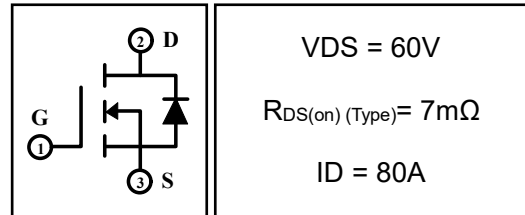


## 80A 60V N-channel Enhancement Mode Power MOSFET

### 1 Description

These N-channel enhancement mode power MOSFETS Used advanced trench technology design, provided excellent  $R_{DS(on)}$  and low gate charge. Which accords with the RoHS standard.

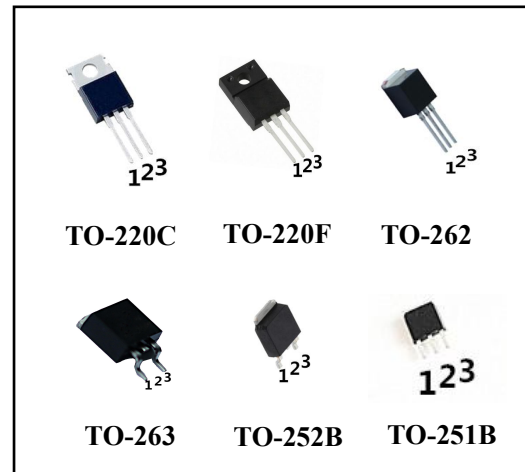


### 2 Features

- Fast Switching
- High avalanche Current
- Low On Resistance
- Low Gate Charge
- Low Reverse Transfer Capacitances
- 100% Single Pulse Avalanche Energy Test
- 100%  $\Delta V_{DS}$  Test

### 3 Applications

- Power switching applications
- DC-DC converters
- UPS power supply
- LED Boost



### 4 Electrical Characteristics

#### 4.1 Absolute Maximum Ratings ( $T_c=25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Value		Units	
		80N06/I80N06/E80N06 /B80N06/D80N06	F80N06		
Drain-Source Voltage	$V_{DSS}$	60		V	
Gate-Source Voltage	$V_{GS}$	$\pm 25$		V	
Drain Current(continuous)	$I_D$	80		A	
Drain Current(continuous)( $T=100^\circ C$ )	$I_D(100^\circ C)$	56		A	
Drain Current(Pulsed) <sup>(1)</sup>	$I_{DM}$	280		A	
Avalanche Current <sup>(4)</sup>	$I_{AS}$	20		A	
Single Pulse Avalanche Energy <sup>(4)</sup>	$E_{AS}$	100		mJ	
Maximum Power Dissipation	$T_a=25^\circ C$	$P_D$	2	2	W
	$T_c=25^\circ C$	$P_D$	160	48	W
Isolation Voltage	$V_{ISO}$	/	2500	V	
Operating Junction Temperature Range	$T_J$	-55~175		$^\circ C$	
Storage Temperature Range	$T_{stg}$	-55~175		$^\circ C$	
High Temperature(tin solder)	$T_L$	300		$^\circ C$	

#### 4.2 Thermal Characteristics

Parameter	Symbol	Value		Unit
		80N06/I80N06/E80N06 /B80N06/D80N06	F80N06	
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.938	3.125	$^\circ C/W$
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	75	75	$^\circ C/W$

**4.3 Electrical Characteristics** (Tc=25°C, unless otherwise noted)

Parameter	Symbol	Test Condition	Value			Units
			Min	Typ	Max	
<b>Off Characteristics</b>						
Drain-source Breakdown Voltage	V <sub>DSS</sub>	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	60	72	--	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V, T <sub>C</sub> =25°C	--	--	1	μA
		V <sub>DS</sub> =48V, V <sub>GS</sub> =0V, T <sub>C</sub> =125°C	--	--	100	μA
Gate-to-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±25V, V <sub>DS</sub> =0V	--	--	±100	nA
<b>On Characteristics</b>						
Gate threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2	3	4	V
Drain-Source on-state Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =40A	--	7	8.4	mΩ
Gate Resisitance	R <sub>G</sub>	V <sub>DD</sub> =0V, V <sub>GS</sub> =0V, f=1MHz	--	2.6	--	Ω
<b>Dynamic Characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =30V, f=1MHz	--	5010	--	pF
Output Capacitance	C <sub>oss</sub>		--	335	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	305	--	
<b>Switching Characteristics</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	I <sub>D</sub> =40A, V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, R <sub>GEN</sub> =3Ω	--	28	--	nS
Turn-on Rise Time	t <sub>r</sub>		--	64	--	
Turn-off Delay Time	t <sub>d(off)</sub>		--	66	--	
Turn-off Fall Time	t <sub>f</sub>		--	28	--	
Total Gate Charge	Q <sub>g</sub>	I <sub>D</sub> =40A, V <sub>DS</sub> =50V, V <sub>GS</sub> =10V	--	77	--	nC
Gate-to-Source Charge	Q <sub>gs</sub>		--	18	--	
Gate-to-Drain("Miller") Charge	Q <sub>gd</sub>		--	31	--	
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>(3)</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =80A	--	--	1.3	V
Diode Forward Current	I <sub>S</sub>		--	--	80	A
Reverse Recovery Time <sup>(3)</sup>	t <sub>rr</sub>	T <sub>J</sub> =25°C, I <sub>F</sub> =40A, dI <sub>F</sub> /dt=100A/μS, V <sub>GS</sub> =0V	--	42	--	nS
Reverse Recovery Charge <sup>(3)</sup>	Q <sub>rr</sub>		--	55	--	nC

