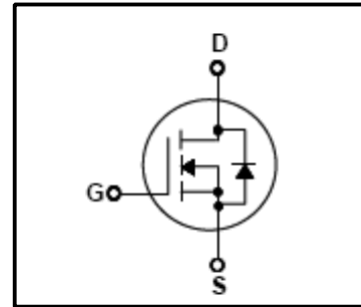


**Silicon N-Channel MOSFET**

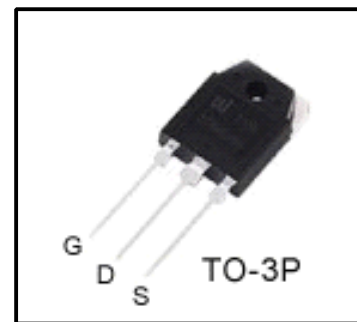
**Features**

- 13A,500V,  $R_{DS(on)}$ (Max0.46 $\Omega$ )@ $V_{GS}=10V$
- Ultra-low Gate charge(Typical 43nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Maximum Junction Temperature Range(150 °C)



**General Description**

This Power MOSFET is produced using Winsemi's advanced planar stripe, DMOS technology. This latest technology has been especially designed to minimize on-state resistance, have a high rugged avalanche characteristics. This device is specially well suited for high efficiency switch mode power supplies, power factor correction and half bridge and full bridge resonant topology line a electronic lamp ballast.



**Absolute Maximum Ratings**

Symbol	Parameter	Value	Units
$V_{DSS}$	Drain Source Voltage	500	V
$I_D$	Continuous Drain Current(@ $T_c=25^\circ C$ )	13	A
	Continuous Drain Current(@ $T_c=100^\circ C$ )	8	A
$I_{DM}$	Drain Current Pulsed (Note1)	52	A
$V_{GS}$	Gate to Source Voltage	$\pm 30$	V
$E_{AS}$	Single Pulsed Avalanche Energy (Note2)	845	mJ
$E_{AR}$	Repetitive Avalanche Energy (Note1)	5	mJ
dv/dt	Peak Diode Recovery dv /dt (Note3)	3.5	V/ ns
$P_D$	Total Power Dissipation(@ $T_c=25^\circ C$ )	218	W
	Derating Factor above 25°C	1.56	W/°C
$T_J, T_{stg}$	Junction and Storage Temperature	-55~150	°C
$T_L$	Channel Temperature	300	°C

**Thermal Characteristics**

Symbol	Parameter	Value			Units
		Min	Typ	Max	
$R_{QJC}$	Thermal Resistance , Junction -to -Case	-	-	0.58	°C/W
$R_{QCS}$	Thermal Resistance , Case-to-Sink	-	0.5	-	°C/W
$R_{QJA}$	Thermal Resistance , Junction-to -Ambient	-	-	62.5	°C/W

