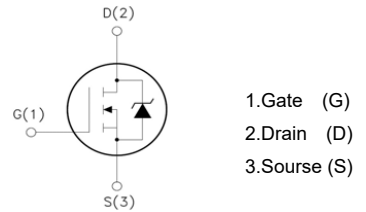
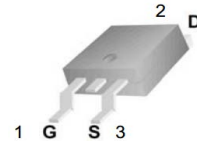




Features:

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge :Qg= 19.8nC (Typ.).
- BVDSS=100V,I<sub>D</sub>=80A
- R<sub>DS(on)</sub> : 0.035Ω (Max) @V<sub>G</sub>=10V
- 100% Avalanche Tested



Marking Diagram

- Y = Year
- A = Assembly Location
- WW = Work Week
- FIR80N10L = Specific Device Code

Absolute Maximum Ratings at T<sub>j</sub>=25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	V <sub>DS</sub>	100	V
Gate source voltage	V <sub>GS</sub>	±20	V
Continuous drain current <sup>1)</sup> , T <sub>C</sub> =25 °C	I <sub>D</sub>	80	A
Pulsed drain current <sup>2)</sup> , T <sub>C</sub> =25 °C	I <sub>D, pulse</sub>	160	A
Power dissipation <sup>3)</sup> , T <sub>C</sub> =25 °C	P <sub>D</sub>	72	W
Single pulsed avalanche energy <sup>5)</sup>	EAS	30	mJ
Operation and storage temperature	T <sub>stg</sub> , T <sub>j</sub>	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-case	R <sub>θJC</sub>	1.74	°C/W
Thermal resistance, junction-ambient <sup>4)</sup>	R <sub>θJA</sub>	62	°C/W

**Electrical Characteristics** at  $T_j=25\text{ }^\circ\text{C}$  unless otherwise specified

Parameter	Symbol	Test condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	$BV_{DSS}$	$V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$	100			V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\text{ }\mu\text{A}$	1.0	1.8	2.5	V
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=40\text{ A}$		26	35	m $\Omega$
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=4.5\text{ V}, I_D=6\text{ A}$			40	m $\Omega$
Gate-source leakage current	$I_{GSS}$	$V_{GS}=20\text{ V}$			100 -100	nA
Drain-source leakage current	$I_{DSS}$	$V_{DS}=100\text{ V}, V_{GS}=0\text{ V}$			1	$\mu\text{A}$
Input capacitance	$C_{iss}$	$V_{GS}=0\text{ V}, V_{DS}=50\text{ V}, f=1\text{ MHz}$		1190.6		pF
Output capacitance	$C_{oss}$			194.6		pF
Reverse transfer capacitance	$C_{rss}$			4.1		pF
Turn-on delay time	$t_{d(on)}$	$V_{GS}=10\text{ V}, V_{DS}=50\text{ V}, R_G=2.2\text{ }\Omega, I_D=10\text{ A}$		17.8		ns
Rise time	$t_r$			3.9		ns
Turn-off delay time	$t_{d(off)}$			33.5		ns
Fall time	$t_f$			3.2		ns
Total gate charge	$Q_g$		$I_D=8\text{ A}, V_{DS}=50\text{ V}, V_{GS}=10\text{ V}$		19.8	
Gate-source charge	$Q_{gs}$			2.4		nC
Gate-drain charge	$Q_{gd}$			5.3		nC
Gate plateau voltage	$V_{plateau}$			3.2		V
Diode forward current	$I_S$	$V_{GS}<V_{th}$			40	
Pulsed source current	$I_{SP}$				120	A
Diode forward voltage	$V_{SD}$	$I_S=40\text{ A}, V_{GS}=0\text{ V}$			1.6	V
Reverse recovery time	$t_{rr}$	$I_S=8\text{ A}, di/dt=100\text{ A}/\mu\text{s}$		50.2		ns
Reverse recovery charge	$Q_{rr}$			95.1		nC
Peak reverse recovery current	$I_{rrm}$			2.5		A

**Note**

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3)  $P_d$  is based on max. junction temperature, using junction-case thermal resistance.
- 4) The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with  $T_a=25\text{ }^\circ\text{C}$ .
- 5)  $V_{DD}=50\text{ V}, R_G=25\text{ }\Omega, L=0.3\text{ mH}$ , starting  $T_j=25\text{ }^\circ\text{C}$ .

