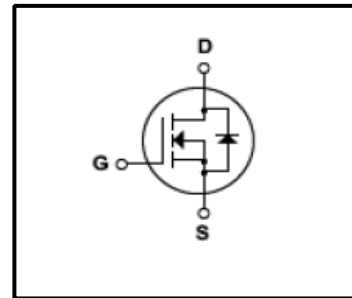


***Silicon N-Channel MOSFET***

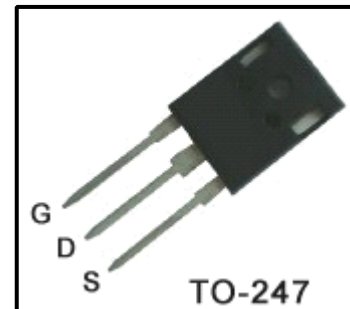
**Features**

- 40A,250V, $R_{DS(on)}$ (Max0.068 $\Omega$ )@ $V_{GS}=10V$
- Ultra-low Gate charge(Typical 87nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Maximum Junction Temperature Range(150 $^{\circ}C$ )



**General Description**

This N-Channel enhancement mode power field effect transistors are produced using Winsemi's proprietary, planar stripe ,DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance , provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switch mode power supplies.



**Absolute Maximum Ratings**

Symbol	Parameter	Value	Units
$V_{DSS}$	Drain Source Voltage	250	V
$I_D$	Continuous Drain Current(@ $T_c=25^{\circ}C$ )	40	A
	Continuous Drain Current(@ $T_c=100^{\circ}C$ )	25	A
$I_{DM}$	Drain Current Pulsed (Note1)	160	A
$V_{GS}$	Gate to Source Voltage	$\pm 30$	V
$E_{AS}$	Single Pulsed Avalanche Energy (Note2)	900	mJ
$I_{AR}$	Avalanche Current (Note1)	40	A
$E_{AR}$	Repetitive Avalanche Energy (Note1)	26	mJ
dv/dt	Peak Diode Recovery dv /dt (Note3)	5.4	V/ ns
$P_D$	Total Power Dissipation(@ $T_c=25^{\circ}C$ )	260	W
	Derating Factor above 25 $^{\circ}C$	2.08	W/ $^{\circ}C$
$T_J$	Junction Temperature	150	$^{\circ}C$
$T_{stg}$	Storage Temperature	-55~150	$^{\circ}C$
$T_L$	Channel Temperature	300	$^{\circ}C$

**Thermal Characteristics**

Symbol	Parameter	Value			Units
		Min	Typ	Max	
$R_{QJC}$	Thermal Resistance , Junction -to -Case	-	-	0.48	$^{\circ}C/W$
$R_{QJA}$	Thermal Resistance, Junction to Ambient	-	-	62.5	$^{\circ}C/W$

## 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> =250V,V <sub>GS</sub> =0V, T <sub>C</sub> =25°C	-	-	1	μA	
		V <sub>DS</sub> =200V,T <sub>C</sub> =125°C	-	-	10	μA	
Drain -source breakdown voltage	V <sub>(BR)DSS</sub>	I <sub>D</sub> =250μA,V <sub>GS</sub> =0V	250	-	-	V	
Breakdown voltage Temperature coefficient	ΔBV <sub>DSS</sub> / ΔT <sub>J</sub>	I <sub>D</sub> =250μA,Referenced to 25°C	-	0.26	-	V/°C	
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =250μA	3	-	5	V	
Drain -source ON resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V,I <sub>D</sub> =20A	-	0.047	0.068	Ω	
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =40V,I <sub>D</sub> =20A	-	27	-	S	
Input capacitance	C <sub>iSS</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	-	3350	4210	pF	
Reverse transfer capacitance	C <sub>rSS</sub>		-	82	105		
Output capacitance	C <sub>oss</sub>		-	685	867		
Switching time	Turn-on Rise time	tr	V <sub>DD</sub> =125V I <sub>D</sub> =40A R <sub>G</sub> =25Ω (Note4,5)	-	620	950	ns
	Turn-on delay time	Td(on)		-	81	112	
	Turn-off Fall time	tf		-	183	235	
	Turn-off delay time	Td(off)		-	142	189	
Total gate charge(gate-source plus gate-drain)	Q <sub>g</sub>	V <sub>DS</sub> =200V, V <sub>GS</sub> =10V, I <sub>D</sub> =40A (Note4,5)	-	87	113	nC	
Gate-source charge	Q <sub>gs</sub>		-	25	-		
Gate-drain("miller") Charge	Q <sub>gd</sub>		-	44	-		