**Notes:**

- 1: Repetitive rating, pulse width limited by maximum junction temperature.
- 2: Surface mounted on FR4 Board, t<sub>l</sub>≤10sec.
- 3: Pulse width ≤ 300μs, duty cycle ≤ 2%.
- 4: L=0.5mH, I<sub>D</sub>=20A, V<sub>DD</sub>=50V, V<sub>GS</sub>=10V, Start T<sub>J</sub>=25°C.

## 5 Typical characteristics diagrams

Figure 1. Typ. Output Characteristics

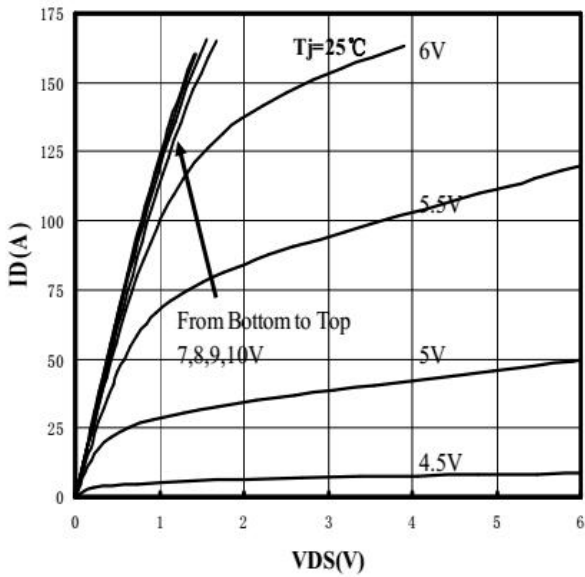


Figure 2. Typ. Output Characteristics

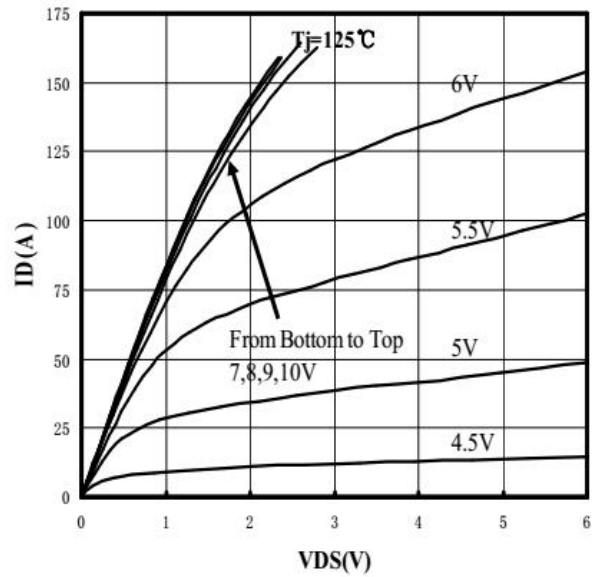


Figure 3. Transfer Characteristics

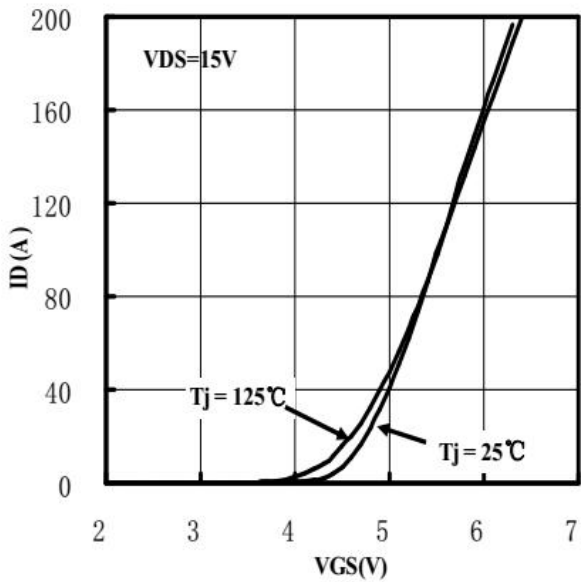
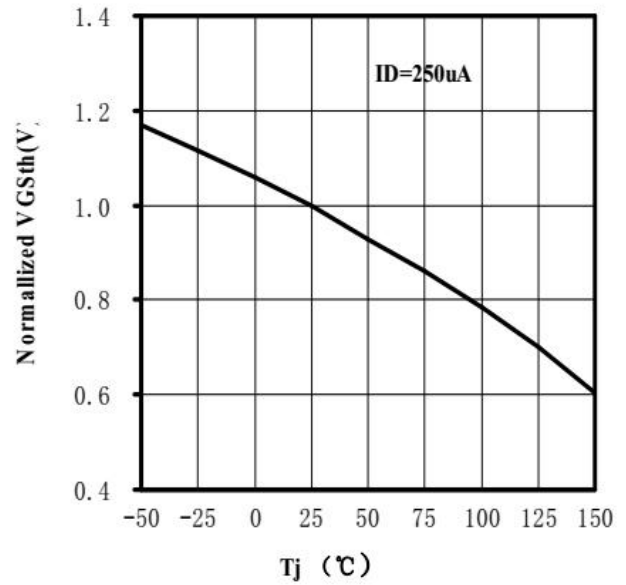


