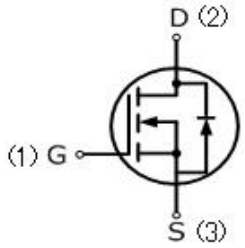
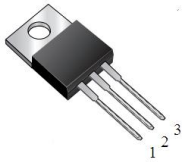
MIC-IRF1010E

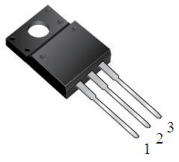
80 Amps, 60 Volts N-CHANNEL MOSFET

FEATURE

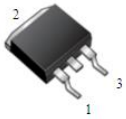
- 80A,60V,$R_{DS(ON)}$=7.8mΩ （MAX）@V_{GS}=10V
  $R_{DS(ON)}$=20mΩ （MAX）@V_{GS}=5V
- Low gate charge
- Low C_{iss}
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability




TO-220AB


ITO-220AB


TO-262


TO-263


TO-252


TO-251

Absolute Maximum Ratings(T_C=25℃,unless otherwise noted)				
Parameter		**Symbol**	MIC-IRF1010E	**UNIT**
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±25	
Continuous Drain Current		I_D	80	A
Pulsed Drain Current(Note1)		I_{DM}	320	
Single Pulse Avalanche Energy (Note 2)		E_{AS}	320	mJ
Avalanche Current(Note1)		I_{AR}	80	A
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 to +175	℃
Maximum lead temperature for soldering purposes, 1/8″from case for 5 seconds		T_L	260	℃
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		$R_{th(ch-c)}$	3.9	1.3	1.3	3.3	℃/W
Maximum Power Dissipation	T_C=25℃	P_D	45	115	115	65	W

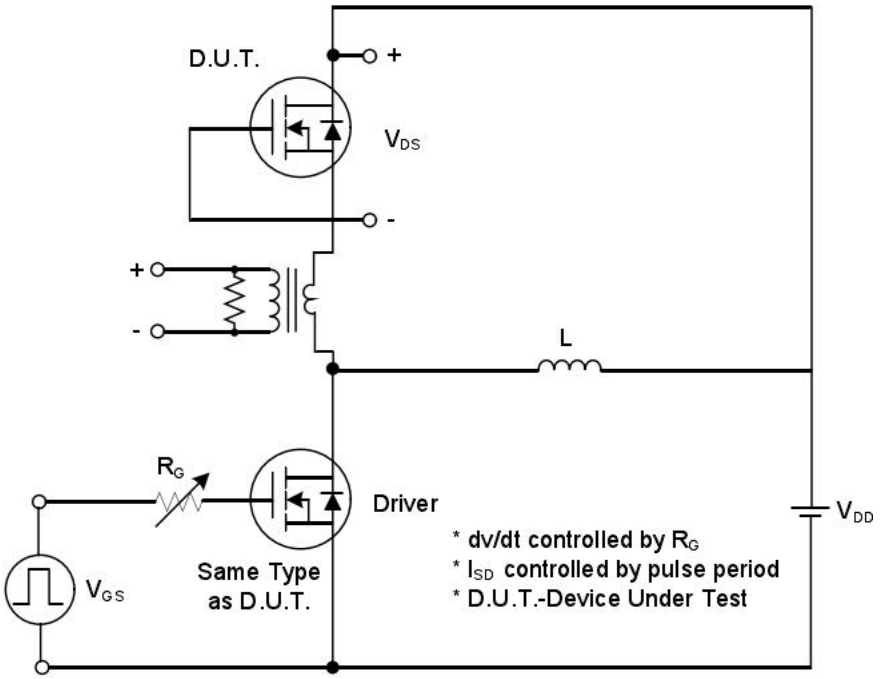
Electrical Characteristics (T_c=25℃,unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250uA	60	—	—	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V	—	—	1	μA
Gate-Body Leakage Current,Forward	I_{GSSF}	V_{GS}=20V,V_{DS}=0V	—	—	100	nA
Gate-Body Leakage Current,Reverse	I_{GSSR}	V_{GS}=-20V,V_{DS}=0V	—	—	-100	nA
On Characteristics						
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250uA	2	—	4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=20A	—	6.8	7.8	mΩ
		V_{GS}=5V,I_D=20A	—	—	20	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V, f=1.0MHZ	—	3200	—	pF
Output Capacitance	C_{oss}		—	362	—	pF
Reverse Transfer Capacitance	C_{rss}		—	277	—	pF
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=34V,I_{DS}=40A, R_G=6Ω,V_{GS}=10V (Note4,5)	—	15		ns
Turn-On Rise Time	t_r		—	13		ns
Turn-Off Delay Time	$t_{d(off)}$		—	20		ns
Turn-Off Fall Time	t_f		—	8		ns
Total Gate Charge	Qg	V_{DS}=55V,I_{DS}=40A, V_{GS}=10V, (Note4,5)	—	84	—	nC
Gate-Source Charge	Qgs		—	14	—	nC
Gate-Drain Charge	Qgd		—	30	—	nC
Drain-Source Body Diode Charcteristics and Maximum Ratings						
Continuous Diode Forward Current	I_S		—	—	80	A
Pulsed Diode Forward Current	I_{SM}		—	—	320	A
Diode Forward Voltage	V_{SD}	I_S=40A,V_{GS}=0V	—	0.8	1.0	V
Reverse Recovery Time	t_{rr}	V_{GS}=0V,I_S=40A, dI_F/dt=100A/us, (Note4)	—	33	—	ns
Reverse Recovery Charge	Q_{rr}		—	61	—	nC

