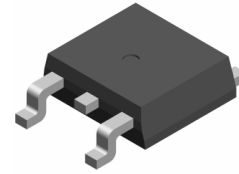




PIN Connection TO-252

V _{DSS}	200	V
I _D	18	A
P _D (T _C =25°C)	100	W
R _{DS(ON)Typ}	0.12	Ω

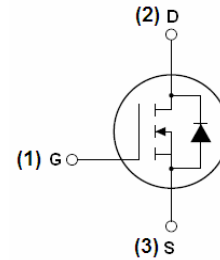


Features

- Fast Switching
- Low ON Resistance(R_{dson}≤0.18Ω)
- Low Gate Charge (Typical Data:24nC)
- Low Reverse transfer capacitances(Typical:25pF)
- 100% Single Pulse avalanche energy Test

Applications

CRT、TV/Monitor and Lighting.



Marking Diagram

- Y = Year
- A = Assembly Location
- WW = Work Week
- FIR19N20L = Specific Device Code

Absolute (T_c= 25°C unless otherwise specified)

Symbol	Parameter	Rating	Units
V _{DSS}	Drain-to-Source Voltage	200	V
I _D	Continuous Drain Current	18	A
	Continuous Drain Current T _C = 100 °C	11.2	A
I _{DM} ^{a1}	Pulsed Drain Current	72	A
V _{GS}	Gate-to-Source Voltage	± 30	V
E _{AS} ^{a2}	Single Pulse Avalanche Energy	950	mJ
E _{AR} ^{a1}	Avalanche Energy ,Repetitive	90	mJ
I _{AR} ^{a1}	Avalanche Current	4.2	A
dv/dt ^{a3}	Peak Diode Recovery dv/dt	5.0	V/ns
P _D	Power Dissipation	100	W
	Derating Factor above 25°C	1.25	W/°C
T _J , T _{stg}	Operating Junction and Storage Temperature Range	150, -55 to 150	°C
T _L	Maximum Temperature for Soldering	300	°C



Electrical Characteristics (Tc= 25°C unless otherwise specified)

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	200	--	--	V
Δ BV _{DSS} / Δ T _J	Bvdss Temperature Coefficient	I _D =250uA, Reference 25°C	--	0.25	--	V/°C
I _{DSS}	Drain to Source Leakage Current	V _{DS} = 200V, V _{GS} = 0V, T _a = 25°C	--	--	1	μA
		V _{DS} = 160V, V _{GS} = 0V, T _a = 125°C	--	--	10	
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} = +30V	--	--	100	nA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} = -30V	--	--	-100	nA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =10V, I _D =10.8A	--	0.12	0.18	Ω
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.0		4.0	V
Pulse width tp ≤ 380μs, δ ≤ 2%						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g _{fs}	Forward Transconductance	V _{DS} =15V, I _D =18A	--	18	--	S
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = 25V f = 1.0MHz	--	1140	--	pF
C _{oss}	Output Capacitance		--	180	--	
C _{rss}	Reverse Transfer Capacitance		--	25	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	I _D = 18A V _{DD} = 100V V _{GS} = 10V R _G = 2.4Ω	--	11	--	ns
t _r	Rise Time		--	33	--	
t _{d(OFF)}	Turn-Off Delay Time		--	25	--	
t _f	Fall Time		--	7	--	
Q _g	Total Gate Charge	I _D = 18A V _{DD} = 100V V _{GS} = 10V	--	24		nC
Q _{gs}	Gate to Source Charge		--	7.5	--	
Q _{gd}	Gate to Drain ("Miller") Charge		--	9.5	--	



Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	18	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	72	A
V_{SD}	Diode Forward Voltage	$I_S=18A, V_{GS}=0V$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S=18A, T_J = 25^\circ C$	--	160		ns
Q_{rr}	Reverse Recovery Charge	$dI_F/dt=100A/us, V_{GS}=0V$	--	880		nC
Pulse width $t_p \leq 380\mu s, \delta \leq 2\%$						

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case	0.8	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient	62.5	$^\circ C/W$