Figure 4. Gate Threshold Voltage Characteristics



## 5 Typical characteristics diagrams(continues)

Figure 5. Rdson vs. Drain Current Characteristics

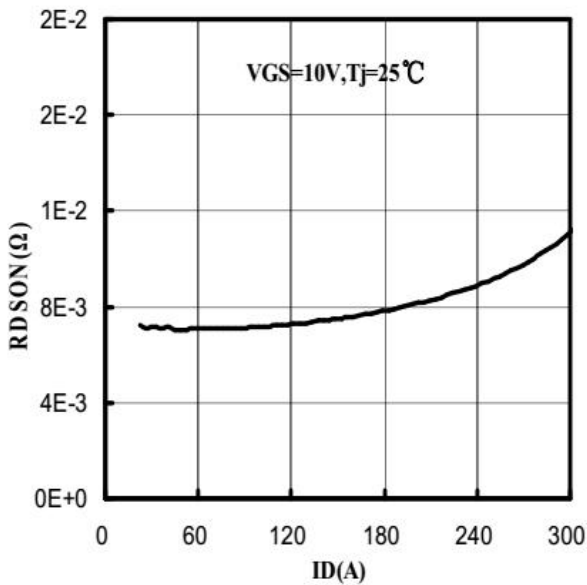


Figure 6. Rdson vs. Junction Tem Characteristics

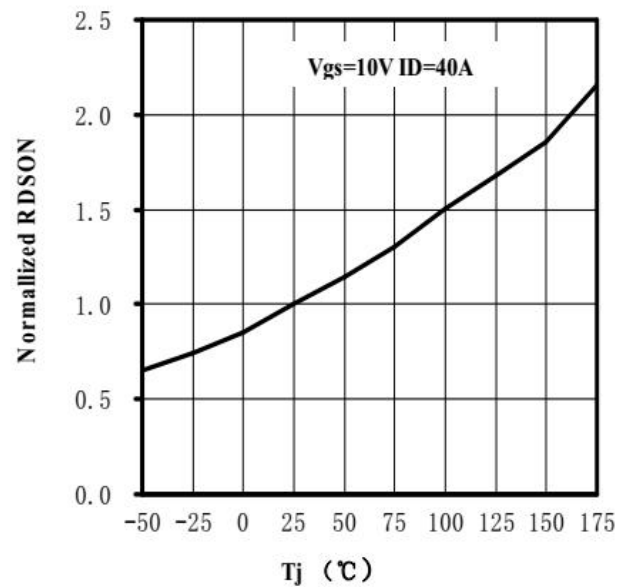


Figure 7. Rdson vs. VGS Characteristics

