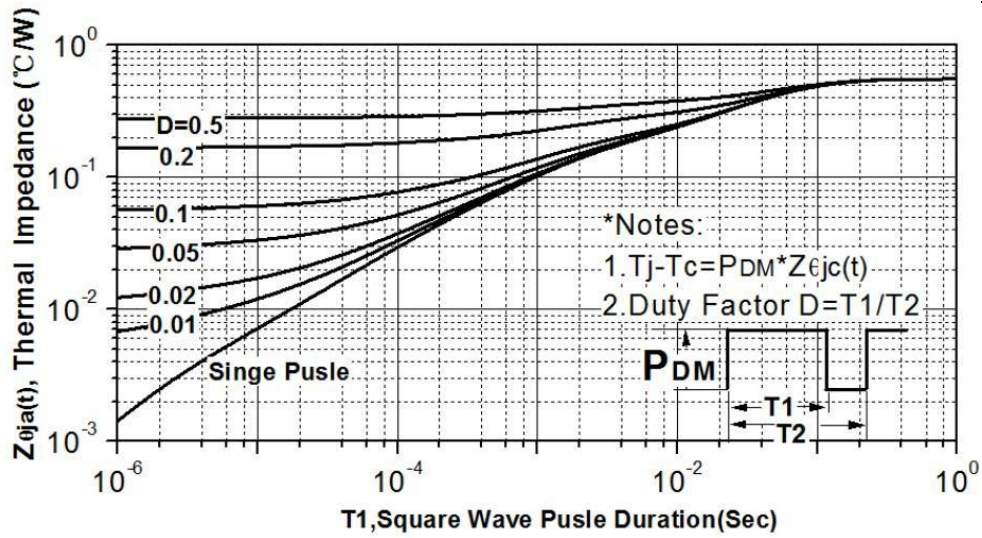


Figure 13. Transient Thermal Response Curve

Test Circuit

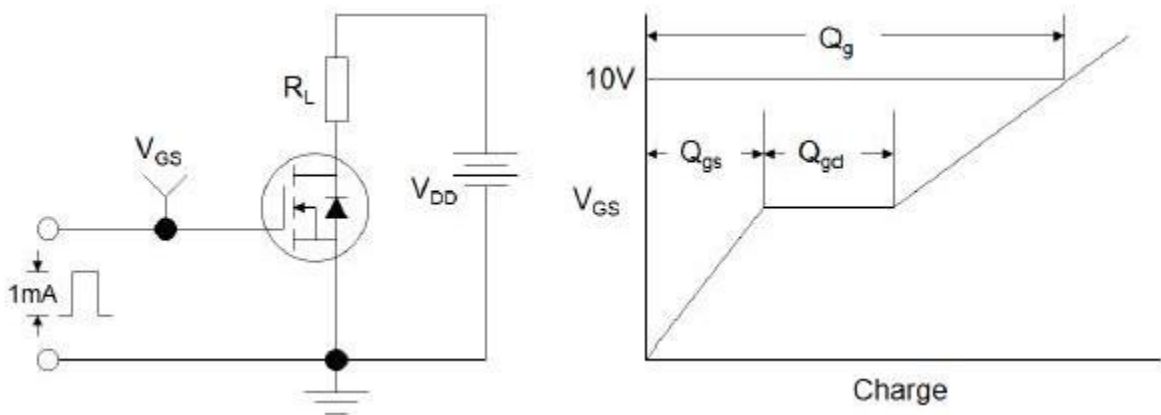


Figure 14. Gate Charge Test Circuit & Waveform