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I <sub>DR</sub>	-	-	-	40	A
Forward voltage(diode)	V <sub>DSF</sub>	I <sub>DR</sub> =40A,V <sub>GS</sub> =0V	-	-	1.5	V
Reverse recovery time	trr	I <sub>DR</sub> =40A,V <sub>GS</sub> =0V, di <sub>DR</sub> / dt =100 A / μs	-	234	-	ns
Reverse recovery charge	Q <sub>rr</sub>		-	2.15	-	μC

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

2.L=0.9mH I<sub>AS</sub>=40A,V<sub>DD</sub>=50V,R<sub>G</sub>=25Ω,Starting T<sub>J</sub>=25°C

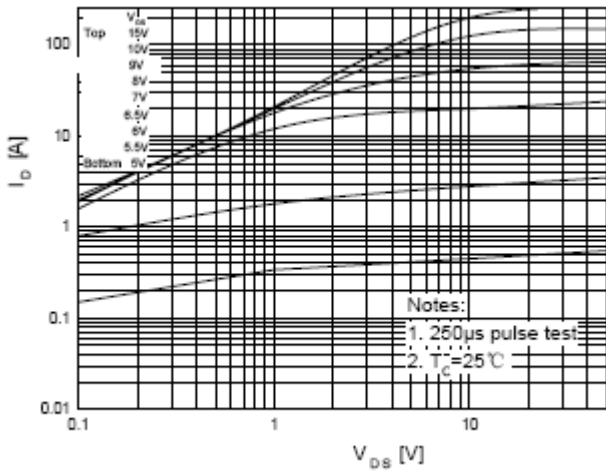
3.I<sub>SD</sub>≤40A,di/dt≤300A/us,V<sub>DD</sub><BV<sub>DSS</sub>,STARTING T<sub>J</sub>=25°C

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

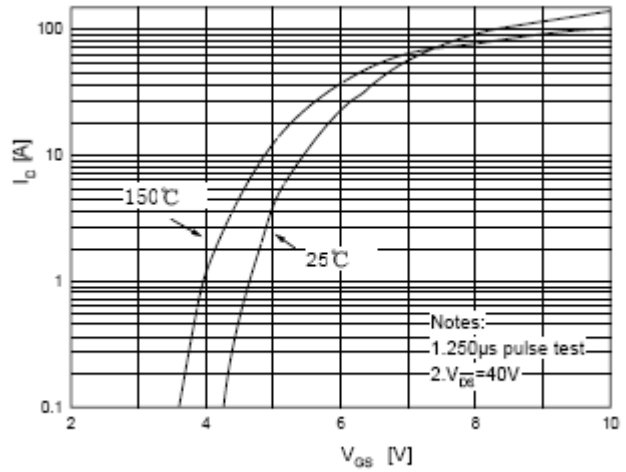
5. Essentially independent of operating temperature.

