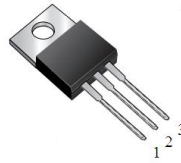
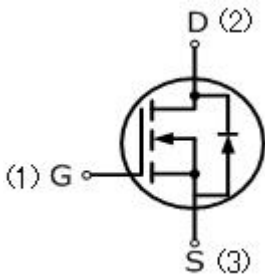


## 50N06(F,B,H,G,D)

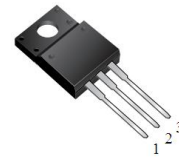
### 50 Amps,60 Volts N-CHANNEL MOSFET

#### FEATURE

- 50A,60V, $R_{DS(ON)MAX}=17.5m\Omega @V_{GS}=10V/25A$   
 $R_{DS(ON)MAX}=20m\Omega @V_{GS}=4.5V/25A$
- Low gate charge
- Low  $C_{iss}$
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



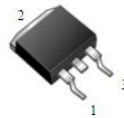
TO-220AB  
50N06



ITO-220AB  
50N06F



TO-262  
50N06H



TO-263  
50N06B



TO-252  
50N06G



TO-251  
50N06D

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

Parameter	Symbol	50N06(F,B,H,G,D)	UNIT
Drain-Source Voltage	$V_{DSS}$	60	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	
Continuous Drain Current	$I_D$	50	A
Pulsed Drain Current(Note1)	$I_{DM}$	200	
Single Pulse Avalanche Energy (Note 2)	$E_{AS}$	150	mJ
Avalanche Current(Note1)	$I_{AR}$	50	A
Repetitive Avalanche Energy (Note1)	$E_{AR}$	12	mJ
Reverse Diode dV/dt (Note 3)	dV/dt	7.0	V/ns
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55to+150	$^\circ C$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	$T_L$	260	$^\circ C$
Mounting Torque	6-32 or M3 screw	10	lbf • in
		1.1	N • m

#### Thermal Characteristics

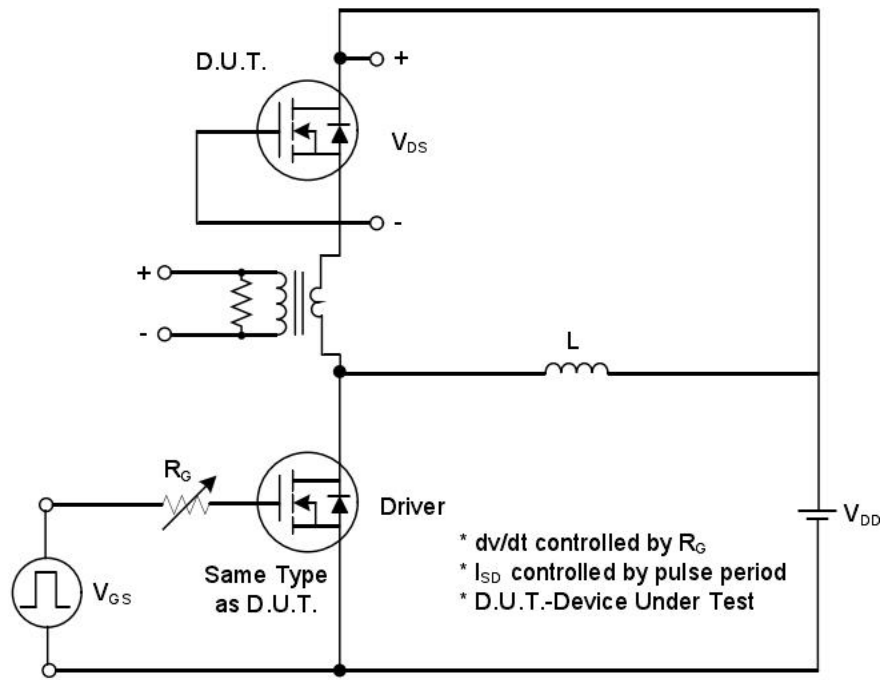
Parameter	Symbol	ITO-220	TO-220	TO-262/263	TO-251/252	Units
Thermal resistance , Channel to Case	$R_{th(ch-c)}$	3.0	2.0	2.0	2.7	$^\circ C/W$
Maximum Power Dissipation	$P_D$	65	150	150	100	W