^{a1}: Repetitive rating; pulse width limited by maximum junction temperature

^{a2}: $L=10.0mH, I_D=13.8A, Start T_J=25^\circ C$

^{a3}: $I_{SD}=18A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}, Start T_J=25^\circ C$



Electrical Characteristic Curves

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

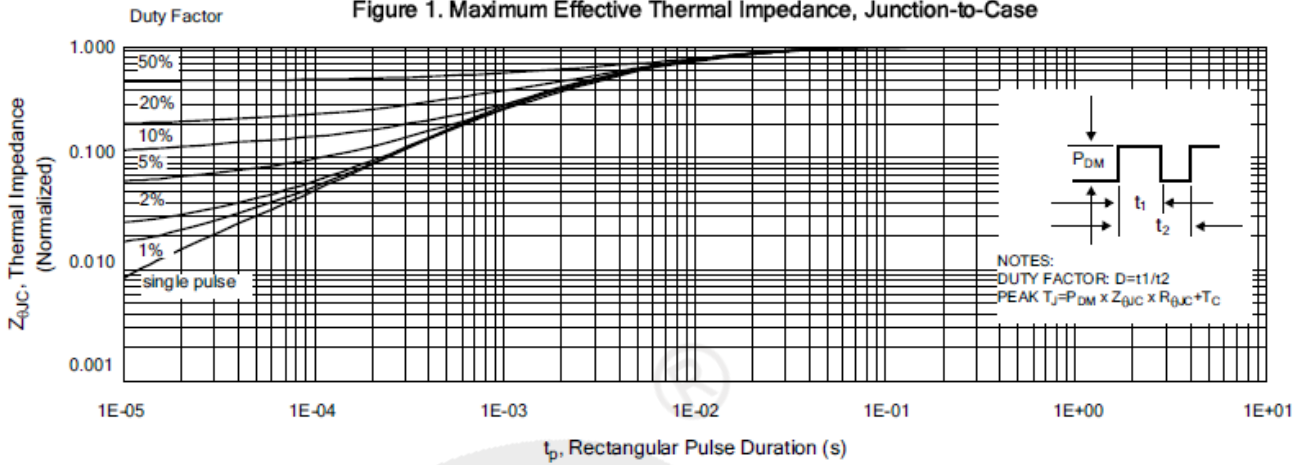