**Electrical Characteristics(Tc=25°C)**

Characteristics		Symbol	Test Condition	Min	Type	Max	Unit
Gate leakage current		I <sub>GSS</sub>	V <sub>GS</sub> =±30V,V <sub>DS</sub> =0V	-	-	±100	nA
Gate-source breakdown voltage		V <sub>(BR)GSS</sub>	I <sub>G</sub> =±10 μA,V <sub>DS</sub> =0V	±30	-	-	V
Drain cut -off current		I <sub>DSS</sub>	V <sub>DS</sub> =500V,V <sub>GS</sub> =0V	-	-	1	μA
			V <sub>DS</sub> =400V,TC=125°C			10	μA
Drain -source breakdown voltage		V <sub>(BR)DSS</sub>	I <sub>D</sub> =250 μA,V <sub>GS</sub> =0V	500	-	-	V
Breakdown voltage Temperature Coefficient		ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	I <sub>D</sub> =250μA,Referenced to 25°C	-	0.5	-	V/°C
Gate threshold voltage		V <sub>GS(th)</sub>	V <sub>DS</sub> =10V,I <sub>D</sub> =250 μA	3	-	4.5	V
Drain -source ON resistance		R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V,I <sub>D</sub> =6.5A	-	0.37	0.46	Ω
Forward Transconductance		g <sub>fs</sub>	V <sub>DS</sub> =50V,I <sub>D</sub> =6.5A	-	15	-	S
Input capacitance		C <sub>iss</sub>	V <sub>DS</sub> =25V,	-	1580	2055	pF
Reverse transfer capacitance		C <sub>rss</sub>	V <sub>GS</sub> =0V,	-	20	25	
Output capacitance		C <sub>oss</sub>	f=1MHz	-	180	235	
Switching time	Rise time	t <sub>r</sub>	V <sub>DD</sub> =250V,	-	25	60	ns
	Turn-on time	t <sub>on</sub>	I <sub>D</sub> =13A	-	100	210	
	Fall time	t <sub>f</sub>	R <sub>G</sub> =9.1Ω	-	130	270	
	Turn-off time	t <sub>off</sub>	R <sub>D</sub> =31Ω (Note4,5)	-	100	210	
Total gate charge(gate-source plus gate-drain)		Q <sub>g</sub>	V <sub>DD</sub> =400V, V <sub>GS</sub> =10V,	-	43	56	nC
Gate-source charge		Q <sub>gs</sub>	I <sub>D</sub> =13A	-	7.5	-	
Gate-drain("miller") Charge		Q <sub>gd</sub>	(Note4,5)	-	18.5	-	

**Source-Drain Ratings and Characteristics(Ta=25°C)**

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I <sub>DR</sub>	-	-	-	13	A
Pulse drain reverse current	I <sub>DRP</sub>	-	-	-	52	A
Forward voltage(diode)	V <sub>DSF</sub>	I <sub>DR</sub> =13A,V <sub>GS</sub> =0V	-	-	1.4	V
Reverse recovery time	t <sub>rr</sub>	I <sub>DR</sub> =13A,V <sub>GS</sub> =0V,	-	442	633	ns
Reverse recovery charge	Q <sub>rr</sub>	dI <sub>DR</sub> / dt =100 A / μs	-	2.16	3.24	μC

Note 1.Repeativity rating :pulse width limited by junction temperature

2.L=500uH I<sub>AS</sub>=13A,V<sub>DD</sub>=50V,R<sub>G</sub>=0Ω,Starting T<sub>J</sub>=25°C

3.I<sub>SD</sub>≤13A,di/dt≤300A/us,V<sub>DD</sub><BV<sub>DSS</sub>,STARTING T<sub>J</sub>=25°C

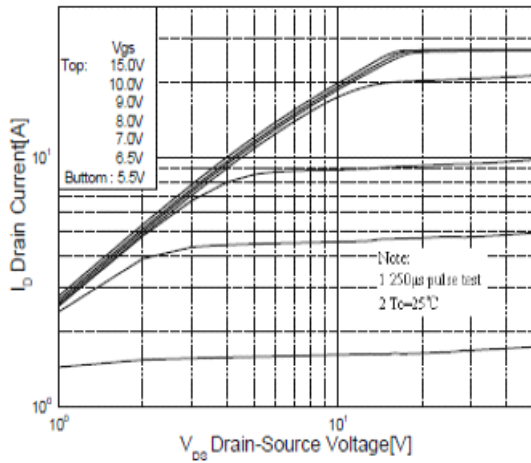
4.Pulse Test:Pulse Width≤300us,Duty Cycle≤2%

5. Essentially independent of operating temperature.

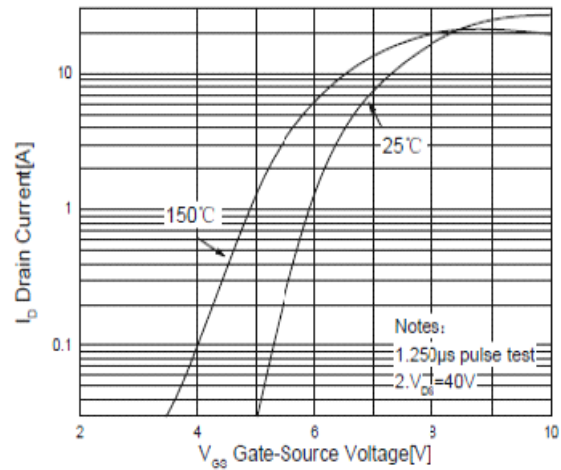
This transistor is an electrostatic sensitive device