### Typical Characteristics

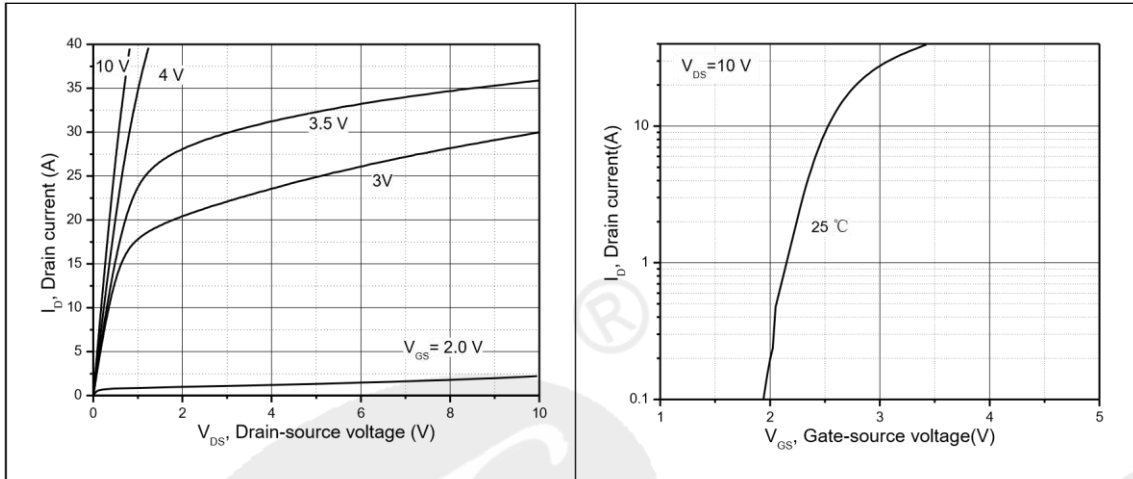


Figure 1, Typ. output characteristics

Figure 2, Typ. transfer characteristics

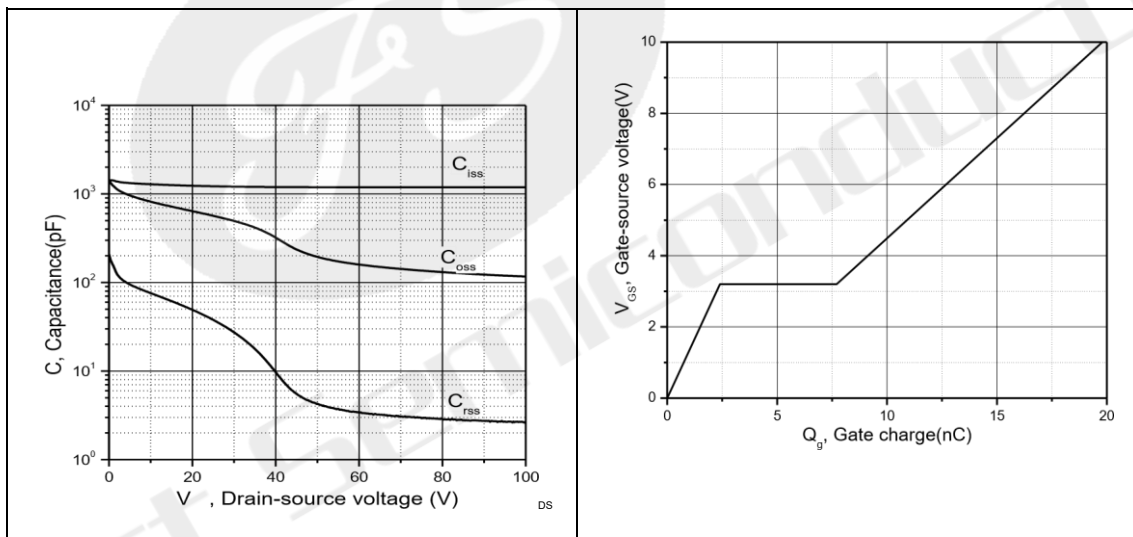


Figure 3, Typ. capacitances

Figure 4, Typ. gate charge



Typical Characteristics (Continued)