Electrical Characteristics (T <sub>c</sub> =25°C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Mix	Typ	Max	Units
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	60	—	—	V
Breakdown Temperature Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Reference to 25°C, I <sub>D</sub> =250uA	—	0.06	—	V/°C
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V	—	—	1	uA
Gate-Body Leakage Current, Forward	I <sub>GSSF</sub>	V <sub>GS</sub> =20V, V <sub>DS</sub> =0V	—	—	100	nA
Gate-Body Leakage Current, Reverse	I <sub>GSSR</sub>	V <sub>GS</sub> =-20V, V <sub>DS</sub> =0V	—	—	-100	nA
<b>On Characteristics</b>						
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =250uA	1.0	—	3.0	V
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =25A	—	—	17.5	mΩ
	R <sub>DS(on)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =25A	—	—	20	mΩ
<b>Dynamic Characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHZ	—	1250	—	pF
Output Capacitance	C <sub>oss</sub>		—	445	—	pF
Reverse Transfer Capacitance	C <sub>rss</sub>		—	90	—	pF
<b>Switching Characteristics</b>						
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =30V, I <sub>D</sub> =50A, R <sub>G</sub> =25Ω (Note4,5)	—	20	—	ns
Turn-On Rise Time	t <sub>r</sub>		—	380	—	ns
Turn-Off Delay Time	t <sub>d(off)</sub>		—	80	—	ns
Turn-Off Fall Time	t <sub>f</sub>		—	145	—	ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =48V, I <sub>D</sub> =50A, V <sub>GS</sub> =5V, (Note4,5)	—	24.5	—	nC
Gate-Source Charge	Q <sub>gs</sub>		—	6	—	nC
Gate-Drain Charge	Q <sub>gd</sub>		—	14.5	—	nC
<b>Drain-Source Body Diode Characteristics and Maximum Ratings</b>						
Continuous Diode Forward Current	I <sub>S</sub>		—	—	50	A
Pulsed Diode Forward Current	I <sub>SM</sub>		—	—	200	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =50A, V <sub>GS</sub> =0V	—	—	1.5	V
Reverse Recovery Time	t <sub>rr</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =50A,	—	65	—	ns
Reverse Recovery Charge	Q <sub>rr</sub>	dI <sub>F</sub> /dt=100A/us, (Note4)	—	125	—	nC