Figure 2. Maximum Power Dissipation vs Case Temperature

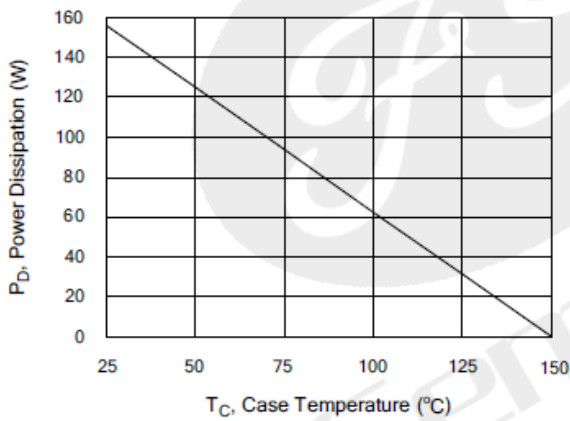


Figure 3. Maximum Continuous Drain Current vs Case Temperature

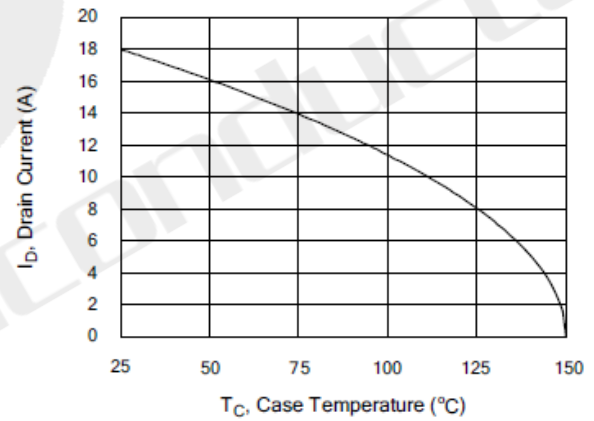


Figure 4. Typical Output Characteristics

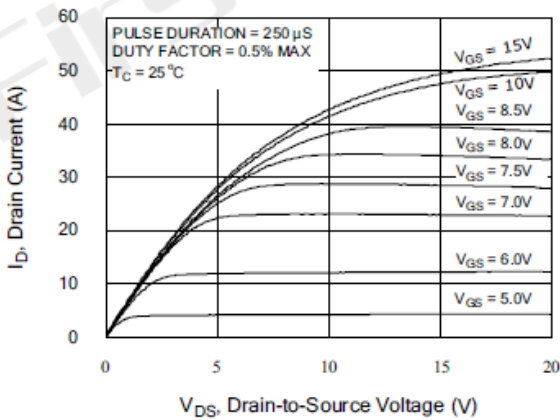


Figure 5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current