This transistor is an electrostatic sensitive device

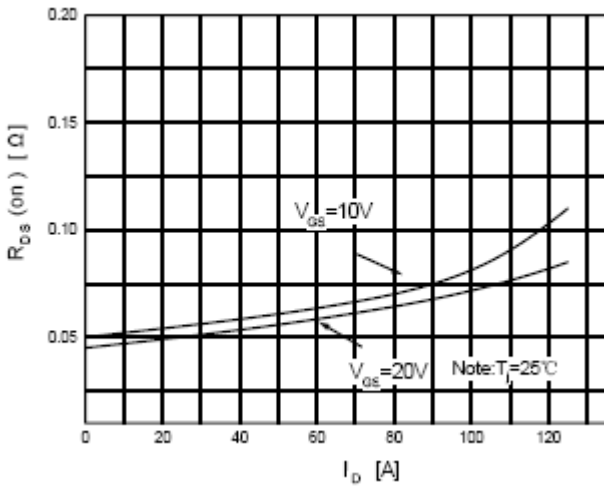
Please handle with caution



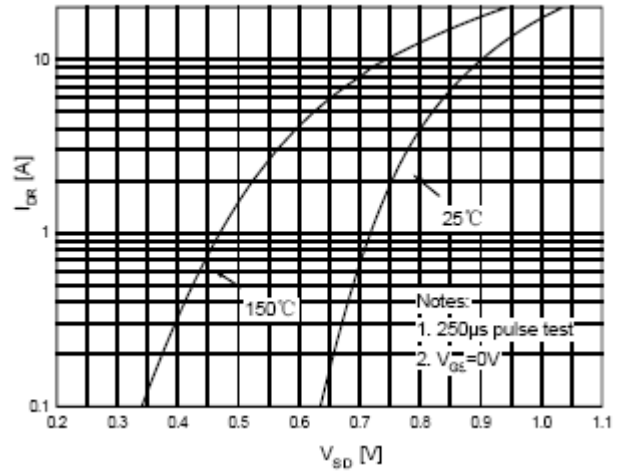
**Fig.1 On-State characteristics**



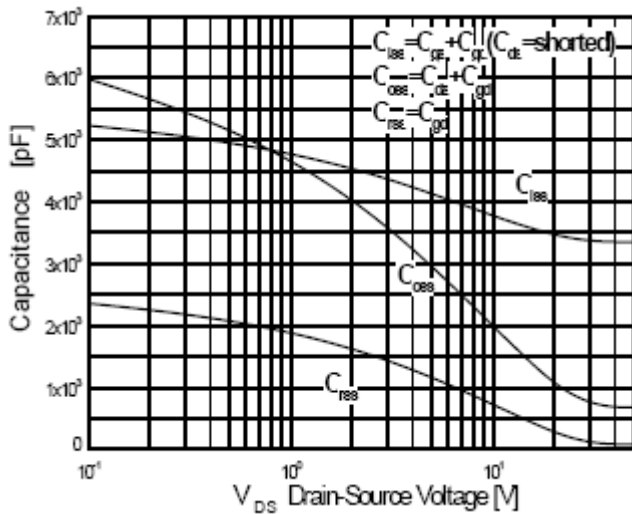
**Fig.2 Transfer Current characteristics**



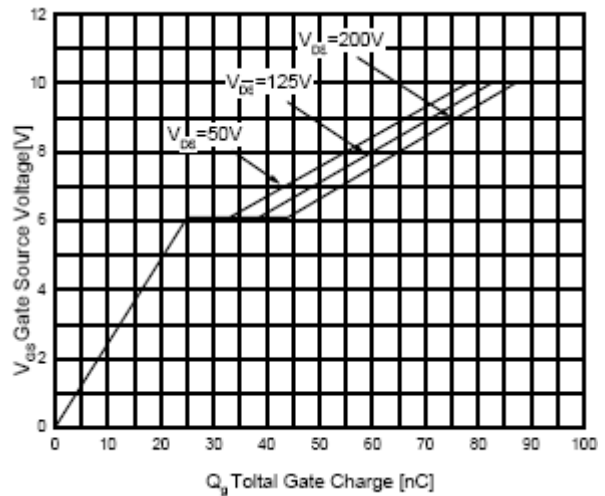
**Fig.3 On-Resistance Variation vs Drain Current and Gate Voltage**



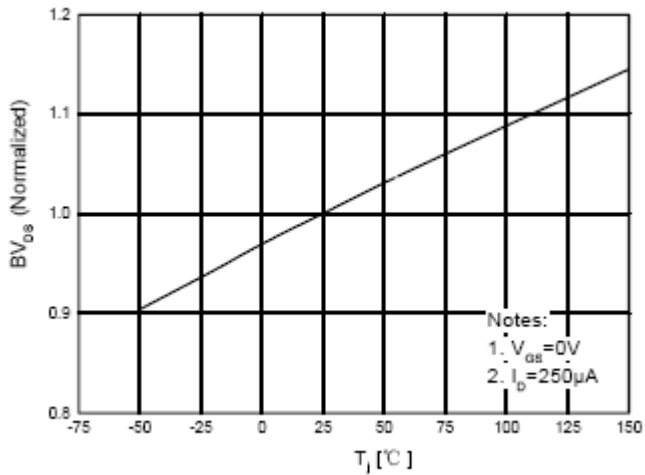
**Fig.4 Body Diode Forward Voltage Variation with Source Current and Temperature**