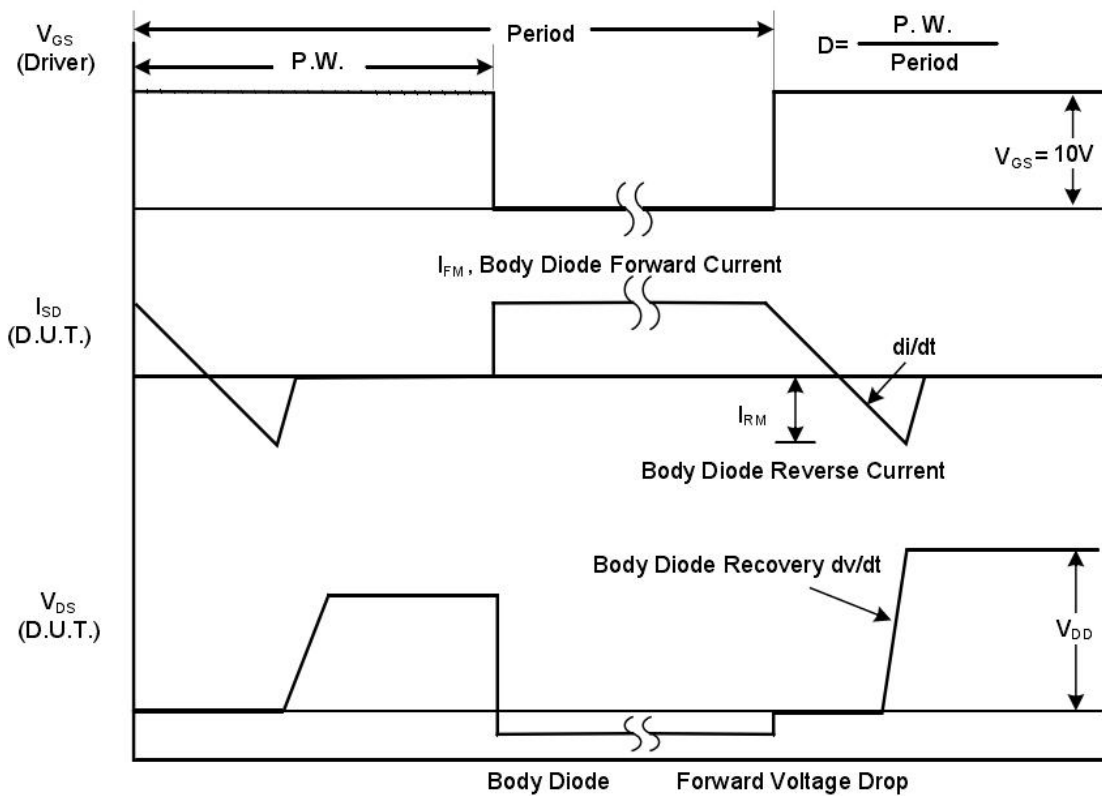
**Notes**

1. Repetitive Rating: pulse width limited by maximum junction temperature.
2. V<sub>DD</sub>=10V, L=0.1mH, R<sub>g</sub>=25Ω, I<sub>AS</sub>=50A, T<sub>J</sub>=25°C.
3. I<sub>SD</sub> ≤ I<sub>D</sub>, dI/dt = \_A/us, V<sub>DD</sub> ≤ BV<sub>DSS</sub>, starting T<sub>J</sub>=25°C.
4. Pulse width ≤ 300us; duty cycle ≤ 2%.
5. Repetitive rating; pulse width limited by maximum junction temperature.

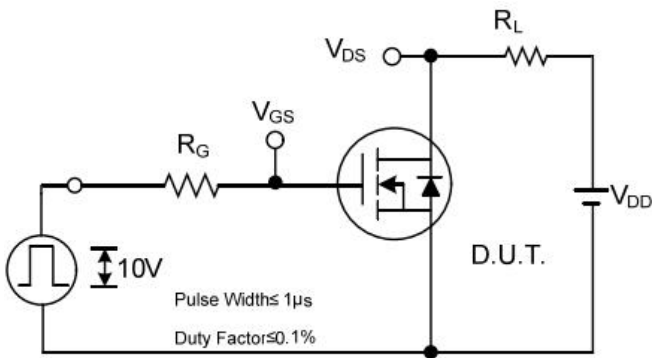
**TEST CIRCUIT AND WAVEFORM**



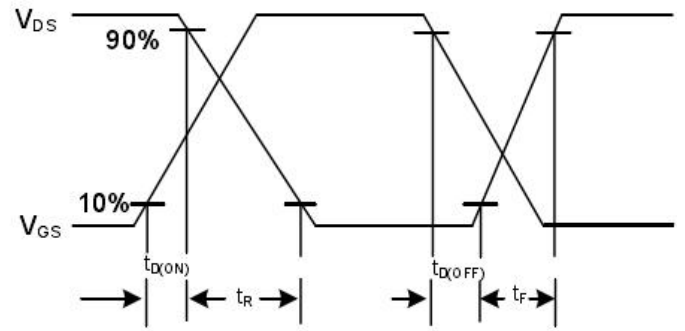
**Peak Diode Recovery dv/dt Test Circuit**