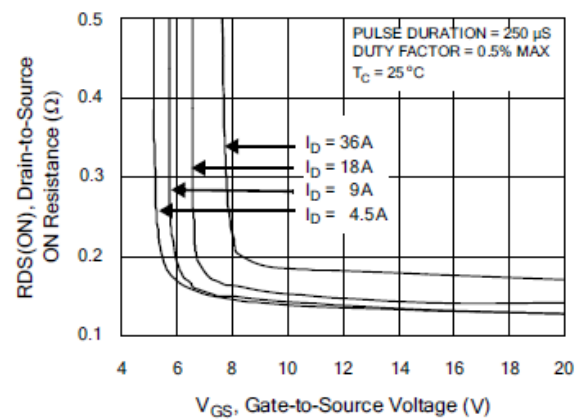


Figure 6. Maximum Peak Current Capability

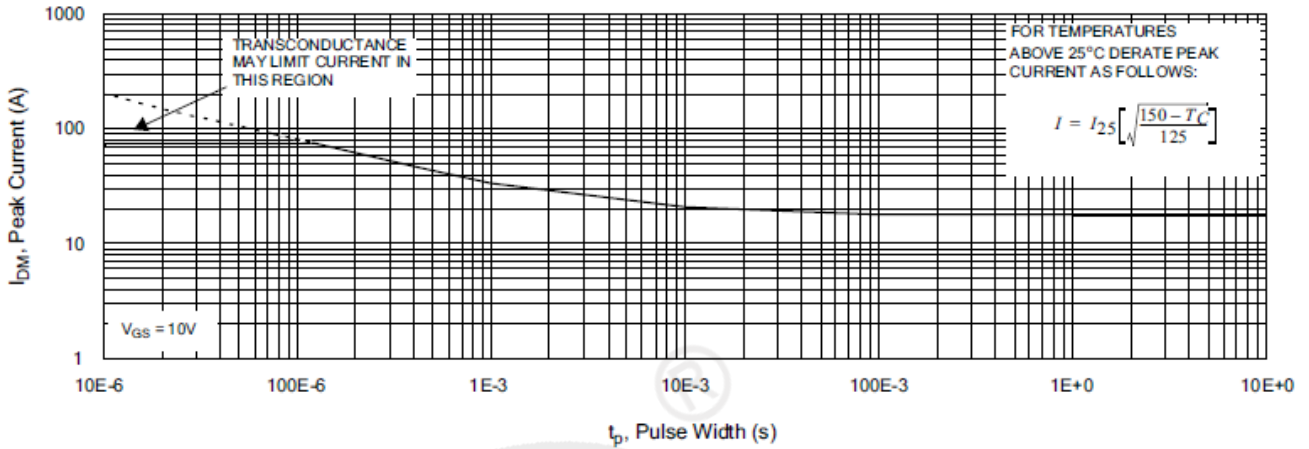


Figure 7. Typical Transfer Characteristics

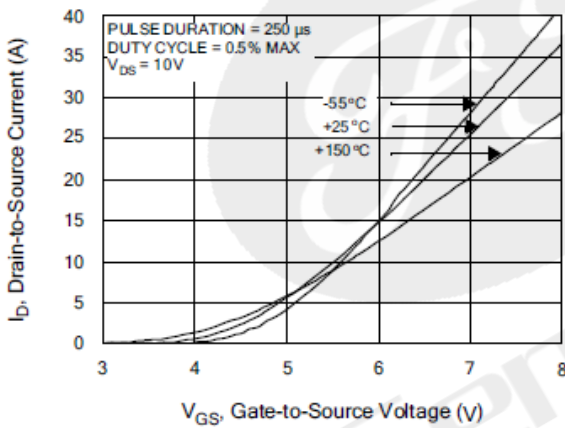


Figure 8. Unclamped Inductive Switching Capability

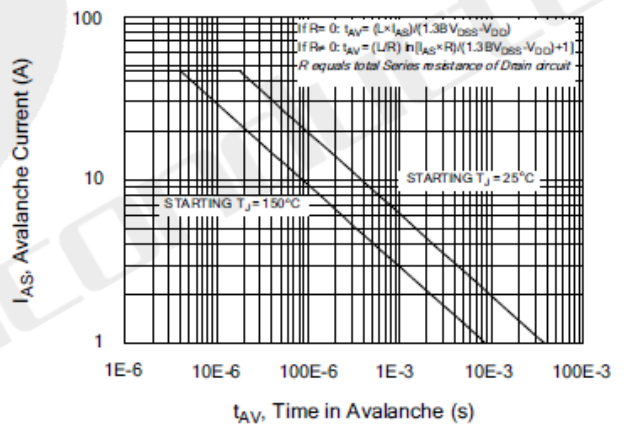


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