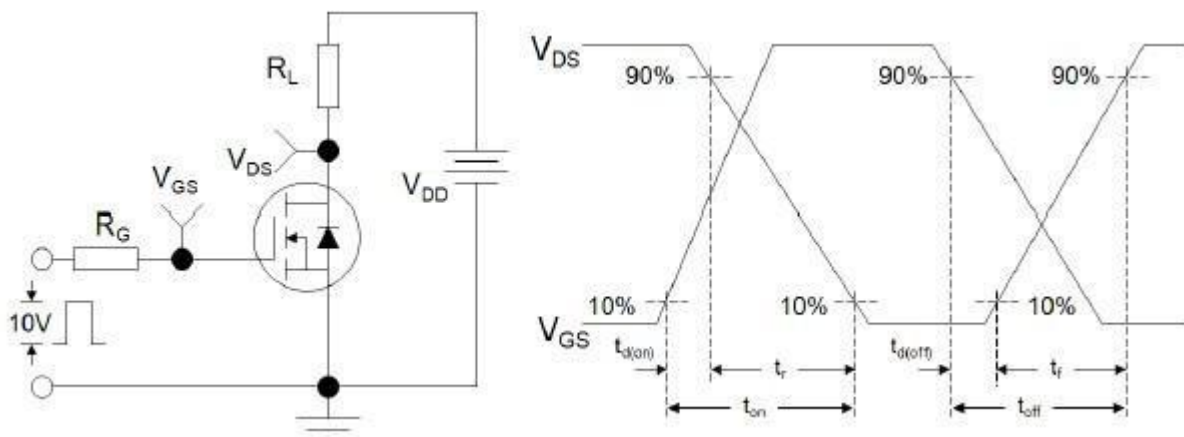


Figure 15. Switching time test circuit & waveform

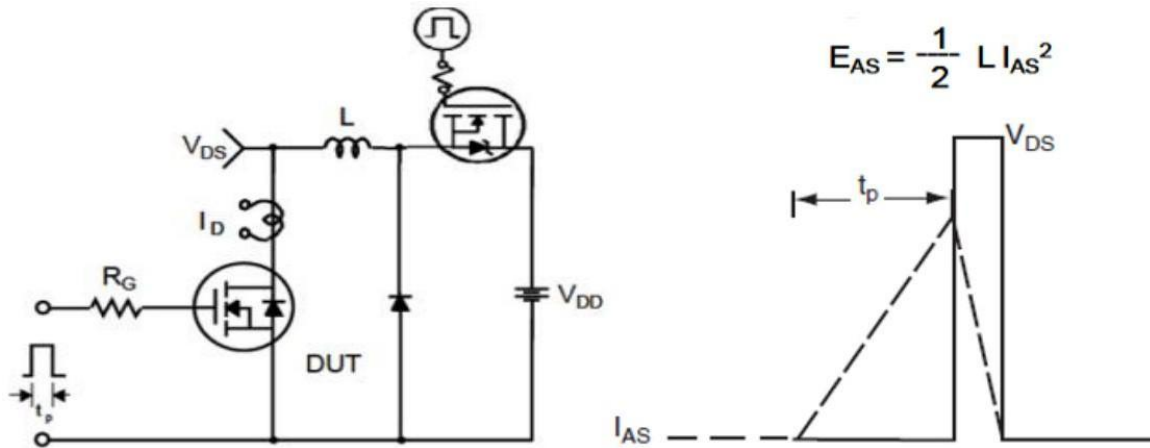


Figure 16. Unclamped Inductive switching test circuit & waveform

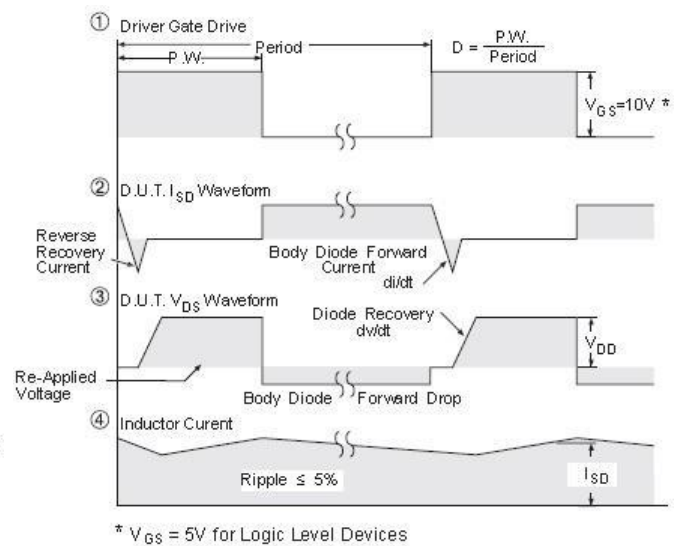