Please handle with caution

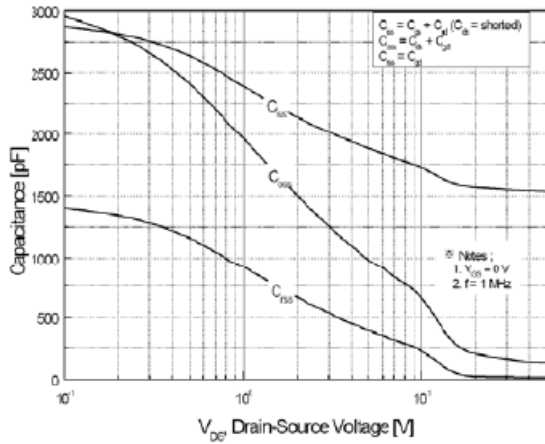




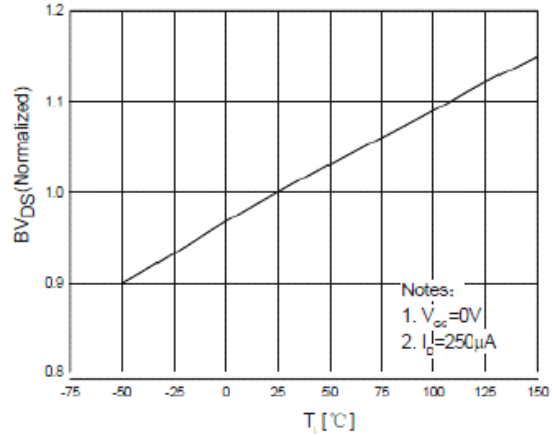
**Fig.1 On State Characteristics**



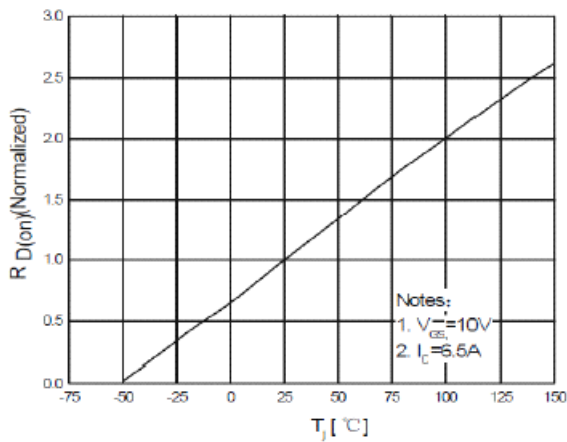
**Fig.2 Transfer Characteristics**



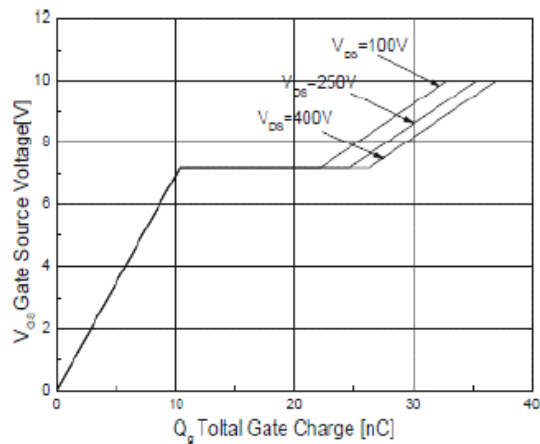
**Fig.3 Capacitance Variation vs Drain Voltage**



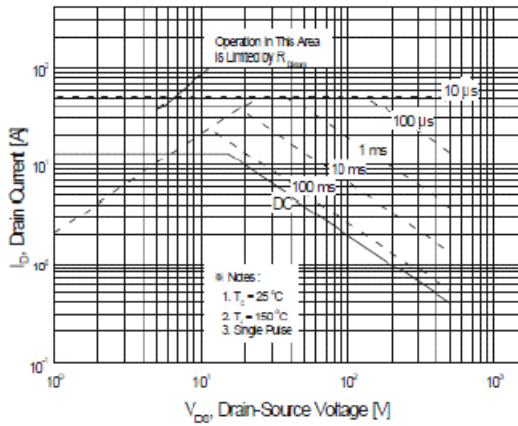
**Fig.4 Maximum Avalanche Energy vs On-State Current**