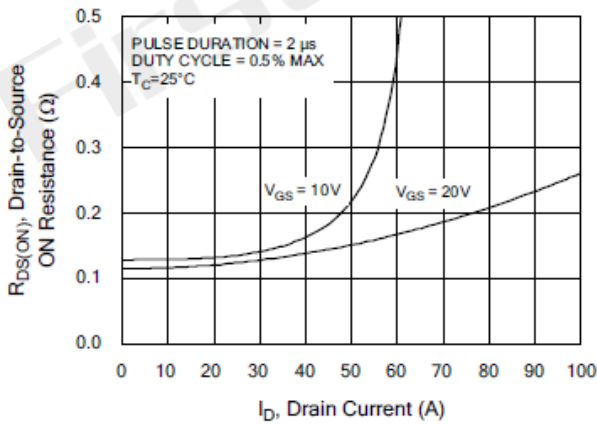


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature

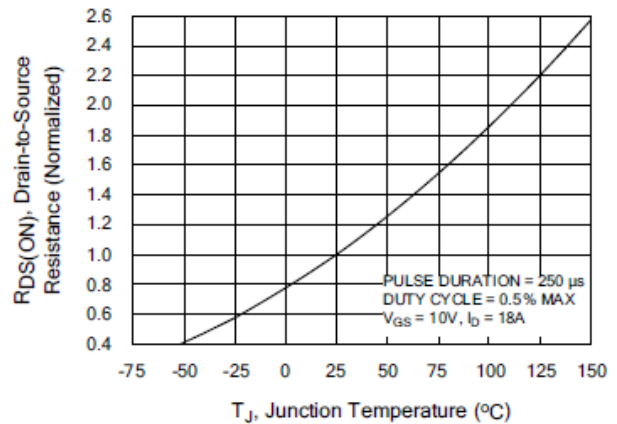




Figure 11. Typical Breakdown Voltage vs Junction Temperature

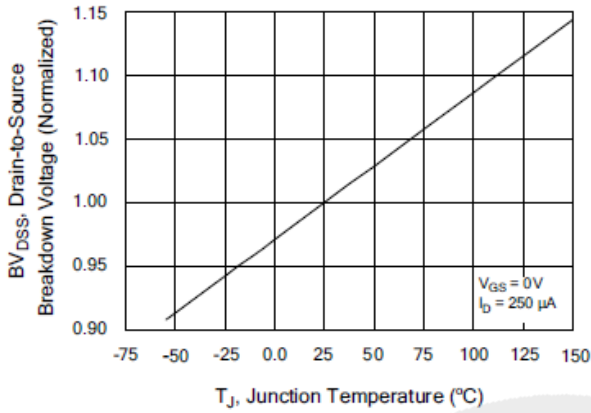


Figure 12. Typical Threshold Voltage vs Junction Temperature

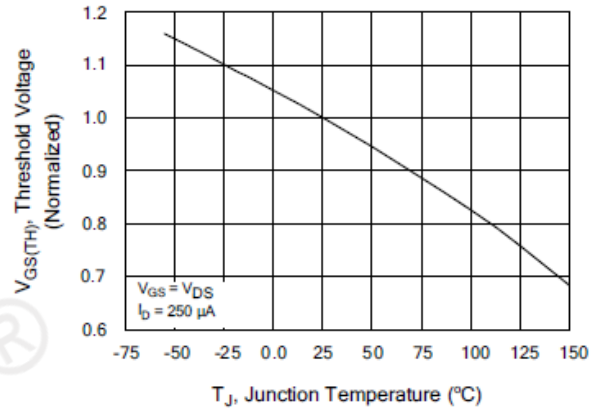