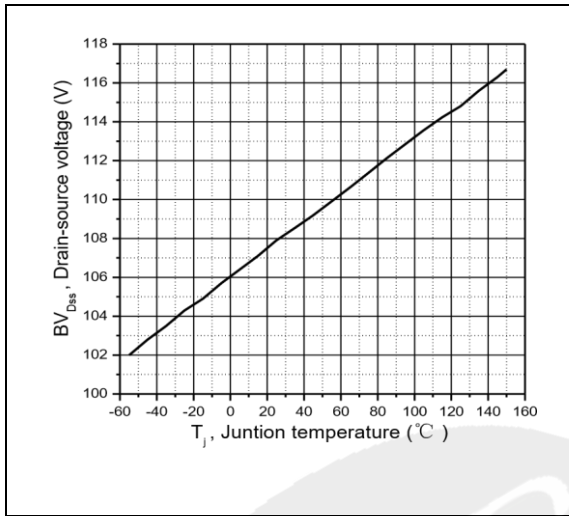


Figure 5, Drain-source breakdown voltage

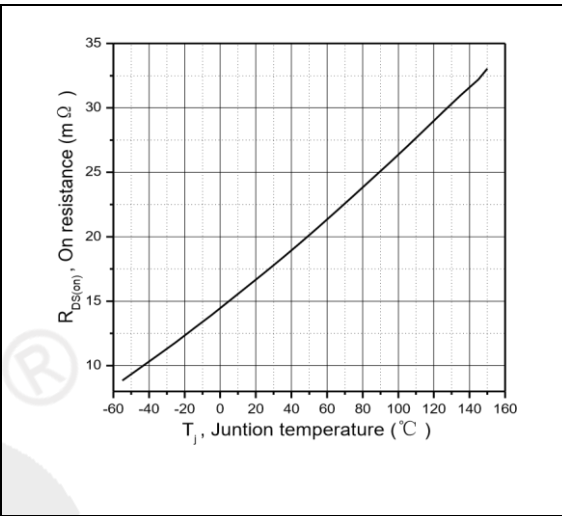


Figure 6, Drain-source on-state resistance

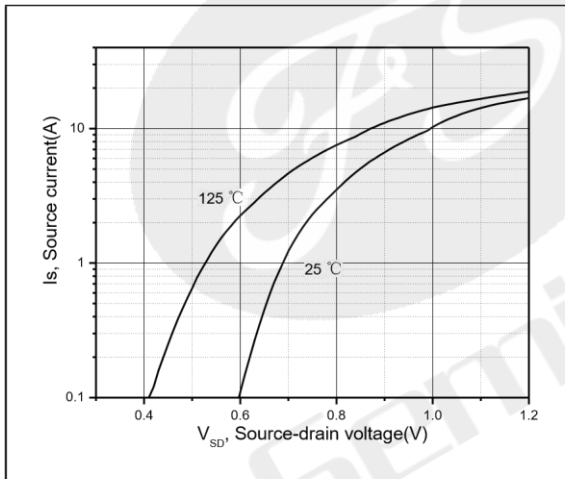


Figure 7, Forward characteristic of body diode

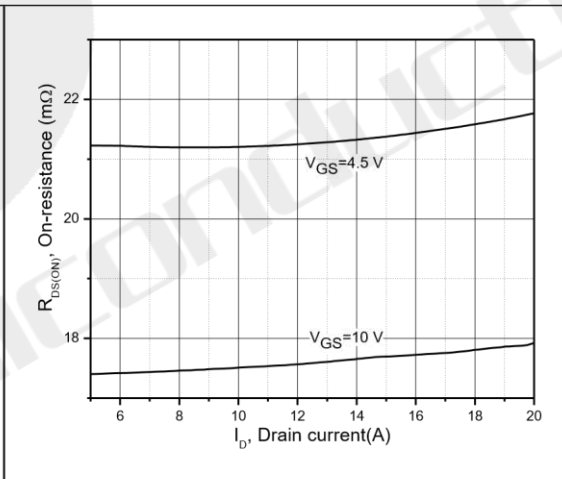


Figure 8, Drain-source on-state resistance

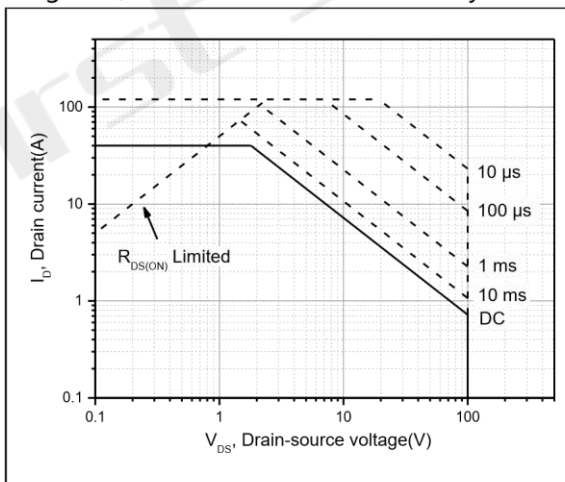
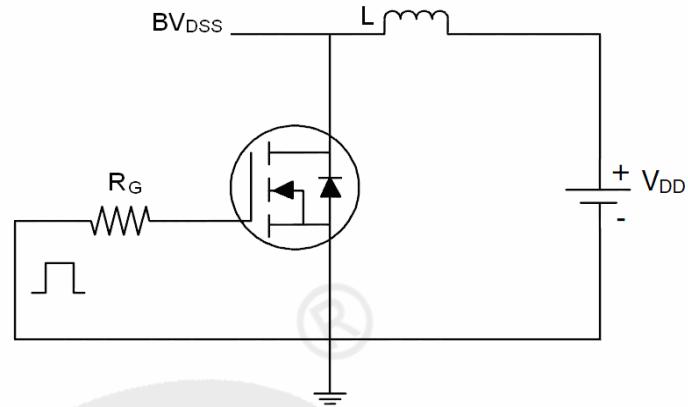


