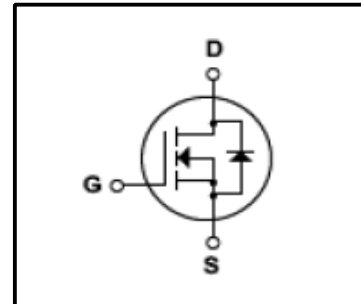


**Silicon N-Channel MOSFET**

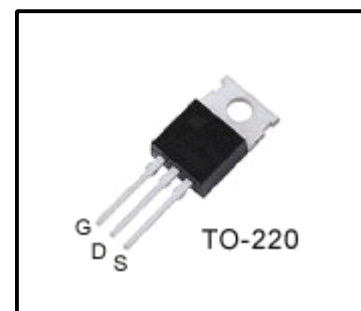
**Features**

- $R_{DS(on)}$ (Max 23m $\Omega$ )@ $V_{GS}=10V$
- Ultra-low Gate Charge(Typical 31nC)
- Fast Switching Capability
- 100%Avalanche Tested
- Maximum Junction Temperature Range(150 $^{\circ}C$ )



**General Description**

This Power MOSFET is produced using Winsemi's trench Layout-based process. This technology improves the performances compared with standard parts from various sources. All of these power MOSFETs are designed for applications in switching regulators, switching converters, motor and relay drivers, and drivers for high power bipolar switching transistors demanding high speed and low gate drive power.



**Absolute Maximum Ratings**

Symbol	Parameter	Value	Units
$V_{DSS}$	Drain Source Voltage	60	V
$I_D$	Continuous Drain Current(@ $T_c=25^{\circ}C$ )	50	A
	Continuous Drain Current(@ $T_c=100^{\circ}C$ )	38	A
$I_{DM}$	Drain Current Pulsed (Note1)	200	A
$V_{GS}$	Gate to Source Voltage	$\pm 25$	V
$E_{AS}$	Single Pulsed Avalanche Energy (Note2)	480	mJ
$E_{AR}$	Repetitive Avalanche Energy (Note1)	13	mJ
dv/dt	Peak Diode Recovery dv /dt (Note3)	5.8	V/ ns
$P_D$	Total Power Dissipation(@ $T_c=25^{\circ}C$ )	125	W
	Derating Factor above 25 $^{\circ}C$	1.2	W/ $^{\circ}C$
$T_J, T_{stg}$	Junction and 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	-	-	1	$^{\circ}C/W$
$R_{QCS}$	Case-to-Sink, Flat, Greased Surface	-	0.5	-	$^{\circ}C/W$
$R_{QJA}$	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> =±20V, 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	±20	-	-	V
Drain cut -off current		I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V	-	-	1	μA
			V <sub>DS</sub> =60V, Tc=125 °C	-	-	250	μA
Drain -source breakdown voltage		V <sub>(BR)DSS</sub>	I <sub>D</sub> =250 μA, V <sub>GS</sub> =0V	60	-	-	V
Gate threshold voltage		V <sub>GS(th)</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =250 μA	2	-	4	V
Drain -source ON resistance		R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =25A	-	20	23	mΩ
Forward Transconductance		g <sub>fs</sub>	V <sub>DS</sub> =25V, I <sub>D</sub> =25A	-	22	-	S
Input capacitance		C <sub>iss</sub>	V <sub>DS</sub> =25V,	-	1126	1420	pF
Reverse transfer capacitance		C <sub>rss</sub>	V <sub>GS</sub> =0V,	-	52	83	
Output capacitance		C <sub>oss</sub>	f=1MHz	-	428	554	
Switching time	Rise time	t <sub>r</sub>	V <sub>DD</sub> =30V,	-	11	32	ns
	Turn-on time	t <sub>on</sub>	I <sub>D</sub> =25A ,	-	98	213	
	Fall time	t <sub>f</sub>	R <sub>G</sub> =25Ω,	-	54	117	
	Turn-off time	t <sub>off</sub>	V <sub>GS</sub> =10V (Note4,5)	-	58	126	
Total gate charge(gate-source plus gate-drain)		Q <sub>g</sub>	V <sub>DD</sub> =48V, V <sub>GS</sub> =10V,	-	31	41	nC
Gate-source charge		Q <sub>gs</sub>	I <sub>D</sub> =50A	-	8	-	
Gate-drain("miller") Charge		Q <sub>gd</sub>	(Note4,5)	-	13	-	