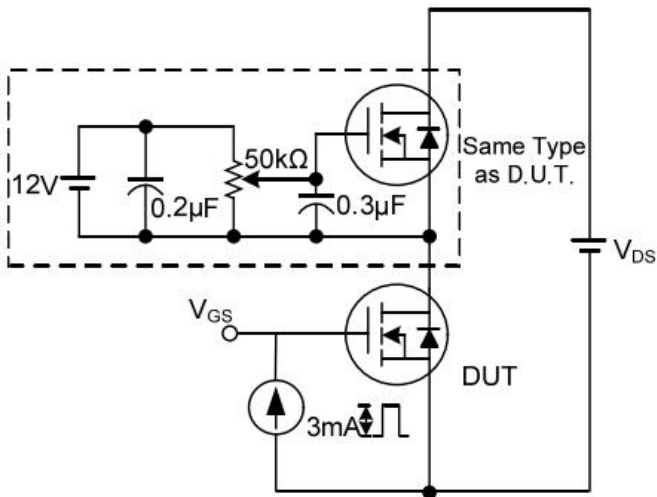
**Peak Diode Recovery dv/dt Waveforms**



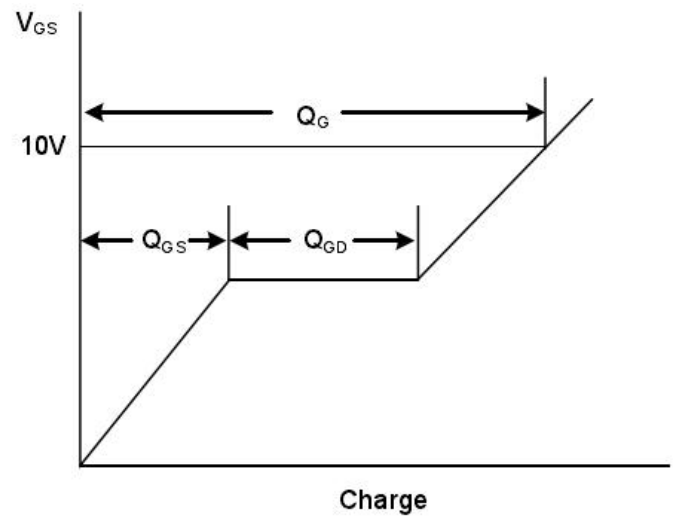
Switching Test Circuit



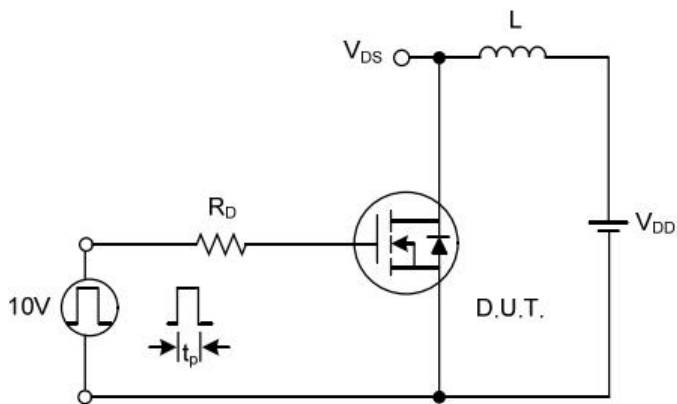
Switching Waveforms



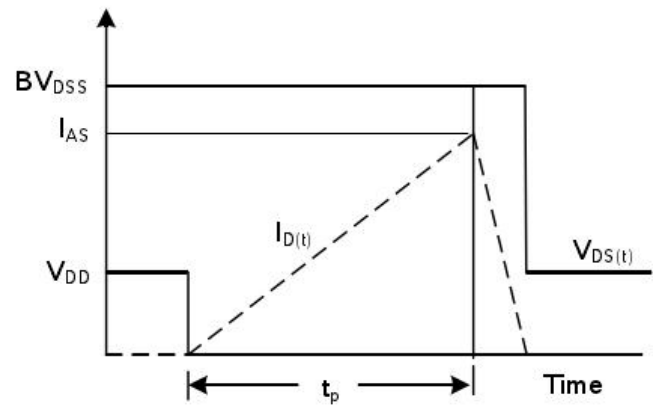
Gate Charge Test Circuit