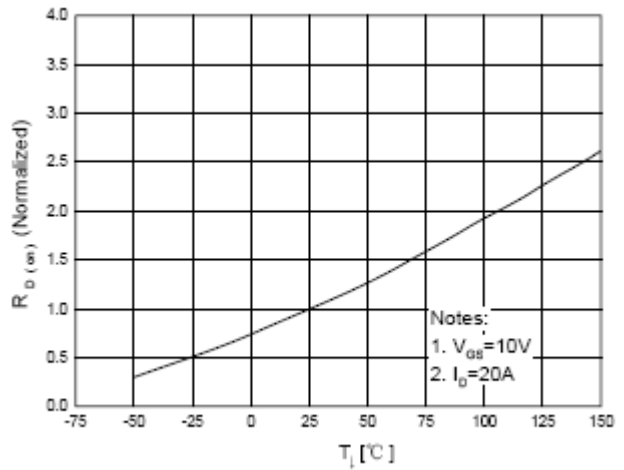
**Fig.5 Capacitance Characteristics**



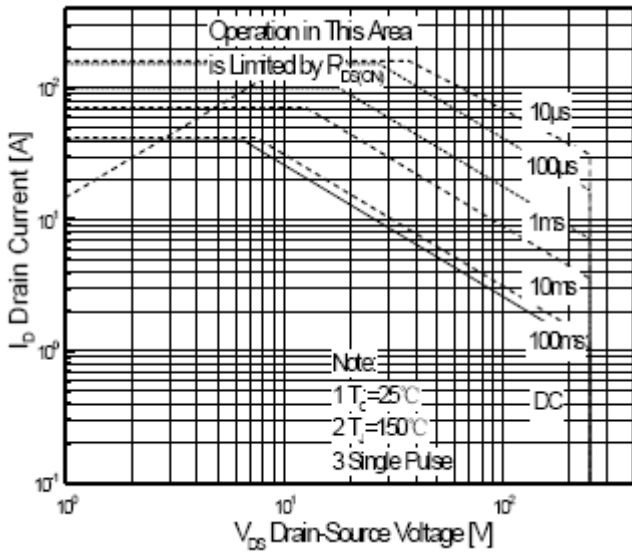
**Fig.6 Gate Charge Characteristics**



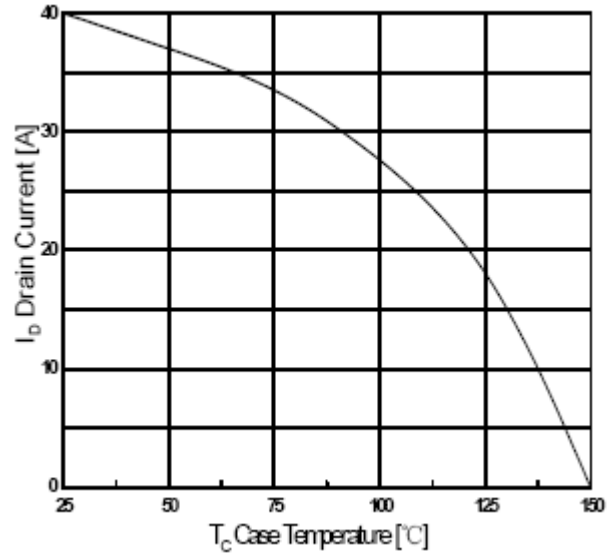
**Fig.7 Breakdown Voltage Variation vs. Temperature**



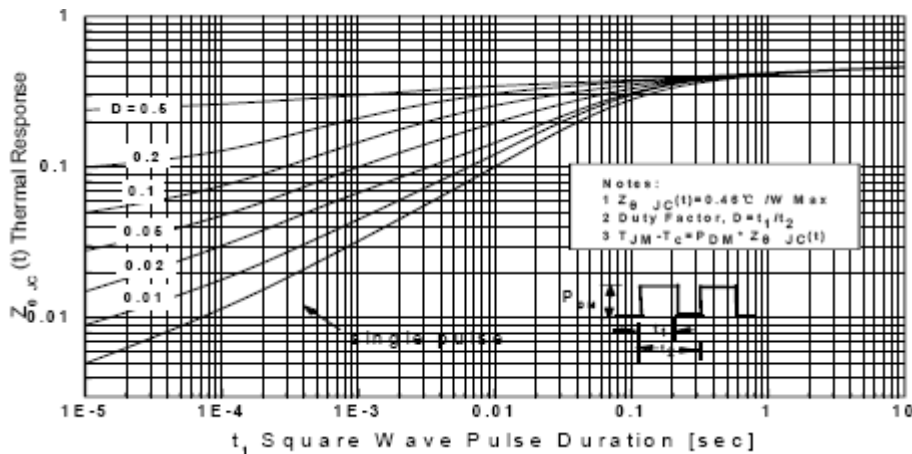
**Fig.8 On-Resistance Variation vs. Junction Temperature**