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

Characteristics	Symbol	Test Condition	Min	Type	Max	Unit
Continuous drain reverse current	I <sub>DR</sub>	-	-	-	50	A
Pulse drain reverse current	I <sub>DRP</sub>	-	-	-	200	A
Forward voltage(diode)	V <sub>DSF</sub>	I <sub>DR</sub> =50A, V <sub>GS</sub> =0V	-	-	1.5	V
Reverse recovery time	t <sub>rr</sub>	I <sub>DR</sub> =50A, V <sub>GS</sub> =0V,	-	52	-	ns
Reverse recovery charge	Q <sub>rr</sub>	dI <sub>DR</sub> / dt =100 A / μs	-	75	-	μC

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

2. L=0.5mH I<sub>AS</sub>=50A, V<sub>DD</sub>=25V, V<sub>GS</sub>=10V ,Starting T<sub>J</sub>=25°C

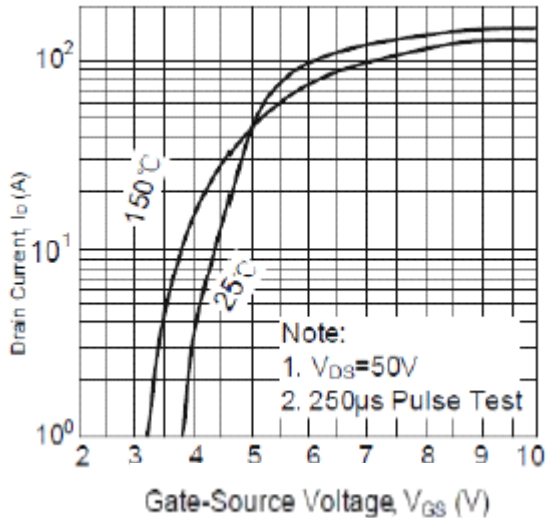
3. I<sub>SD</sub>≤50A, di/dt≤380A/μs, V<sub>DD</sub><BV<sub>DSS</sub>, STARTING T<sub>J</sub>=25°C

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

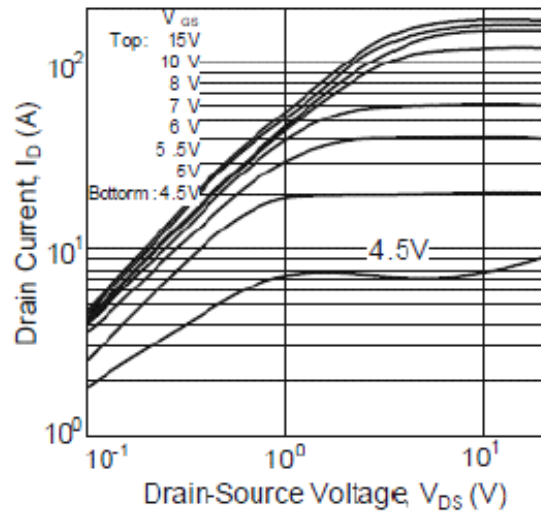
5. Essentially independent of operating temperature.

