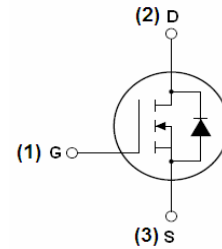
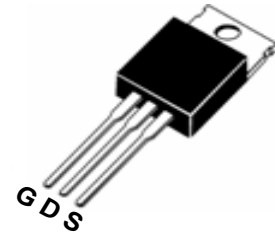




Features:

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge :Qg= 31nC (Typ.).
- BVDSS=60V, I<sub>D</sub>=50A
- R<sub>DS(on)</sub> : 21mΩ (Max) @V<sub>G</sub>=10V
- 100% Avalanche Tested



Marking Diagram



- Y = Year
- A = Assembly Location
- WW = Work Week
- FIR50N06AP = Specific Device Code

Absolute Maximum Ratings\* (T<sub>c</sub>=25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V <sub>DSS</sub>	Drain-Source Voltage	60	V
I <sub>D</sub>	Drain Current	T <sub>C</sub> =25°C	50
		T <sub>C</sub> =100°C	35.4
V <sub>GSS</sub>	Gate Threshold Voltage	±25	V
E <sub>AS</sub>	Single Pulse Avalanche Energy (note1)	490	mJ
I <sub>AR</sub>	Avalanche Current (note2)	50	A
P <sub>D</sub>	Power Dissipation (T <sub>c</sub> =25°C)	120	W
T <sub>j</sub>	Junction Temperature(MAX)	150	°C
T <sub>stg</sub>	Storage Temperature	-55~+150	
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	300	

Thermal Characteristics

Symbol	Parameter	Typ.	MAX.	Unit
R <sub>θJC</sub>	Thermal Resistance, Junction to Case	-	1.24	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction to Ambient	-	62.5	
R <sub>θCS</sub>	Thermal Resistance, Case to Sink	-	0.5	



<b>Electrical Characteristics</b> Tc=25°C unless other wise noted						
Symbol	Parameter	Test Condition	Min.	Typ.	Max	Units
<b>Off Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	ID=250 μ A, VGS=0	60	--	--	V
ΔBV <sub>DSS</sub> / ΔT <sub>J</sub>	Breakdown Voltage Temperature Coefficient	ID=250 μ A, Reference to 25°C	--	0.06	--	V/°C
IDSS	Zero Gate Voltage Drain Current	Vds=60V, Vgs=0V	--	--	1	μ A
		Vds=48V, Tc=125 °C	--	--	10	μ A
IGSSF	Gate-body leakage Current, Forward	Vgs=+25V, Vds=0V	--	--	100	nA
IGSSR	Gate-body leakage Current, Reverse	Vgs=-25V, Vds=0V	--	--	-100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	Id=250uA, Vds=Vgs	2	--	4	V
R <sub>DS(on)</sub>	Static Drain-Source On-Resistance	Id=25A, Vgs=10V	--	--	0.022	Ω
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=25V, VGS=0, f=1.0MHz	--	1180	1540	pF
Coss	Output Capacitance		--	440	580	pF
Crss	Reverse Transfer Capacitance		--	65	90	pF
<b>Switching Characteristics</b>						
Td(on)	Turn-On Delay Time	VDD=250V, ID=25A RG=25 Ω (Note 3,4)	--	15	40	nS
Tr	Turn-On Rise Time		--	105	220	nS
Td(off)	Turn-Off Delay Time		--	60	130	nS
Tf	Turn-Off Fall Time		--	65	140	nS
Qg	Total Gate Charge	VDS=400, VGS=10V, ID=25A (Note 3,4)	--	31	41	nC
Qgs	Gate-Source Charge		--	8	--	nC
Qgd	Gate-Drain Charge		--	13	--	nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximun Continuous Drain-Source Diode Forward Current		--	--	50	A
I <sub>SM</sub>	Maximun Plused Drain-Source Diode Forward Current		--	--	200	A
V <sub>SD</sub>	Drain-Source Diode Forward Voltage	Id=25A	--	--	1.5	V
trr	Reverse Recovery Time	I <sub>S</sub> =25A, V <sub>GS</sub> =0V	--	52	--	nS
Qrr	Reverse Recovery Charge	di <sub>F</sub> /dt=100A/ μ s (Note3)	--	75	--	μ C
*Notes	1, L=9.3mH, IAS=50A, VDD=50V, RG=25Ω, Starting T <sub>J</sub> =25°C 2, Repetitive Rating : Pulse width limited by maximum junction temperature 3, Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2% 4, Essentially Independent of Operating Temperature					