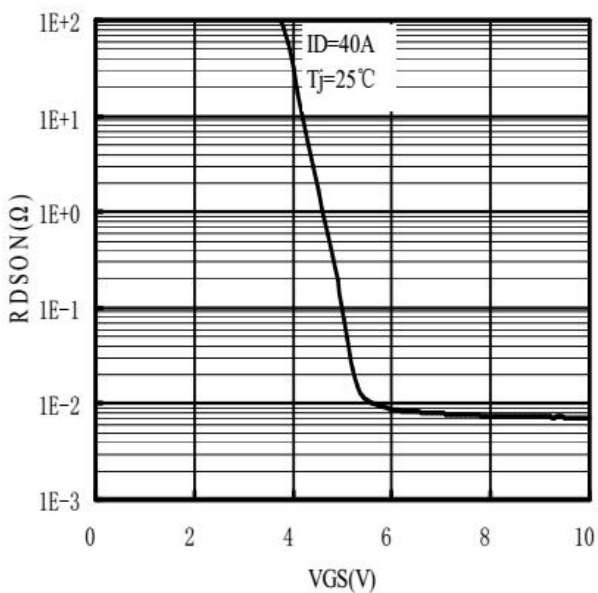
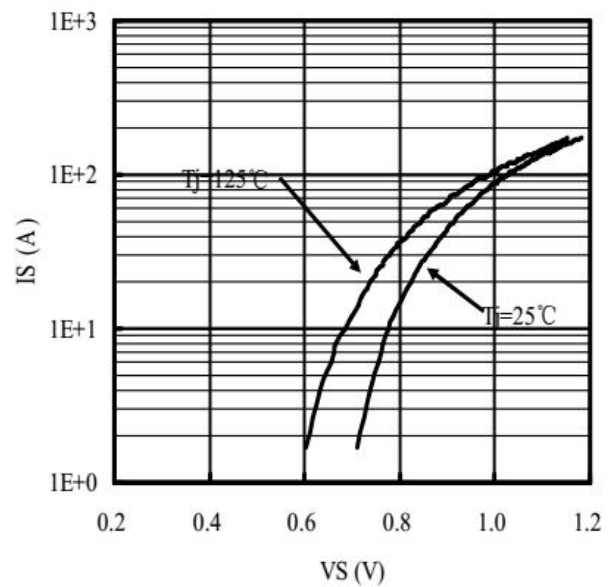
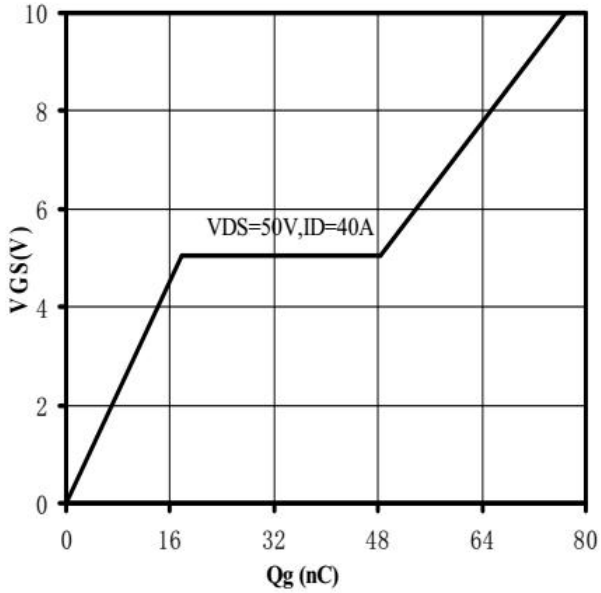


Figure 8. IS vs. VSD Characteristics

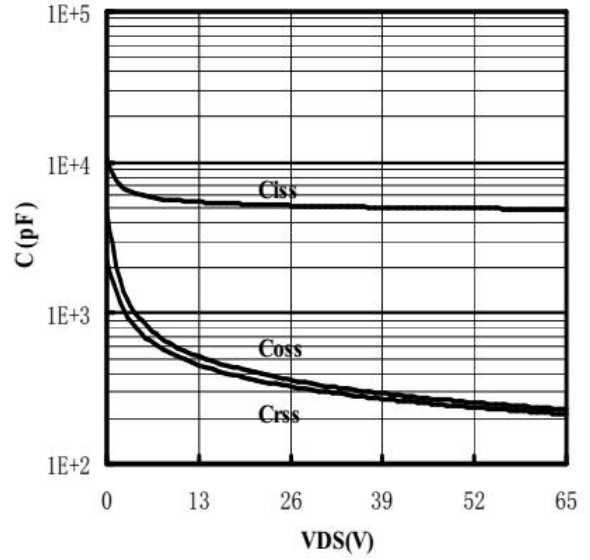


**5 Typical characteristics diagrams(continues)**

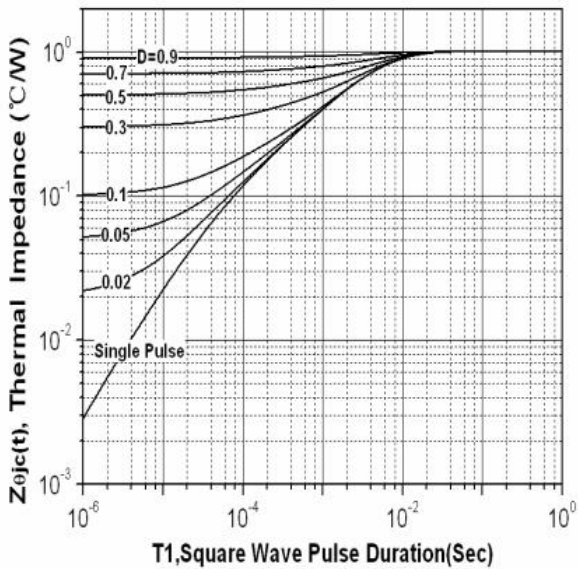
**Figure 9. Gate Charge Characteristics**