This transistor is an electrostatic sensitive device

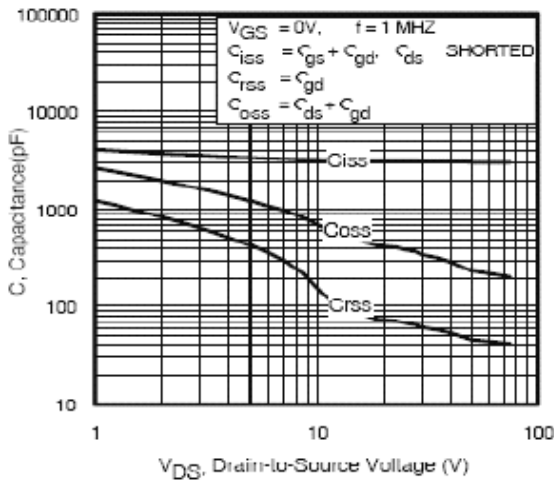
Please handle with caution



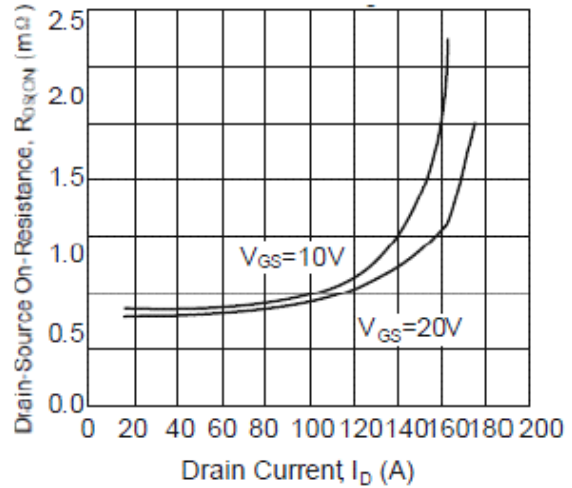
**Fig.1 Transfer characteristics**



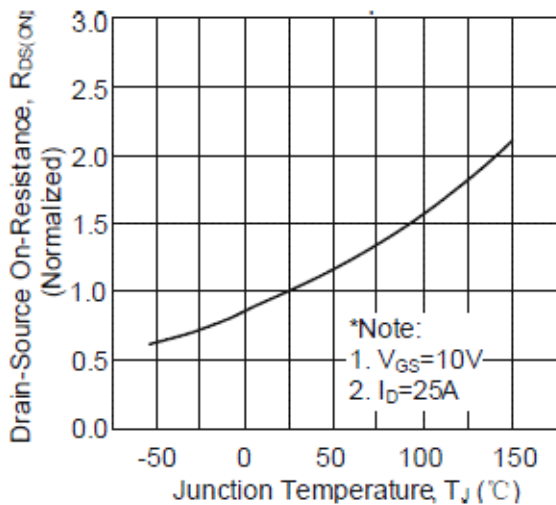
**Fig.2 On-state Characteristics**



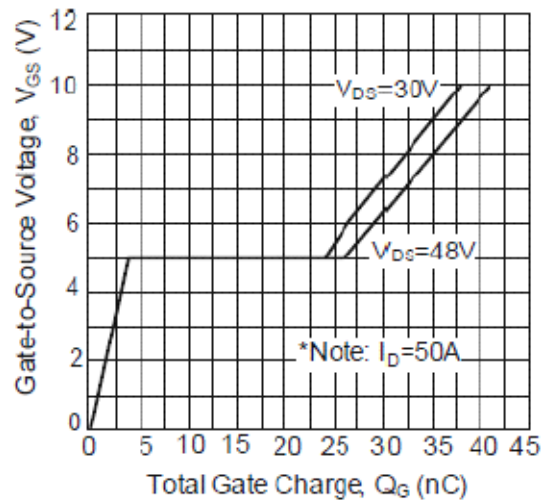
**Fig.3 Typical Capacitance vs Drain Current**