Gate Charge Waveform

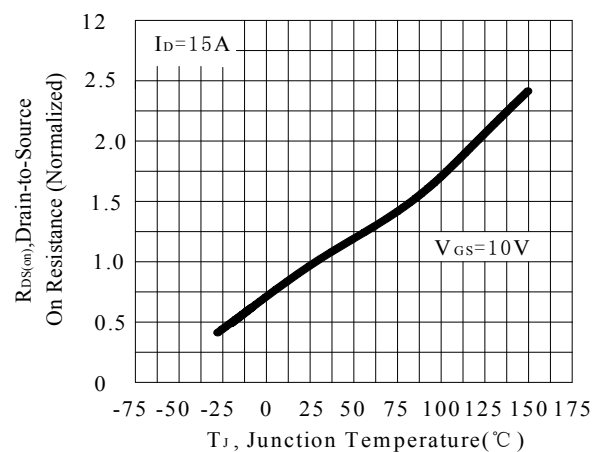
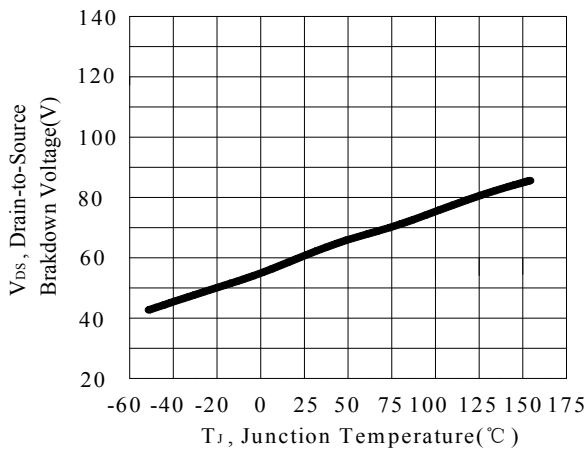
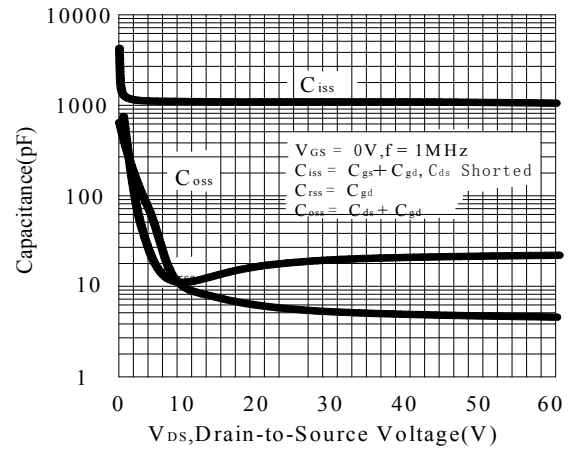
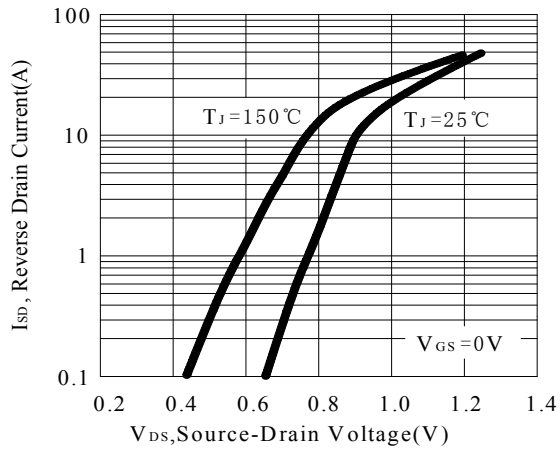
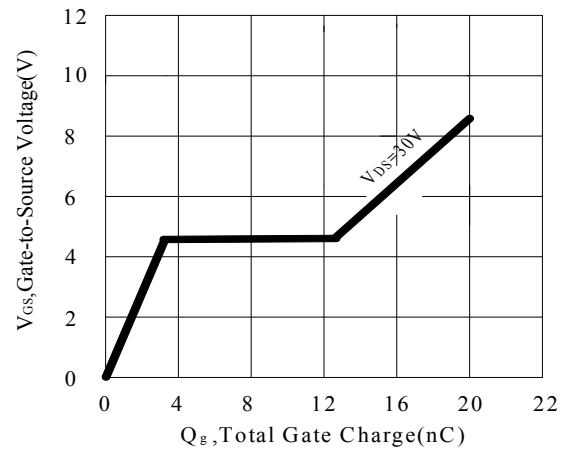
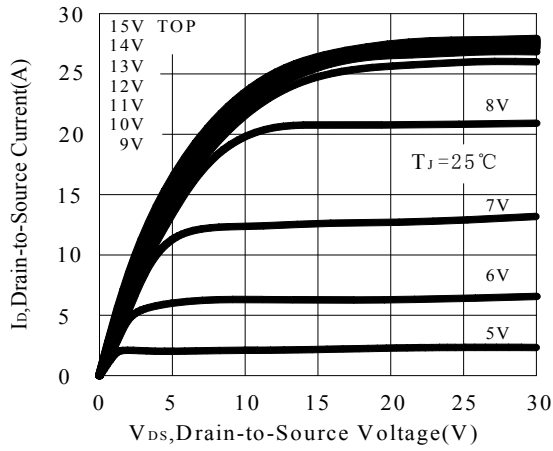