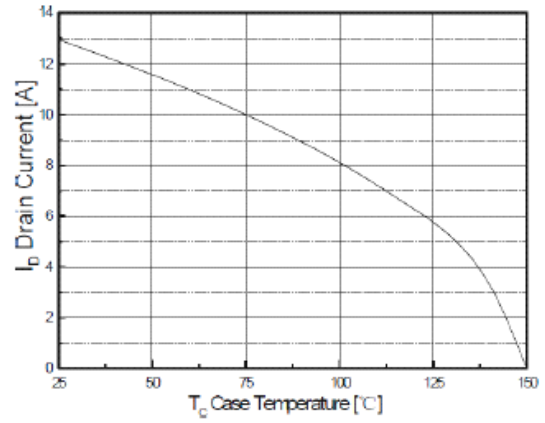
**Fig.5 On-Resistance Variation vs Junction temperature**



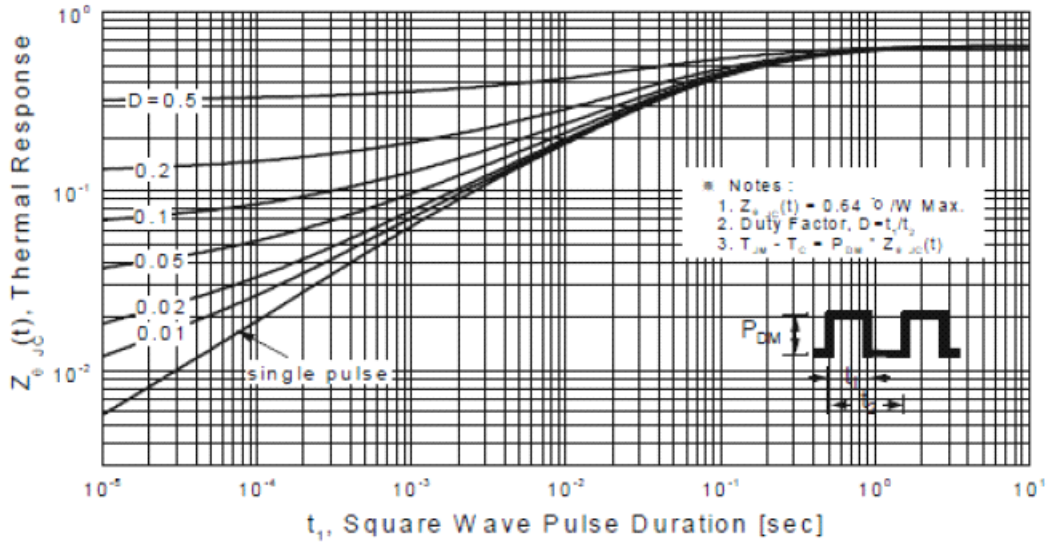
**Fig.6 Gate Charge Characteristics**



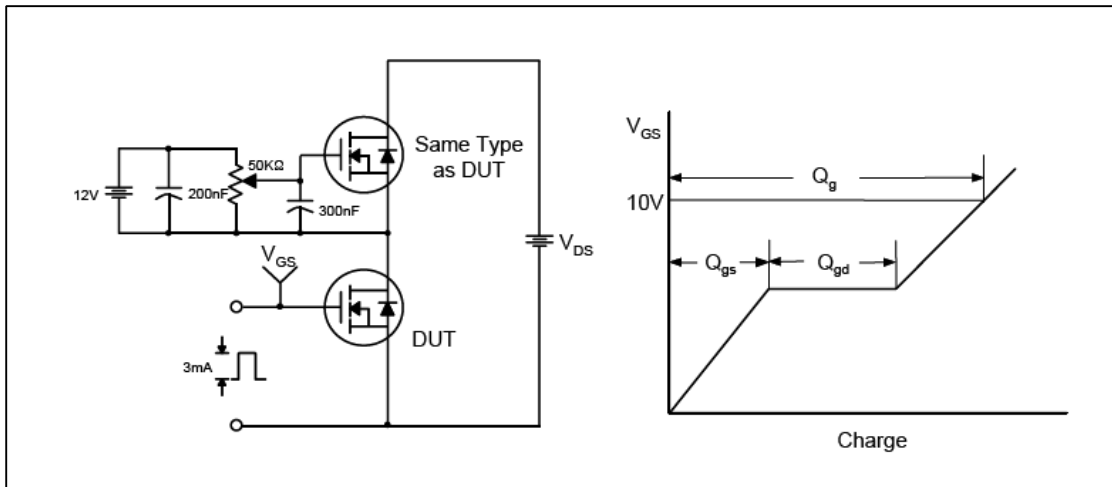