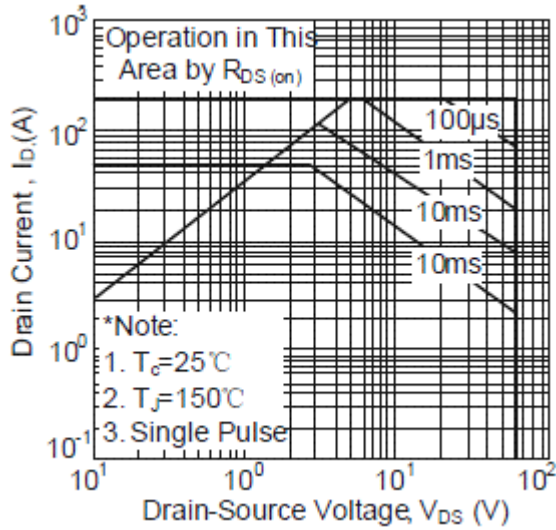
**Fig.4 On-resistance Variation vs Drain current and gate Voltage**



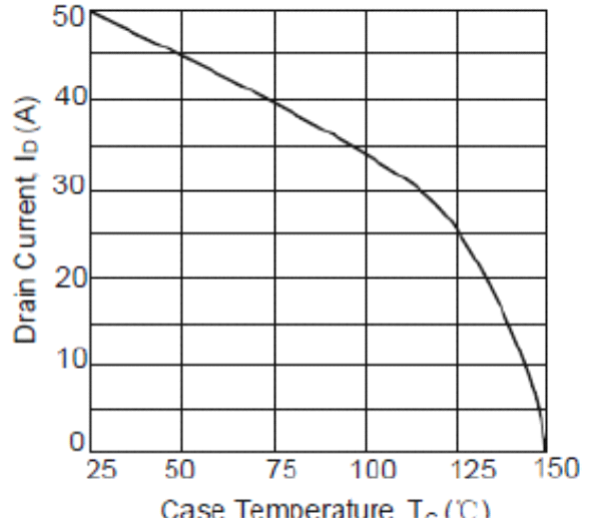
**Fig.5 On-resistance variation vs Junction Temperature**