### Typical Characteristics

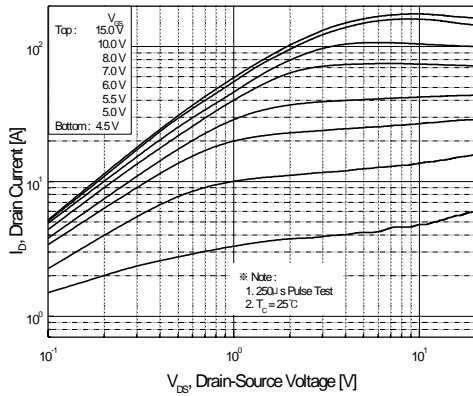


Figure 1. On-Region Characteristics

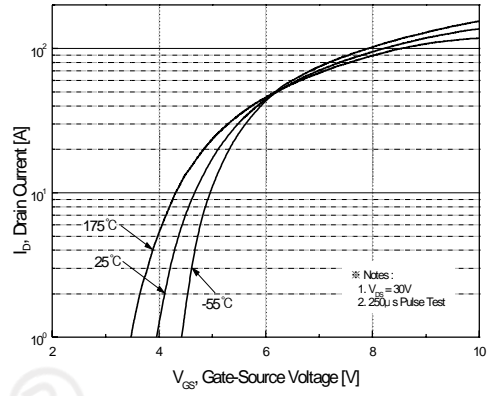


Figure 2. Transfer Characteristics

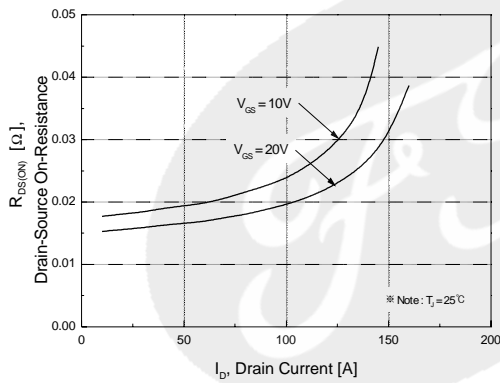


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

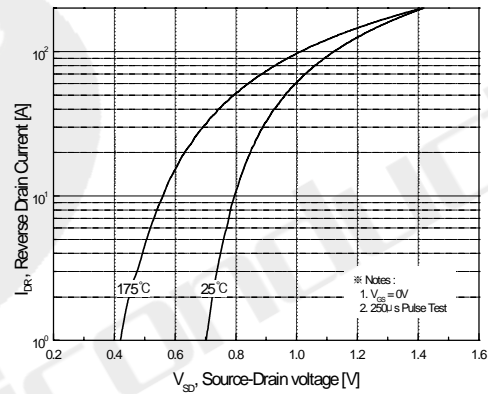


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

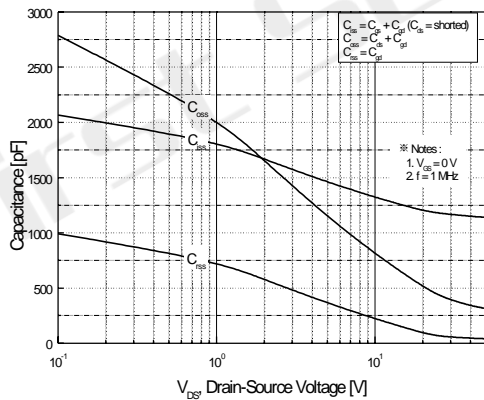


Figure 5. Capacitance Characteristics

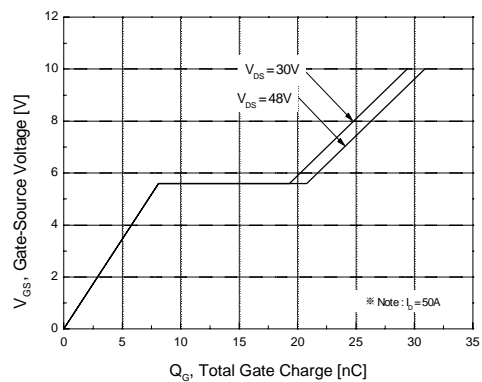