**Fig.7 Maximum Safe Operation Area**



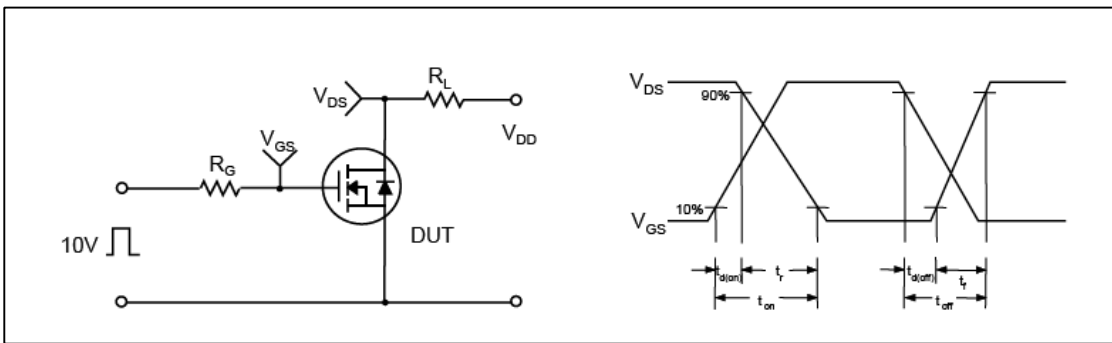
**Fig.8 Maximum Drain Current vs Case temperature**



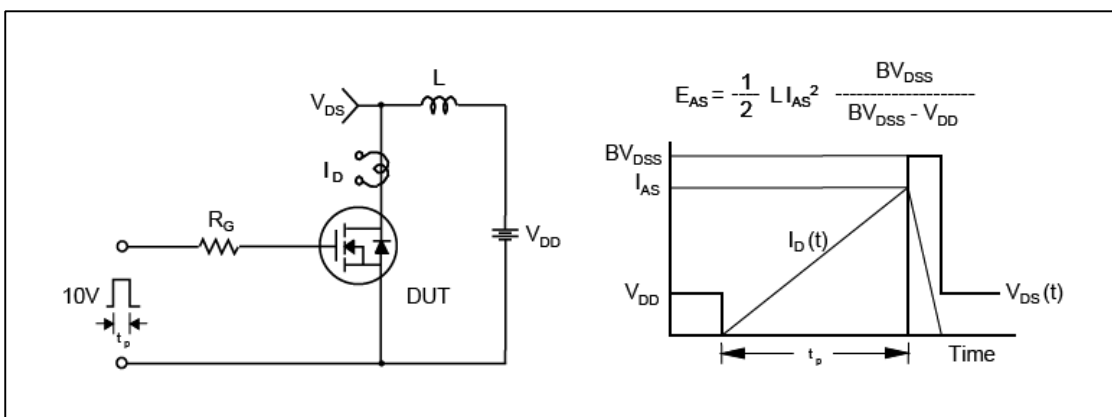
**Fig.9 Transient thermal Response Curve**