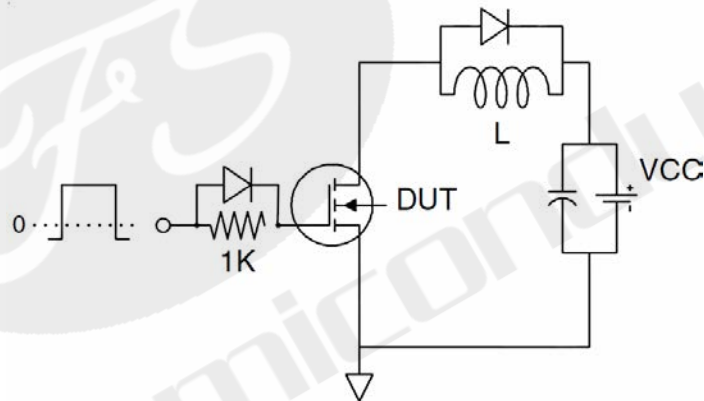
Figure 9, Safe operation area  $T_C=25\text{ }^\circ\text{C}$

**Test Circuit**

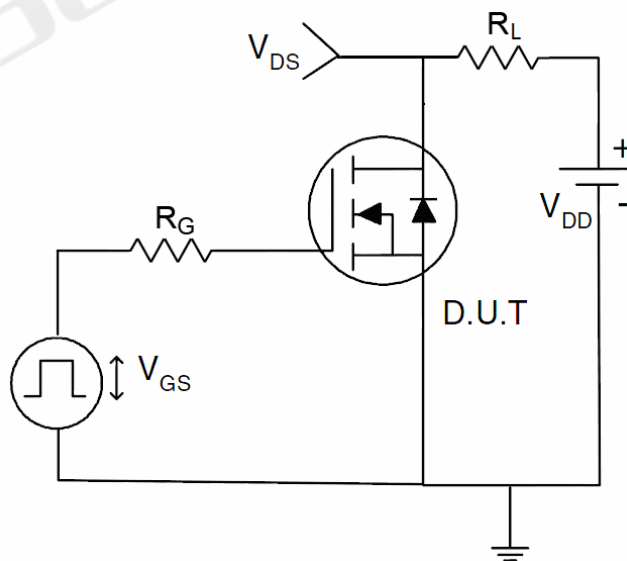
**1)  $A_S$  Test Circuit**



**2) Gate Charge Test Circuit**



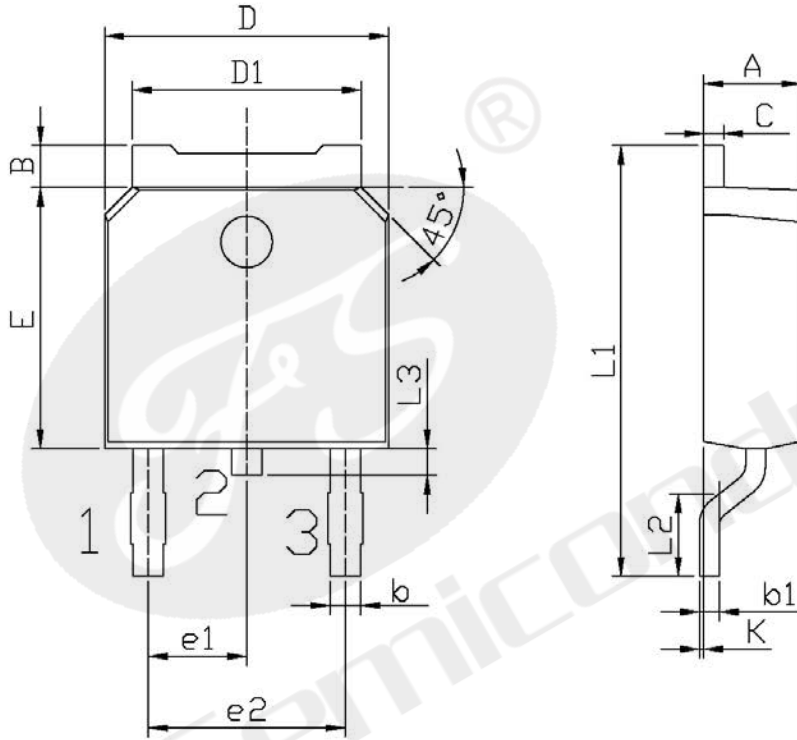
**3) Switch Time Test Circuit**



**Package Dimension**

TO-252

Unit:mm



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	