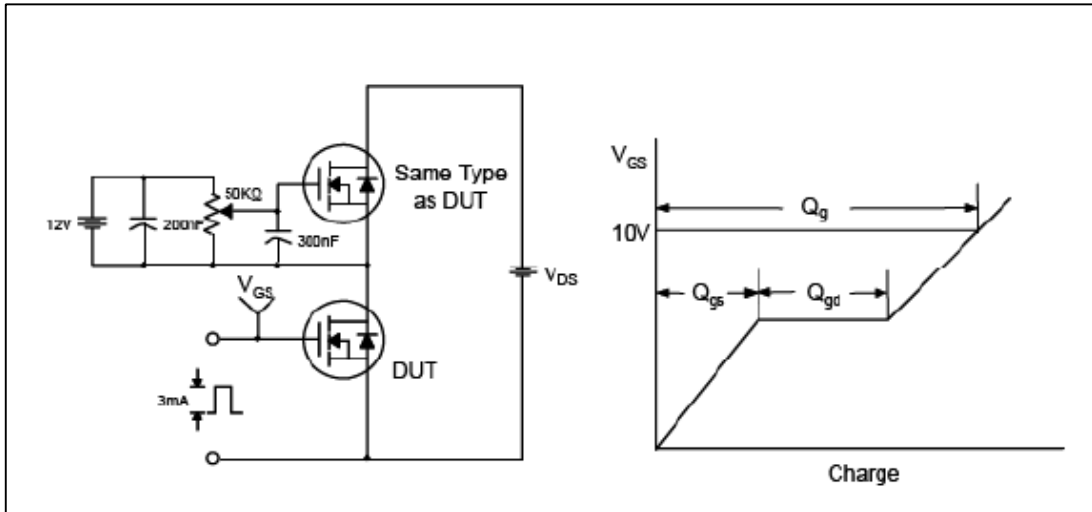
**Fig.9 Maximum Safe Operation Area**



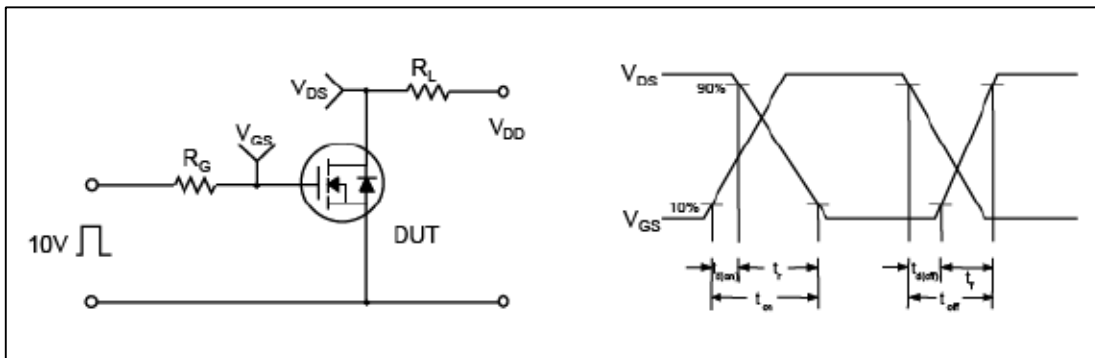
**Fig.10 Maximum Drain Current vs. Case Temperature**



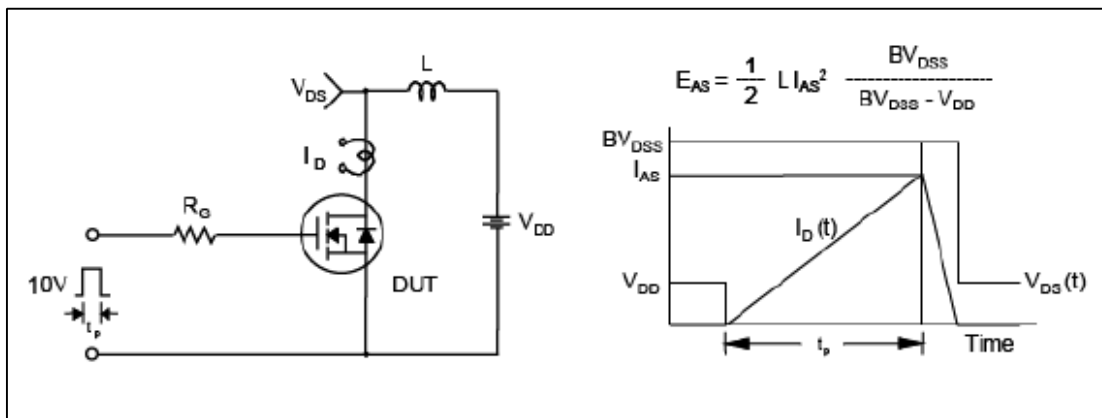
**Fig.11 Transient Thermal Response Curve**