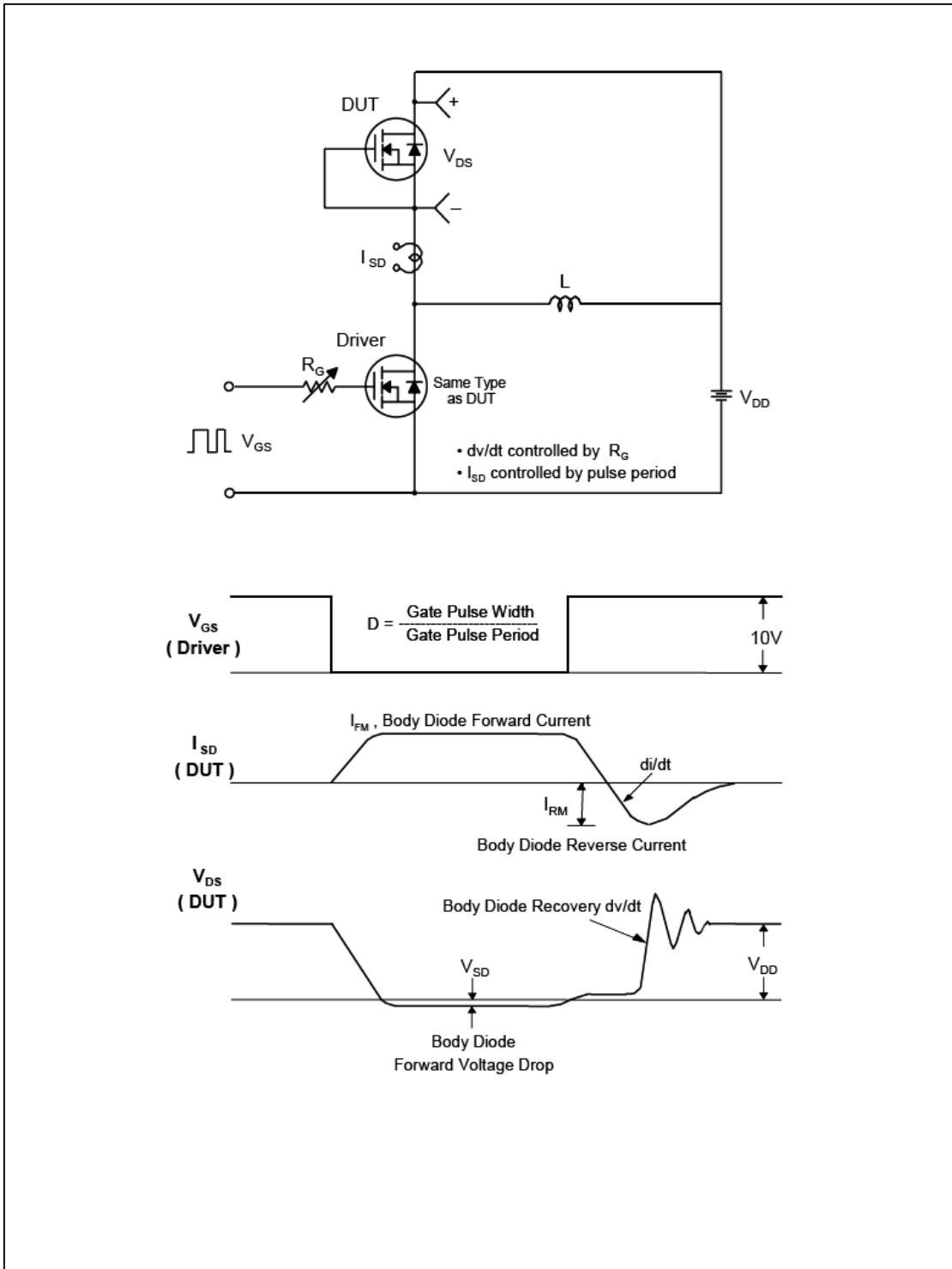
**Fig.10 Gate Test circuit & Waveform**



**Fig.11 Resistive Switching Test Circuit & Waveform**



**Fig.12 Unclamped Inductive Switching Test Circuit & Waveform**



**Fig.13 Peak Diode Recovery  $dv/dt$  Test Circuit & Waveform**

**TO-3P Package Dimension**