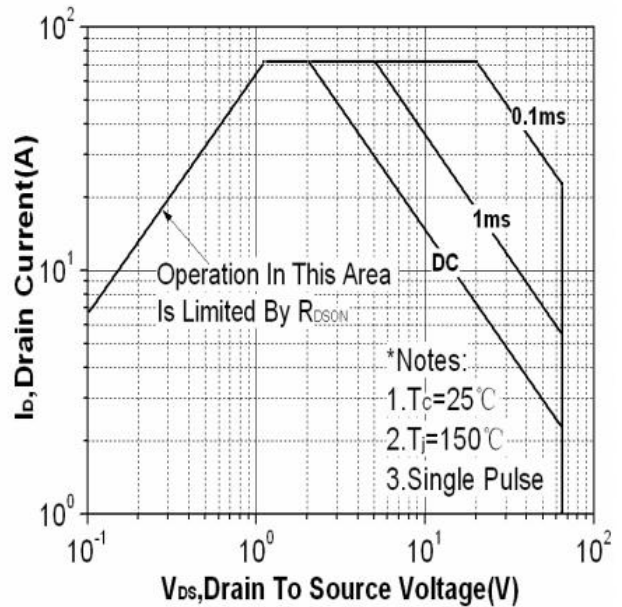
**Figure 10. Capacitance Characteristics**



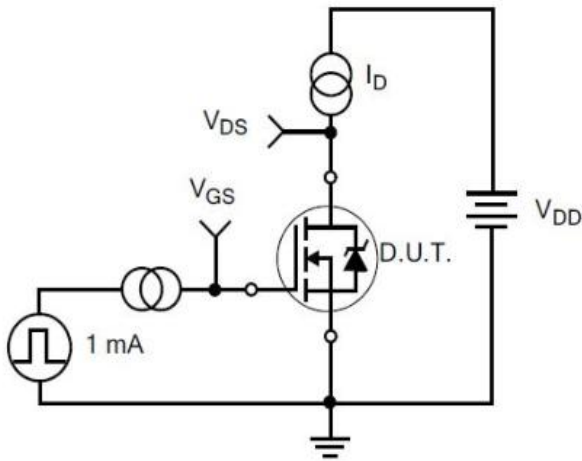
**Figure 11. Thermal Resistance Characteristics**