Figure 13. Maximum Forward Bias Safe Operating Area

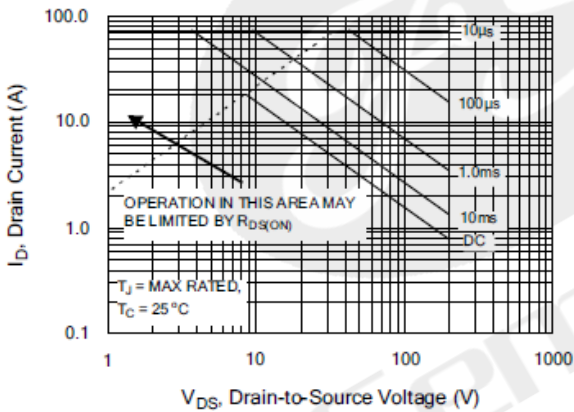


Figure 14. Typical Capacitance vs Drain-to-Source Voltage

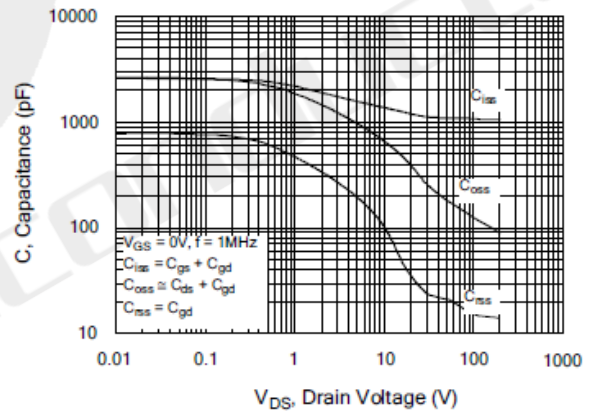


Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

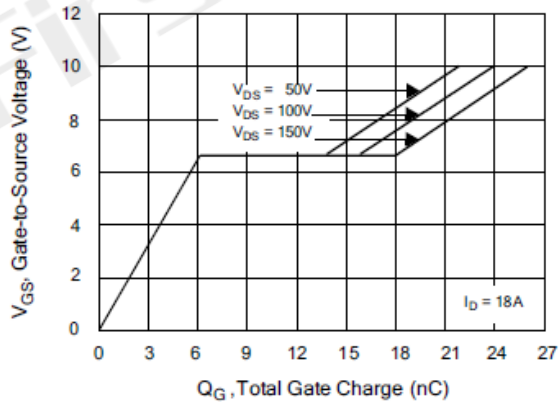
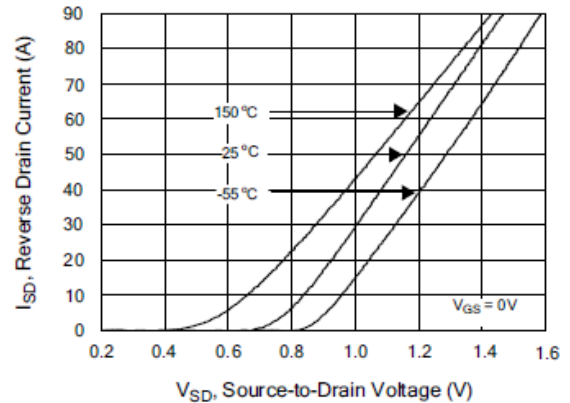
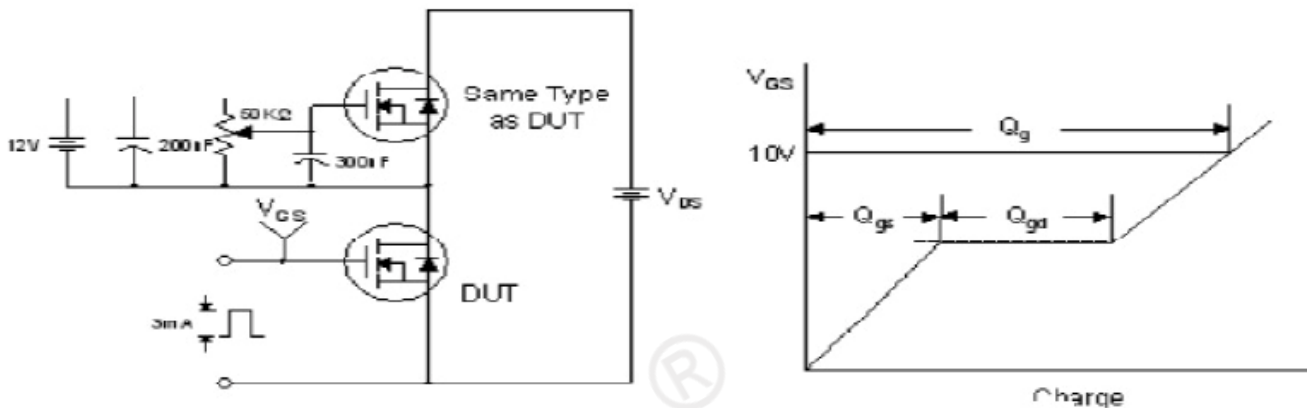