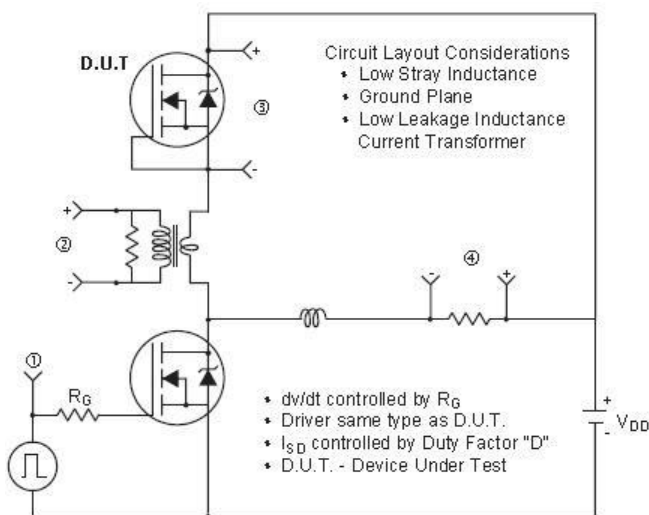
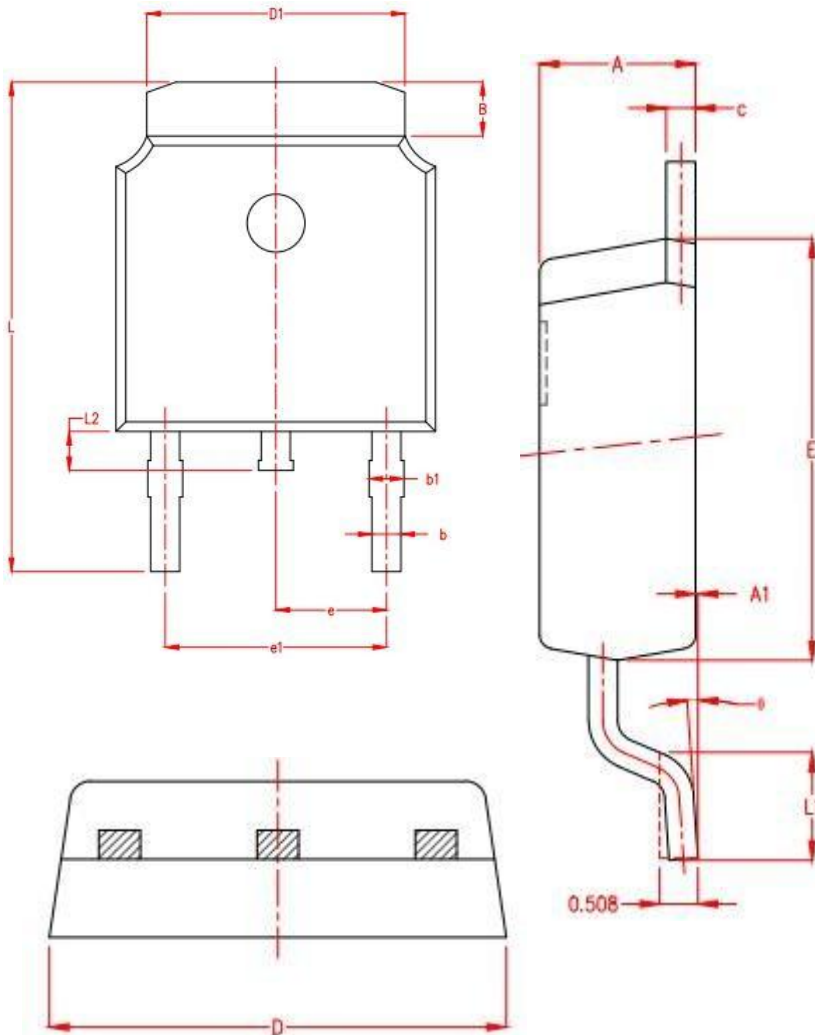


Figure 17. Peak diode recovery dv/dt test circuit & waveform

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°