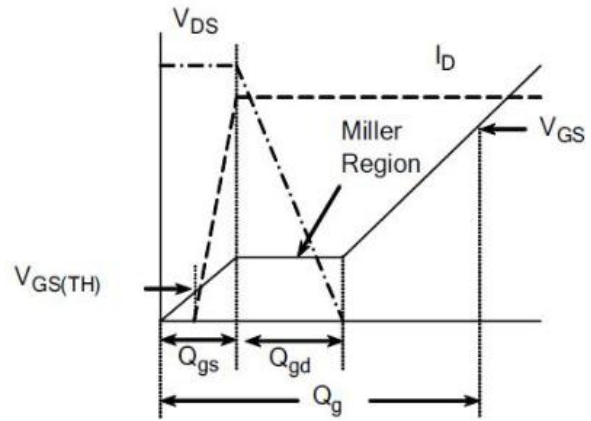
**Figure 12. SOA**



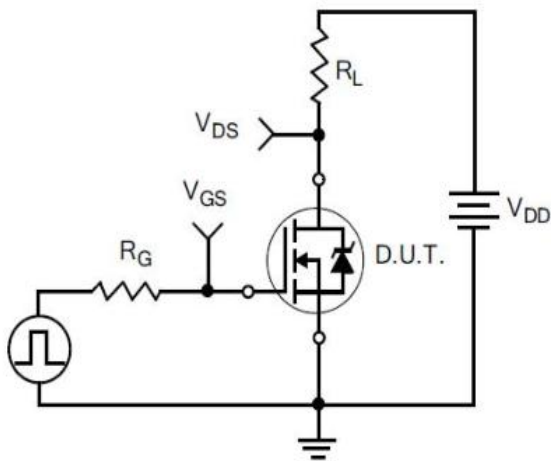
**6 Typical Test Circuit and Waveform**



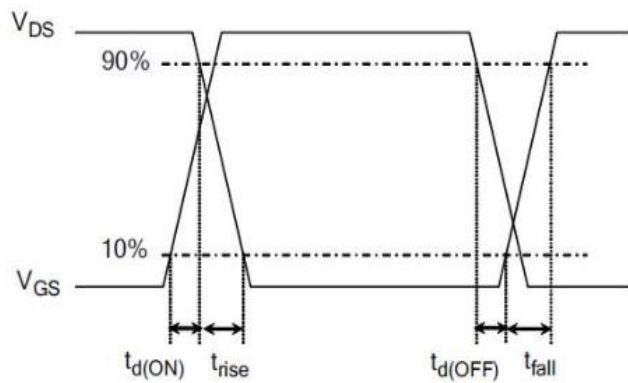
1) Gate Charge Test Circuit



2) . Gate Charge Waveform



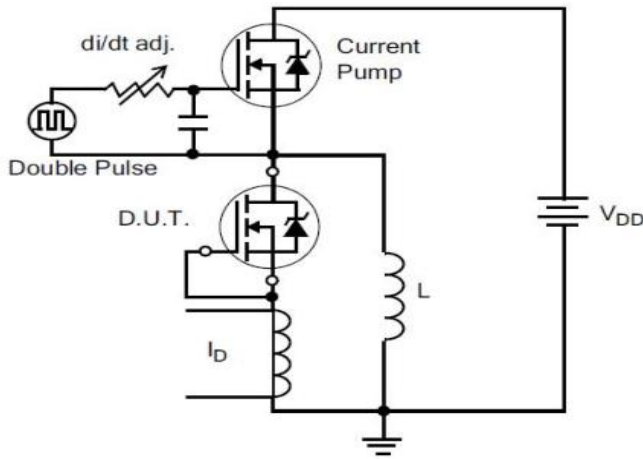
3) Resistive Switching Test Circuit



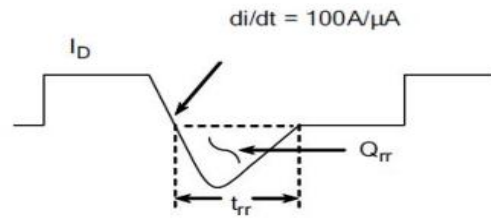
4) Resistive Switching Waveforms



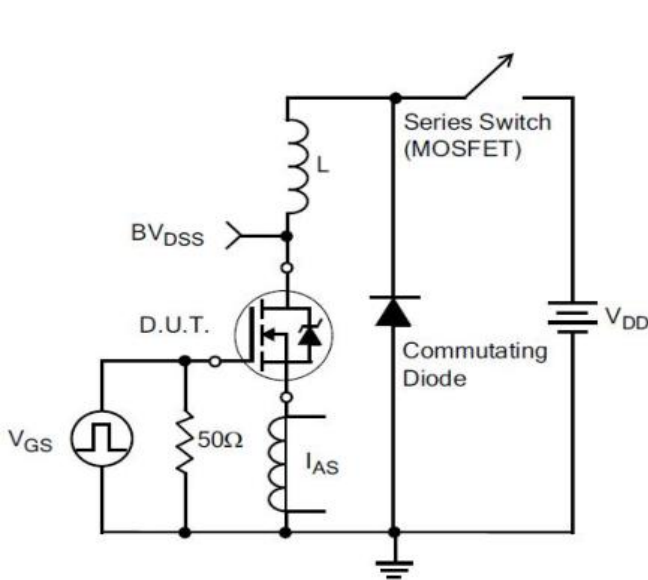
**6 Typical Test Circuit and Waveform(continues)**



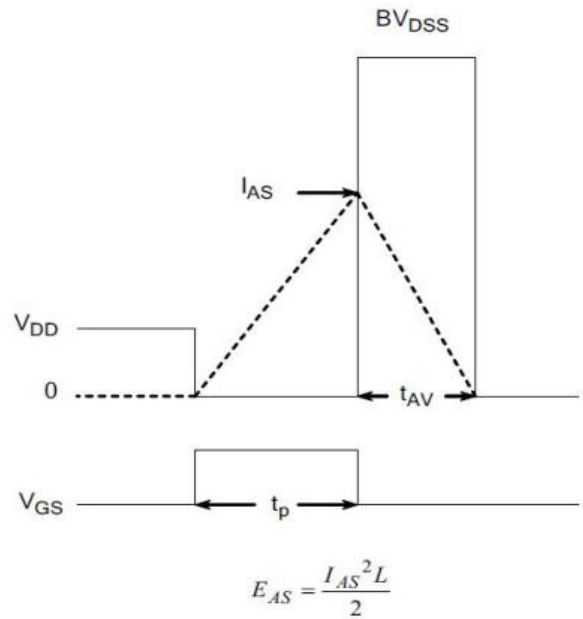
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



7) . Unclamped Inductive Switching Test Circuit



8) Unclamped Inductive Switching Waveforms

## 7 Product Names Rules

**F X X N E X X**

Packaging Code  
220F: F 220: Nothing  
251: B 252: D  
262: I 263: E

Rated Voltage Code  
With 2 Digital, For Example:  
60 on behalf of 600V  
06 on behalf of 60V

Rated Current Code  
With 1-2 Digital  
For Example:  
4 on behalf of 4A  
10 on behalf of 10A  
08 on behalf of 0.8A

Special Function Code  
E on behalf of build-in ESD  
Nothing on behalf of not ESD

Channel Polarity Code  
N on behalf of N channel  
P on behalf of P channel

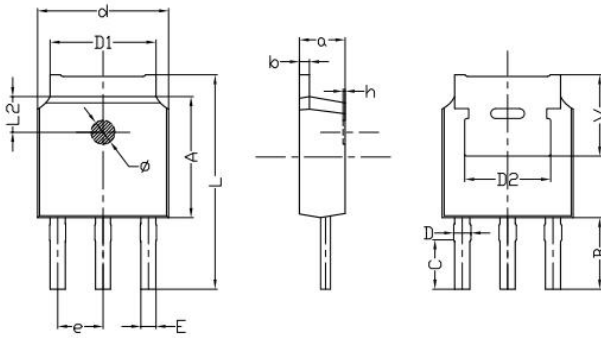
## 8 Product Specifications and Packaging Models