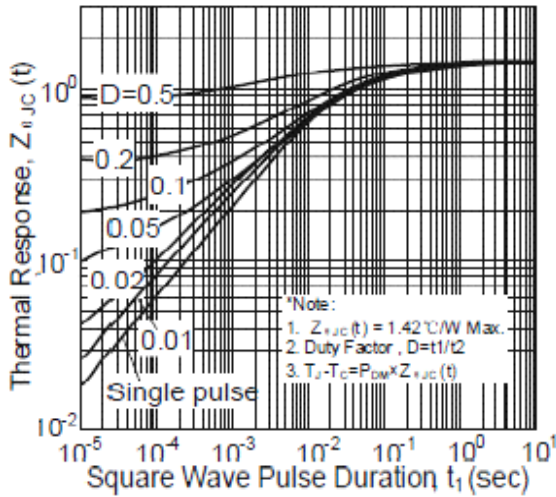
**Fig.6 Gate charge Characteristics**



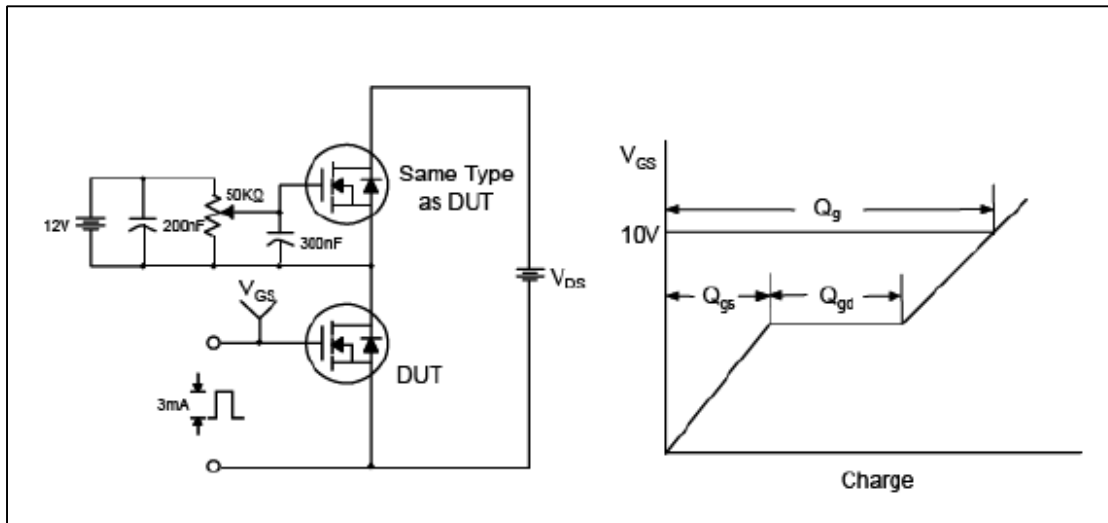
**Fig.7 Maximum Safe Operation Area**



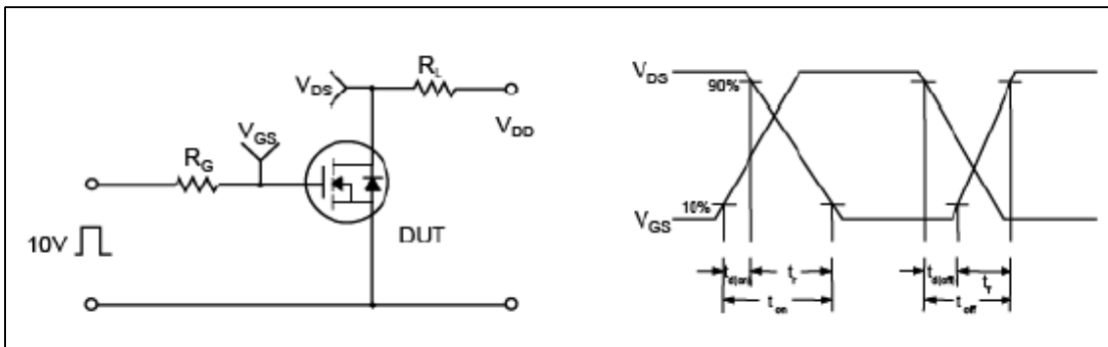
**Fig.8 Maximum Drain current vs Case Temperature**



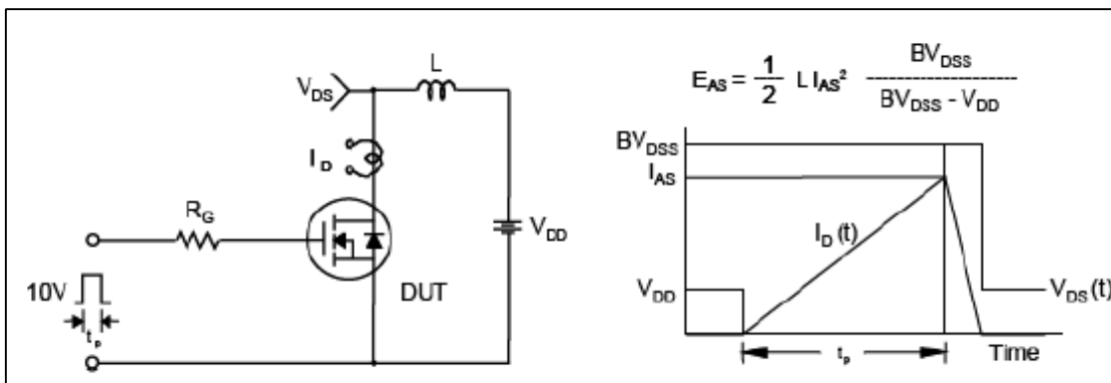
**Fig.9 Transient Thermal Response Curve**