Figure 16. Typical Body Diode Transfer Characteristics



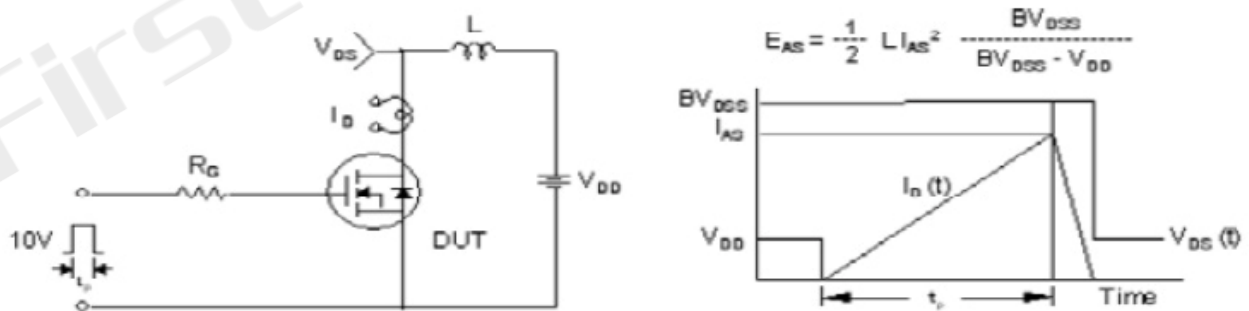
Test Circuit and Waveform



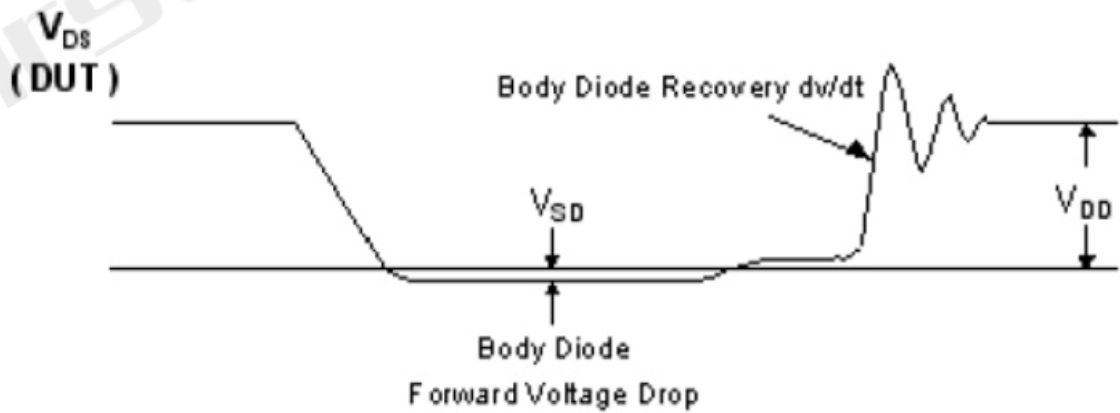
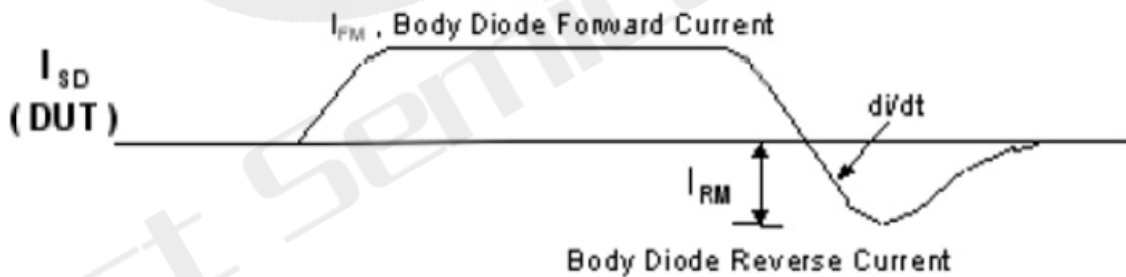
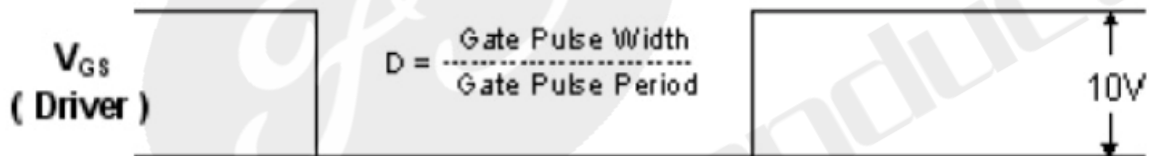
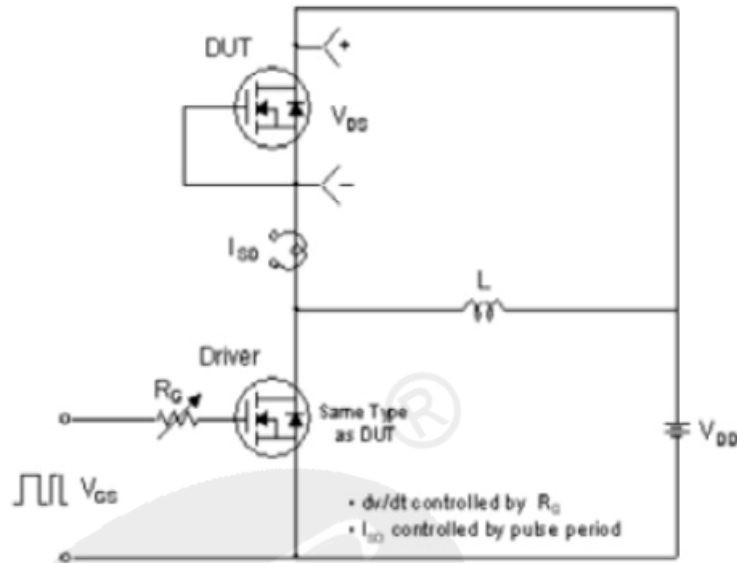
Gate Charge Test Circuit and Waveform