Product Model	Package Type	Mark Name	RoHS	Package	Quantity
80N06	TO-220C	80N06	Pb-free	Tube	1000/box
F80N06	TO-220F	F80N06	Pb-free	Tube	1000/box
I80N06	TO-262	I80N06	Pb-free	Tube	1000/box
E80N06	TO-263	E80N06	Pb-free	Tape & Reel	800/box
B80N06	TO-251	B80N06	Pb-free	Tube	3000/box
D80N06	TO-252	D80N06	Pb-free	Tape & Reel	2500/box



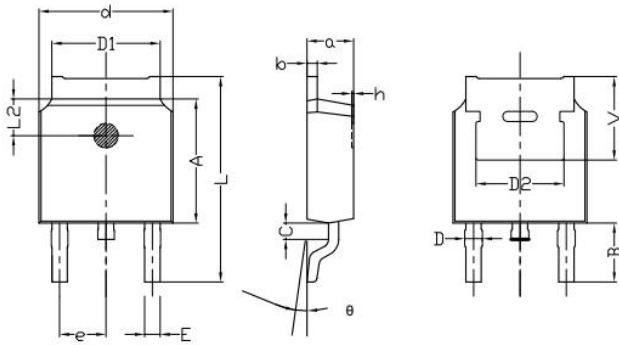
## 9 Dimensions

TO-251B PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
a	2.20	2.40	0.087	0.0946
b	0.46	0.58	0.018	0.023
C	2.45	2.65	0.097	0.104
D	0.80	0.90	0.032	0.035
d	6.30	6.70	0.248	0.264
D1	5.00	5.50	0.197	0.217
D2	TYP 4.83		TYP 0.190	
A	5.80	6.20	0.228	0.244
e	2.19	2.39	0.086	0.094
L	10.40	11.00	0.4098	0.4334
B	3.50	3.70	0.1379	0.1458
L2	1.5	1.8	0.059	0.071
Φ	1.10	1.30	0.0433	0.0512
h	0.00	0.30	0.000	0.012
V	5.25	5.85	0.207	0.230
E	0.60	0.80	0.0236	0.0315

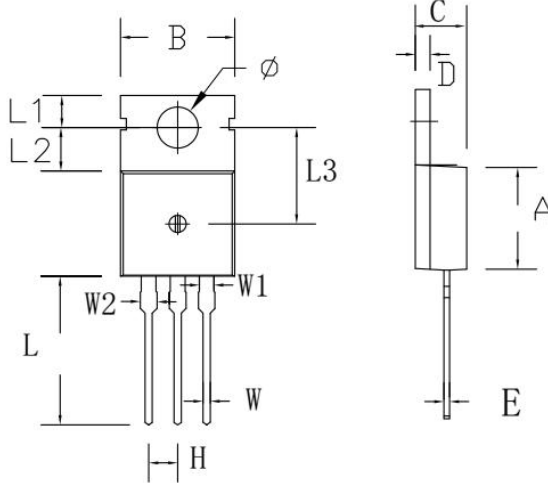
TO-252B PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
a	2.20	2.40	0.087	0.095
b	0.46	0.58	0.018	0.023
c	0.70	0.90	0.028	0.035
D	0.80	1.00	0.032	0.039
d	6.30	6.70	0.248	0.264
D1	5.00	5.50	0.197	0.217
D2	TYP 4.83		TYP 0.190	
A	5.80	6.20	0.228	0.244
e	2.19	2.39	0.086	0.094
L	9.40	10.40	0.370	0.409
B	2.6	3.2	0.102	0.126
L2	1.5	1.8	0.059	0.071
θ	0	8	0	8
h	0	0.3	0	0.012
V	5.25	5.85	0.207	0.230
E	0.6	0.8	0.024	0.032

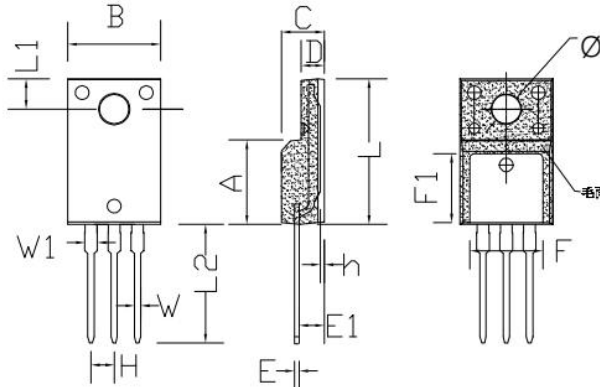
9 Dimensions(continues)