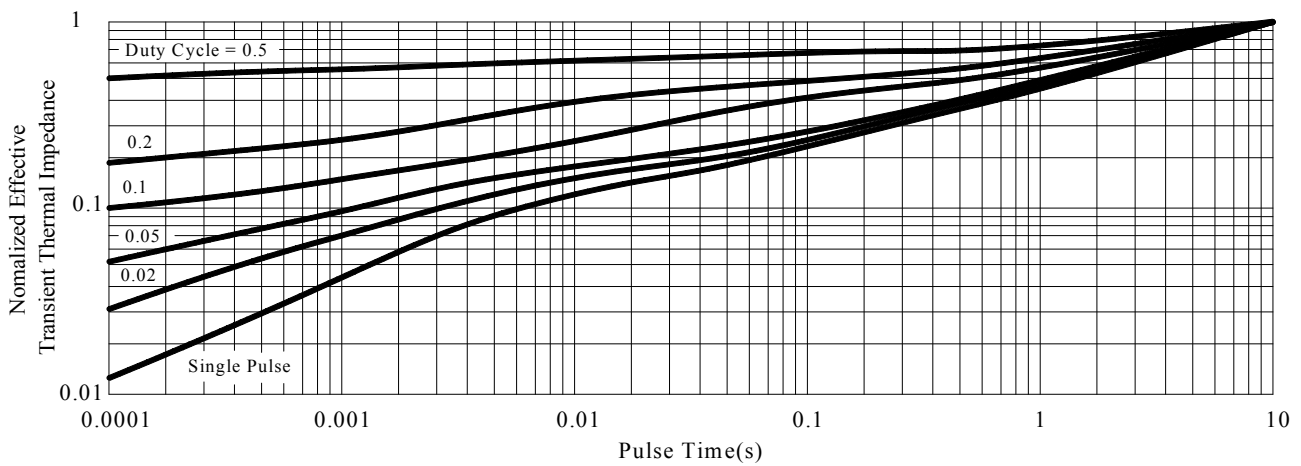
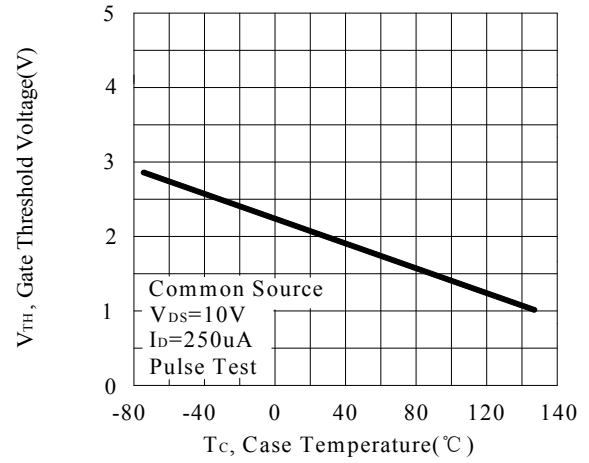
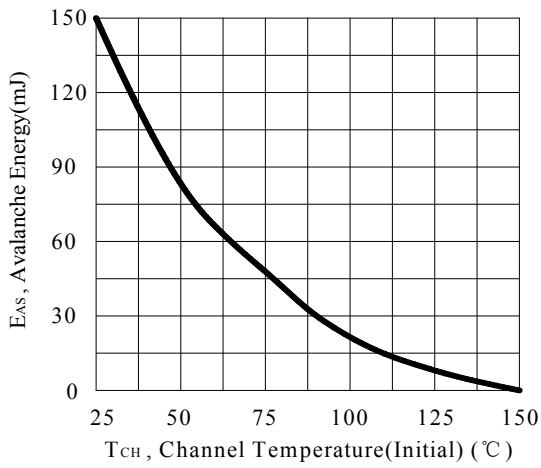
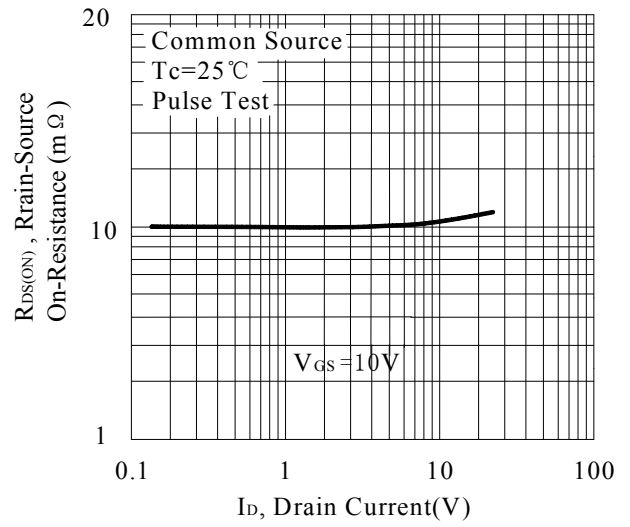
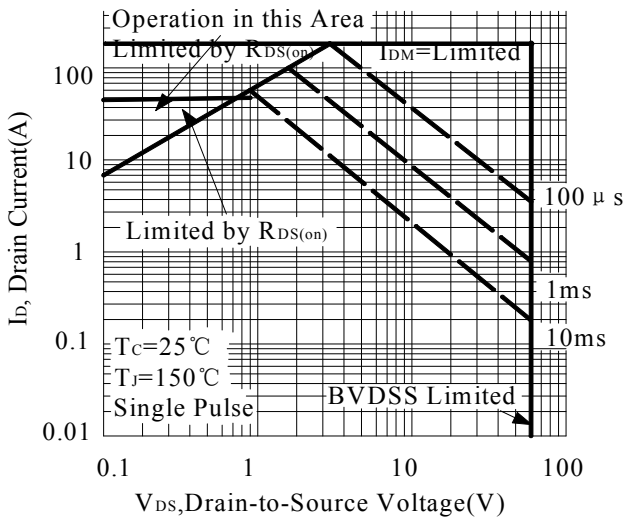
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