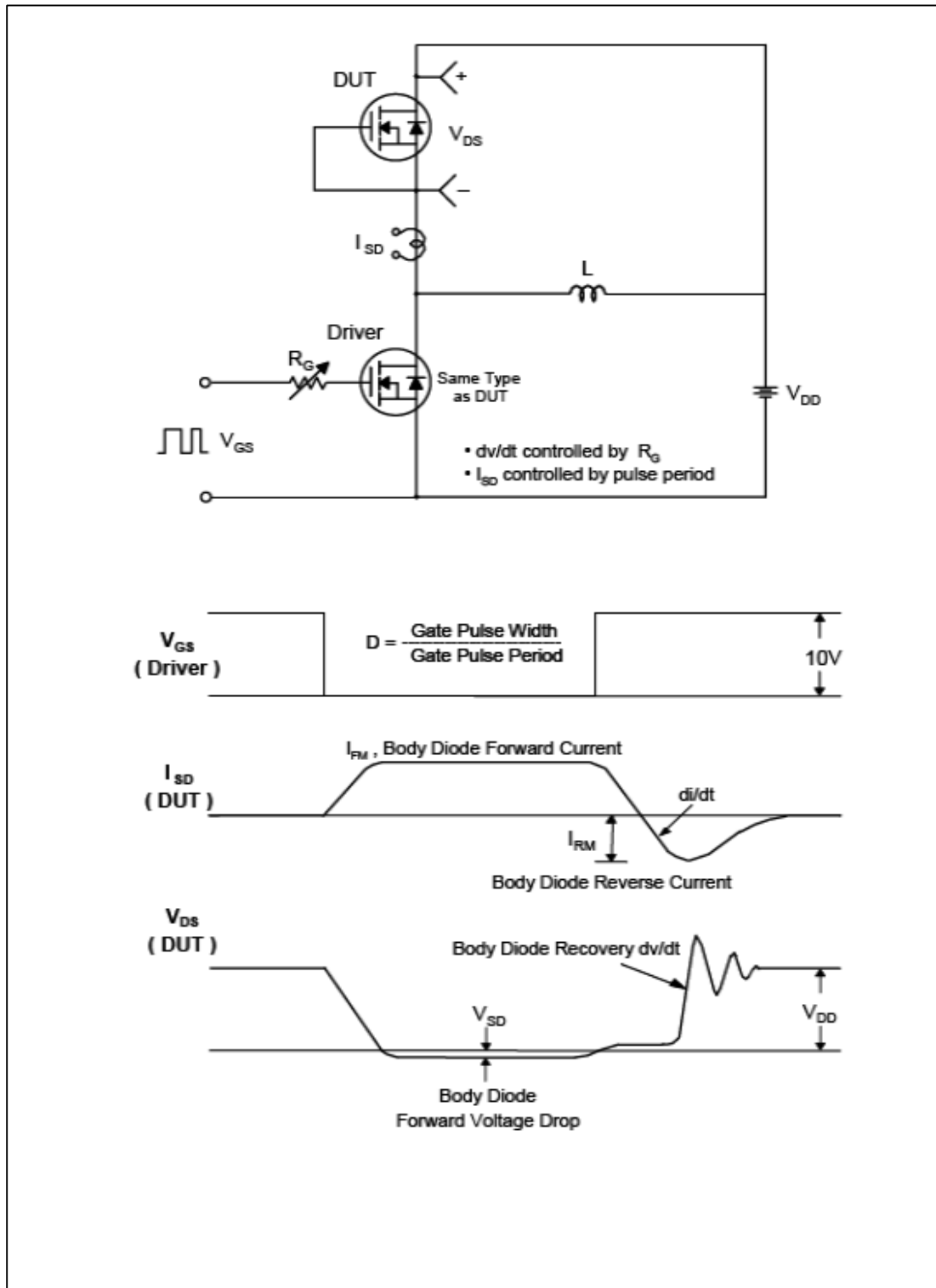
**Fig.12 Gate Test Circuit & Waveform**



**Fig.13 Resistive Switching Test Circuit & Waveform**



**Fig.14 Unclamped Inductive Switching Test Circuit & Waveform**



**Fig.15 Peak Diode Recovery  $dv/dt$  Test Circuit & Waveform**

**TO-247 Package Dimension**