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

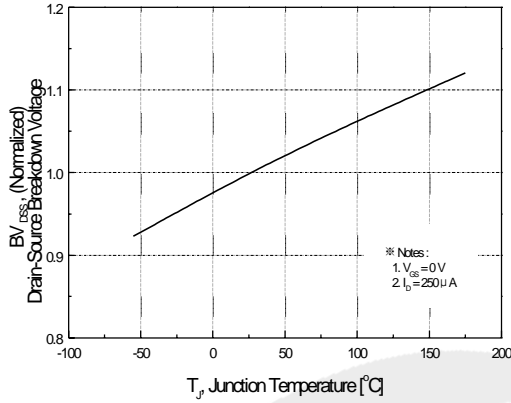


Figure 7. Breakdown Voltage Variation vs. Temperature

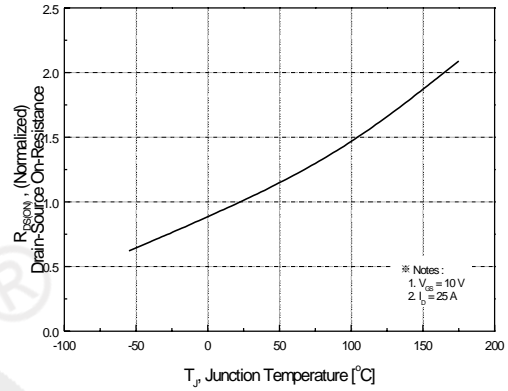


Figure 8. On-Resistance Variation vs. Temperature

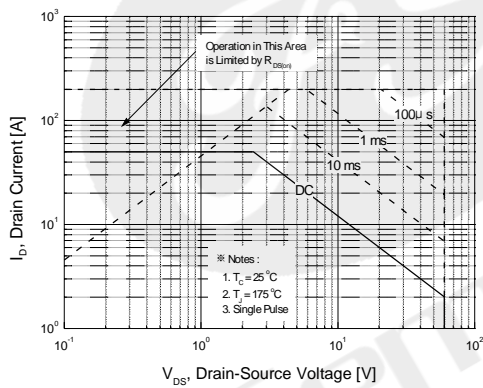


Figure 9. Maximum Safe Operating Area

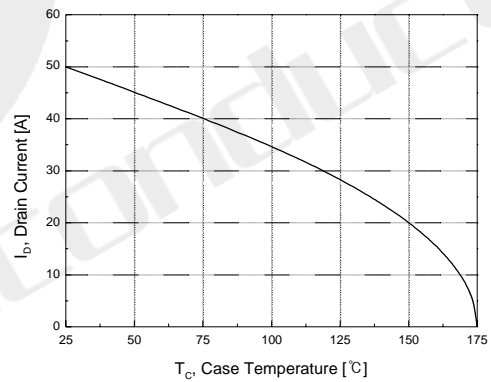


Figure 10. Maximum Drain Current vs. Case Temperature

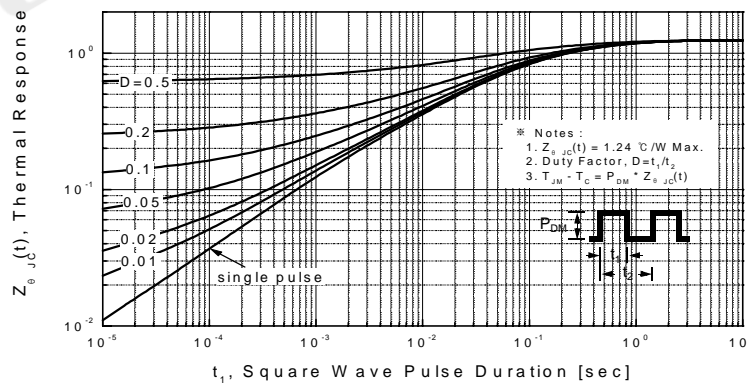
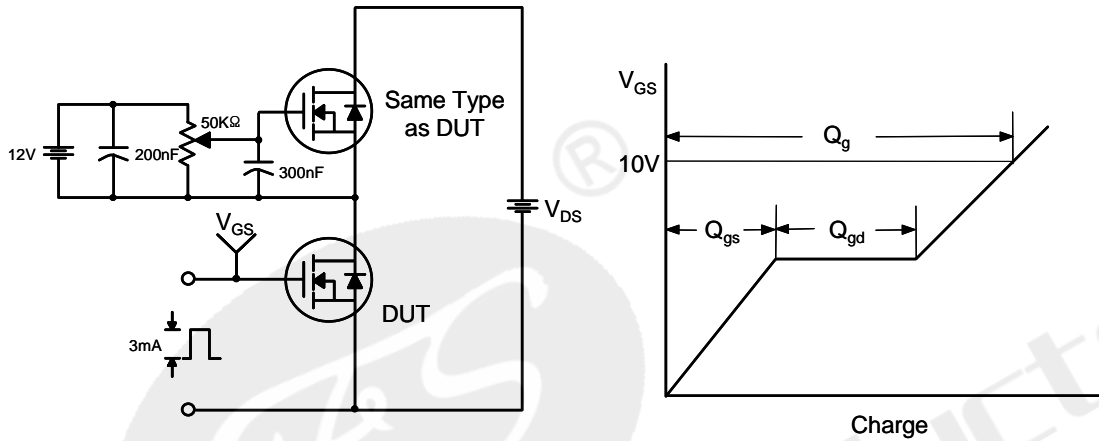