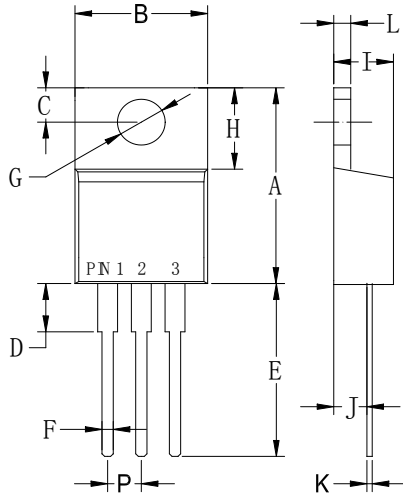
## RATING AND CHARACTERISTIC CURVES





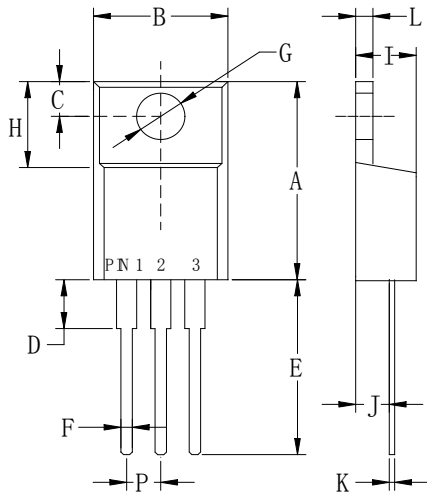
**PACKAGE OUTLINE DIMENSIONS**

**TO-220AB**



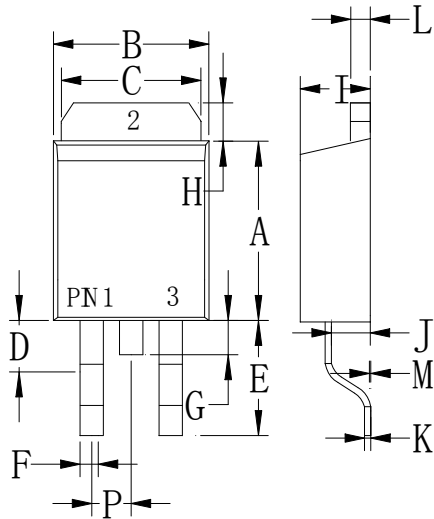
TO-220AB		
Dim	Min	Max
A	.573 (14.55)	.603 (15.32)
B	—	.412 (10.5)
C	.103 (2.62)	.113 (2.87)
D	.140 (3.56)	.160 (4.06)
E	.510 (13.0)	.560 (14.3)
F	.027 (0.68)	.037 (0.94)
G	.148 (3.74)	.154 (3.91)
H	.230 (5.84)	.270 (6.86)
I	.175 (4.44)	.185 (4.86)
J	.100 (2.54)	.110 (2.79)
K	.014 (0.35)	.025 (0.64)
L	.045 (1.14)	.055 (1.40)
P	.095 (2.41)	.105 (2.67)

**ITO-220AB**



ITO-220AB		
Dim	Min	Max
A	.571 (14.5)	.610 (15.5)
B	.383 (9.72)	.406 (10.3)
C	.110 (2.80)	.126 (3.20)
D	.133 (3.38)	.162 (4.10)
E	.512 (13.0)	.551 (14.0)
F	.028 (0.70)	.035 (0.90)
G	.114 (2.90)	.138 (3.50)
H	.268 (6.80)	.291 (7.40)
I	.162 (4.10)	.185 (4.70)
J	.102 (2.60)	.110 (2.80)
K	.018 (0.45)	.026 (0.65)
L	.097 (2.46)	.113 (2.86)
P	.890 (2.25)	.113 (2.85)