Resistive Switching Test Circuit and Waveform



Unclamped Inductive Switching Test Circuit and Waveform

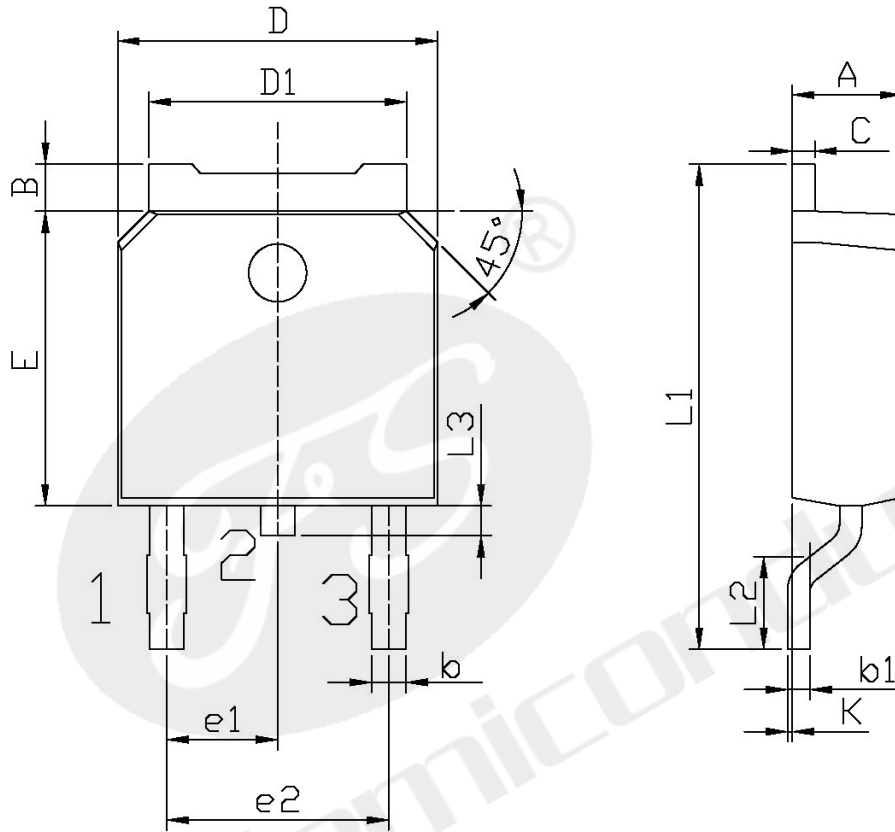


Diode Reverse Recovery Test Circuit and Waveform



Package Dimensions

TO-252



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.70	0.90	e2	4.43	4.73
b1	0.45	0.55	L1	9.85	10.35
C	0.45	0.55	L2	1.25	1.75
D	6.45	6.75	L3	0.60	0.90
D1	5.20	5.40	K	0.00	0.10



Declaration

- FIRST reserves the right to change the specifications, the same specifications of products due to different packaging line mold, the size of the appearance will be slightly different, shipped in kind, without notice! Customers should obtain the latest version information before ordering, and verify whether the relevant information is complete and up-to-date.
- Any semiconductor product under certain conditions has the possibility of failure or failure, The buyer has the responsibility to comply with safety standards and take safety measures when using FIRST products for system design and manufacturing, To avoid To avoid potential failure risks, which may cause personal injury or property damage!
- Product promotion endless, our company will wholeheartedly provide customers with better products!

ATTACHMENT

Revision History

Date	REV	Description	Page
2018.01.01	1.0	Initial release	