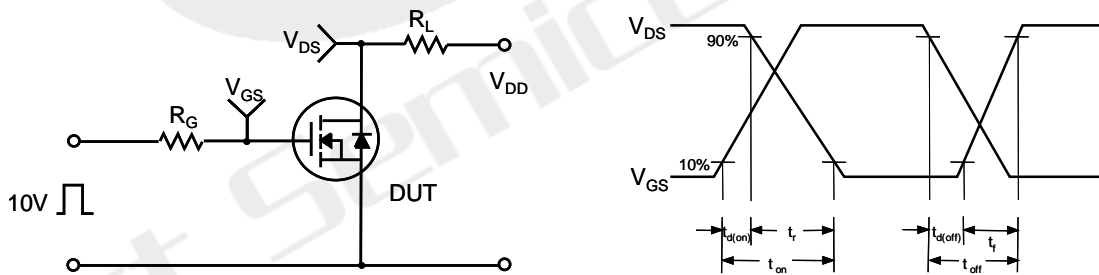
Figure 11. Transient Thermal Response Curve

Typical Characteristics (Continued)

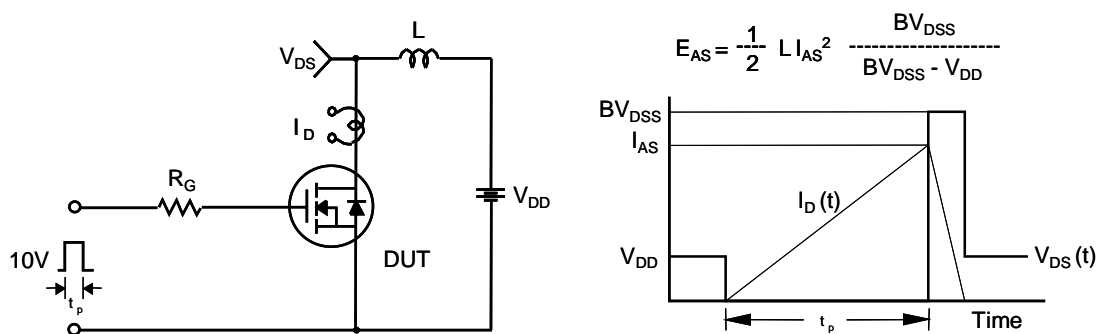
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

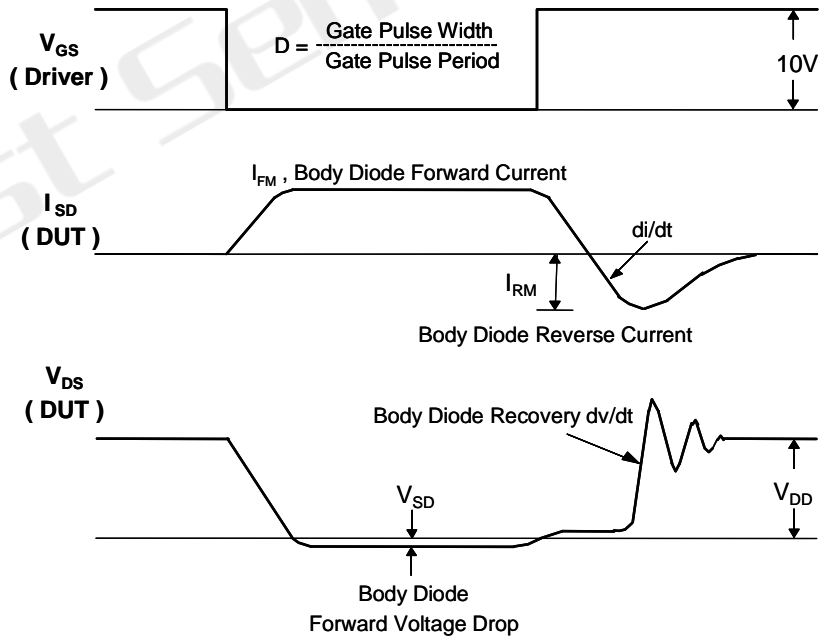
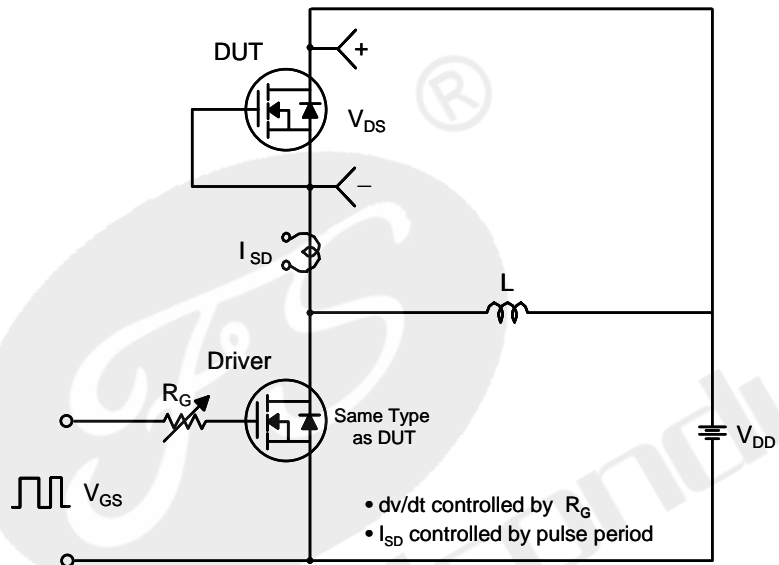