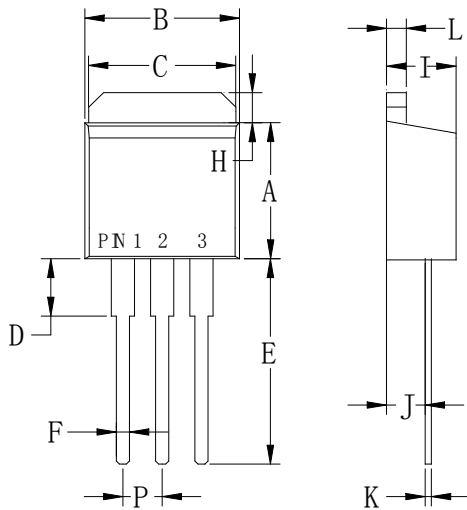
**TO-263**



TO-263		
Dim	Min	Max
A	.323 (8.20)	.348 (8.85)
B	.394 (10.0)	.413 (10.5)
C	.394 (10.0)	.402 (10.2)
D	.077 (1.95)	.100 (2.55)
E	.204 (5.17)	.227 (5.77)
F	.027 (0.68)	.037 (0.94)
G	--	.067 (1.70)
H	.046 (1.17)	.053 (1.34)
I	.175 (4.44)	.191 (4.86)
J	.100 (2.54)	.110 (2.79)
K	.014 (0.35)	.025 (0.64)
L	.047 (1.20)	.055 (1.40)
M	.000 (0.00)	.010 (0.25)
P	.095 (2.41)	.105 (2.67)

Dimensions in inches and (millimeters)

**TO-262**

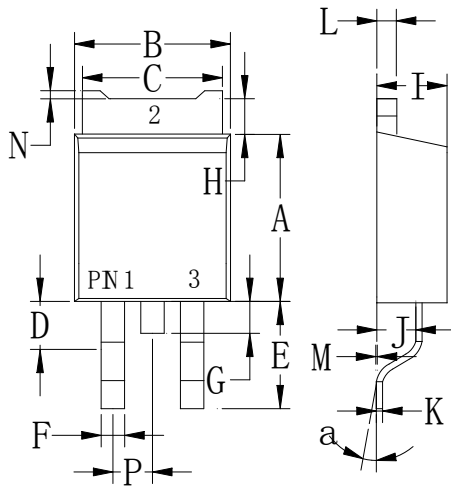


TO-262		
Dim	Min	Max
A	.323 (8.20)	.348 (8.85)
B	.394 (10.0)	.413 (10.5)
C	.394 (10.0)	.402 (10.2)
D	.140 (3.56)	.160 (4.06)
E	.510 (13.0)	.560 (14.3)
F	.027 (0.68)	.037 (0.94)
H	.046 (1.17)	.053 (1.34)
I	.175 (4.44)	.185 (4.86)
J	.100 (2.54)	.110 (2.79)
K	.014 (0.35)	.025 (0.64)
L	.045 (1.14)	.055 (1.40)
P	.095 (2.41)	.105 (2.67)

Dimensions in inches and (millimeters)



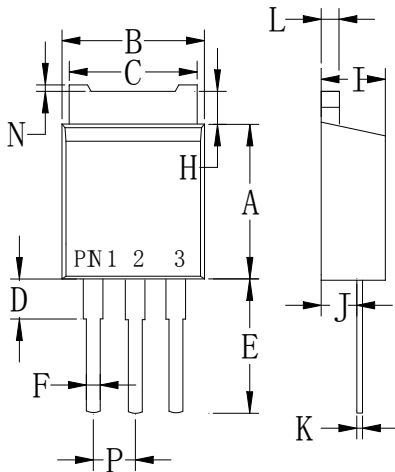
**TO-252**



TO-252		
Dim	Min	Max
A	.230 (5.85)	.246 (6.25)
B	.250 (6.35)	.264 (6.75)
C	.207 (5.27)	.218 (5.54)
D	.037 (0.93)	.045 (1.14)
E	.106 (2.70)	.138 (3.50)
F	.028 (0.72)	.033 (0.84)
G	.024 (0.60)	.041 (1.05)
H	.028 (0.72)	.043 (1.10)
I	.085 (2.15)	.096 (2.45)
J	.037 (0.95)	.047 (1.20)
K	.018 (0.45)	.026 (0.65)
L	.018 (0.45)	.024 (0.60)
P	.081 (2.05)	.094 (2.40)
M	.000 (0.00)	.006 (0.15)
N	--	.008 (0.20)
a	0°	10°

Dimensions in inches and (millimeters)

**TO-251**



TO-251		
Dim	Min	Max
A	.230 (5.85)	.246 (6.25)
B	.250 (6.35)	.266 (6.75)
C	.207 (5.27)	.218 (5.54)
D	.037 (0.93)	.045 (1.14)
E	.173 (4.40)	.205 (5.20)
F	.028 (0.72)	.033 (0.84)
H	.028 (0.70)	.043 (1.10)
I	.085 (2.15)	.096 (2.45)
J	.037 (0.95)	.047 (1.20)
K	.018 (0.45)	.026 (0.65)
L	.018 (0.45)	.024 (0.60)
N	--	.008 (0.20)
P	.081 (2.05)	.094 (2.40)

Dimensions in inches and (millimeters)

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