TO-220C PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	9.70	10.30	0.382	0.406
C	4.25	4.75	0.167	0.187
D	1.20	1.45	0.047	0.057
E	0.40	0.60	0.016	0.024
H	2.54 TYP		0.100 TYP	
W	0.60	0.95	0.024	0.037
W1	1.05	1.45	0.041	0.057
W2	1.20	1.60	0.047	0.063
L	12.60	13.40	0.496	0.528
L1	2.45	2.95	0.096	0.116
L2	3.45	3.95	0.136	0.156
L3	8.15	8.65	0.321	0.341
Φ	3.50	3.90	0.138	0.154

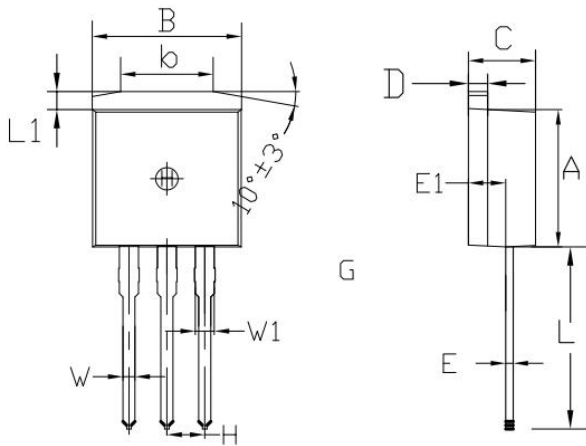
TO-220F PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	10.00	10.50	0.394	0.413
C	4.30	4.90	0.169	0.193
D	2.30	2.70	0.091	0.106
L	15.55	16.15	0.612	0.636
h	0.40	0.60	0.016	0.024
L1	3.15	3.55	0.124	0.140
L2	12.65	13.35	0.498	0.526
W	0.70	0.90	0.028	0.035
W1	1.15	1.55	0.045	0.061
H	2.54 TYP		0.100 TYP	
E	0.48	0.53	0.019	0.021
Φ	2.90	3.40	0.114	0.134
E1	2.40	2.90	0.094	0.114
F	7.75	8.25	0.305	0.325
F1	7.35	7.85	0.289	0.309

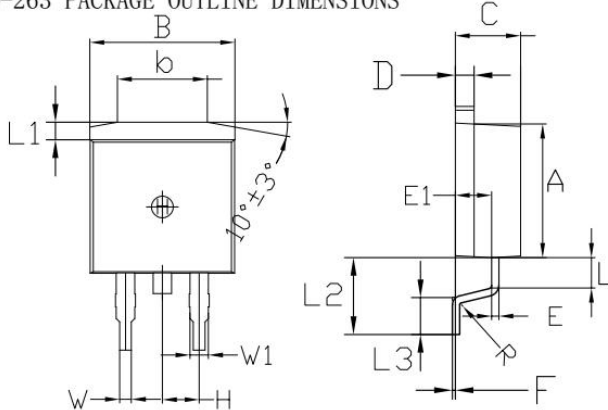
9 Dimensions(continues)

TO-262 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	9.70	10.30	0.382	0.406
C	4.25	4.75	0.167	0.187
D	1.20	1.45	0.047	0.057
E	0.40	0.60	0.016	0.024
L	12.25	13.75	0.482	0.541
L1	1.15	1.45	0.045	0.057
E1	2.4	2.6	0.0945	0.1024
W	0.80	0.82	0.0315	0.034
W1	1.20	1.30	0.047	0.051
H	2.54 TYP		0.200 TYP	
b	5.50	6.50	0.216	0.256

TO-263 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	9.70	10.30	0.382	0.406
C	4.25	4.75	0.167	0.187
D	1.20	1.45	0.047	0.057
E	0.40	0.60	0.016	0.024
L	1.90	2.30	0.075	0.091
L1	1.15	1.45	0.045	0.057
R	0.24	0.26	0.0095	0.0102
W	0.80	0.82	0.0315	0.0323
W1	1.20	1.30	0.047	0.051
H	2.54 TYP		0.200 TYP	
b	5.50	6.50	0.216	0.256
E1	2.4	2.6	0.0946	0.1024
L2	5.20	5.80	0.205	0.228
L3	2.20	3.20	0.087	0.126
F	0.03	0.23	0.0012	0.0091

## 10 Attentions

- Jiangsu Donghai Semiconductor Technology CO.,LTD. reserves the right to change the specification without prior notice! The customer should obtain the latest version of the information before making the order and verify that the information is complete and up to date.
- It is the responsibility of the purchaser for any failure or failure of any semiconductor product under certain conditions. It is the responsibility of the purchaser to comply with safety standards and to take safety measures in the system design and machine manufacturing of Donghai products in order to avoid potential risk of failure. Injury or property damage.
- Product promotion is endless, our company will be dedicated to provide customers with better products.

## 11 Appendix

Revision history:

Date	REV.	Description	Page
2017.05.09	1.0	Original	