Unclamped Inductive Switching Test Circuit & Waveforms



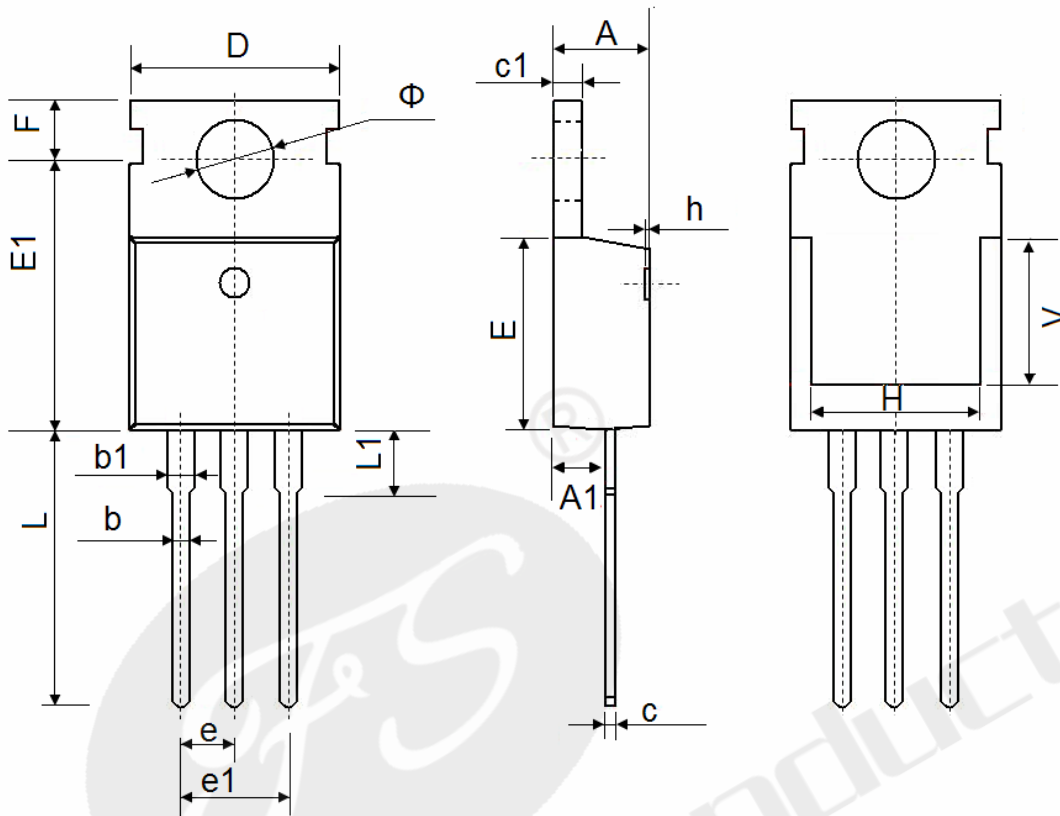
Typical Characteristics (Continued)

Peak Diode Recovery dv/dt Test Circuit & Waveforms





TO-220AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	7.500 REF.		0.295 REF.	
Φ	3.400	3.800	0.134	0.150



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	