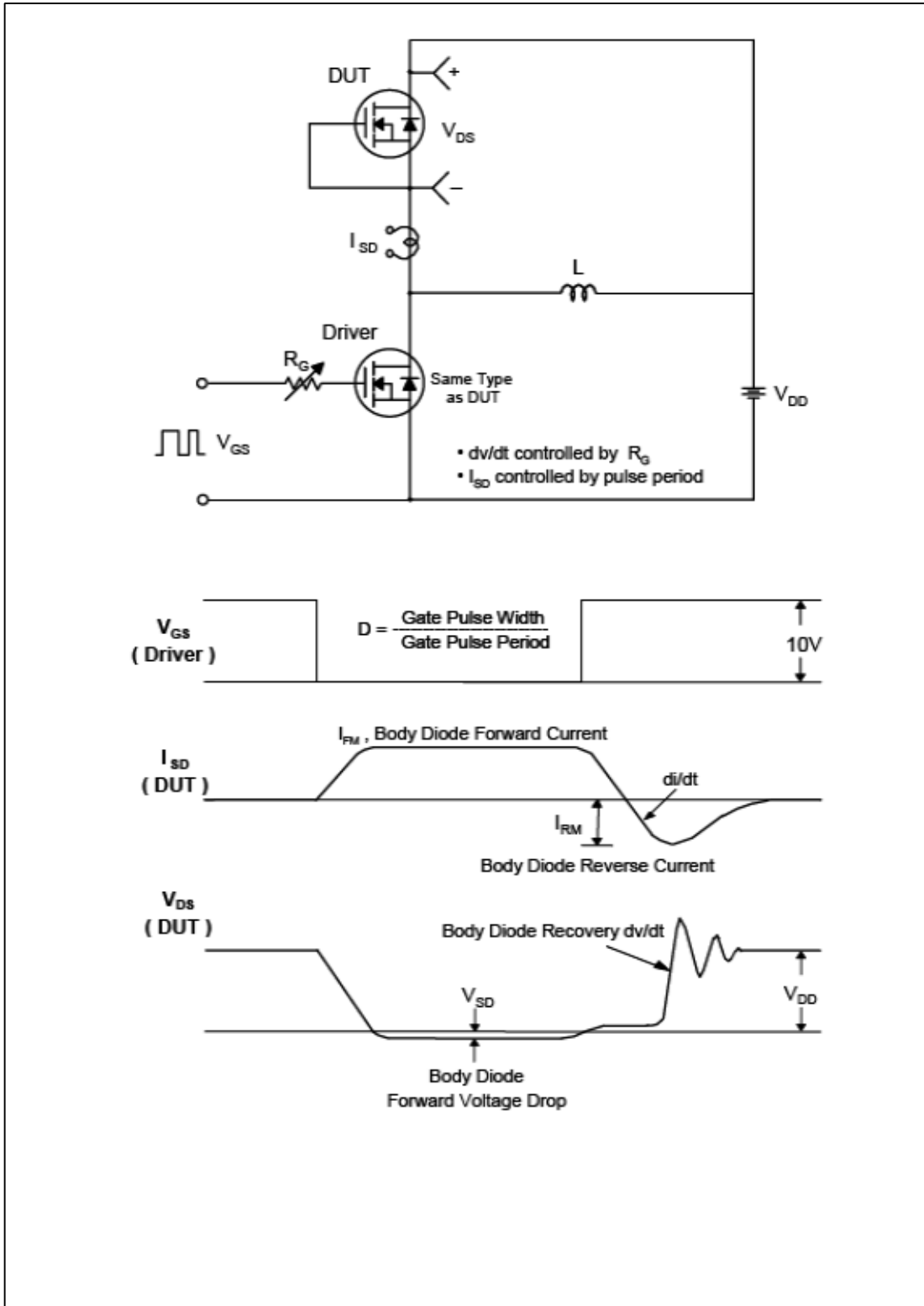
**Fig.10 Gate Test circuit & Waveform**



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



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



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

**TO-220 Package Dimension**