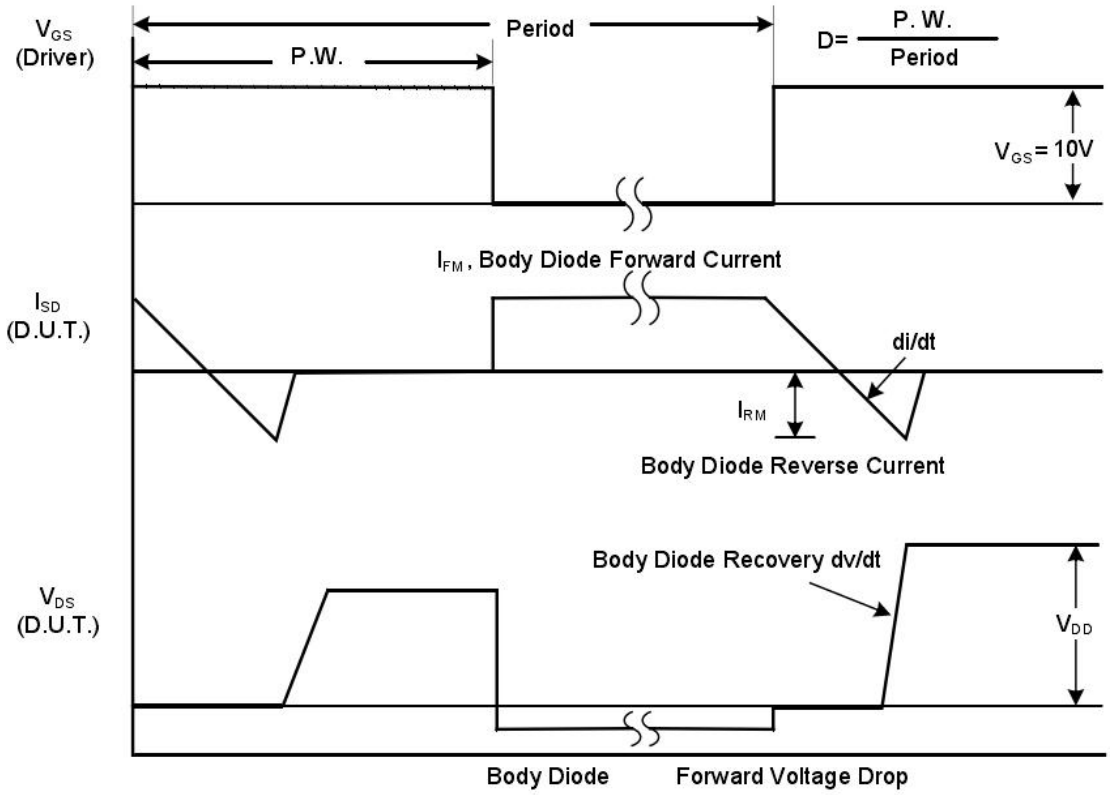
Notes

1. Repetitive Rating:pulse width limited by maximum junction temperature.
2. L=0.1mH,R_g=25Ω,I_{AS}=80A , starling T_J=25℃.
3. I_{SD}≤I_D,dI/dt=200A/us,V_{DD}≤BV_{DSS},starting T_J=25℃.
4. Pulse width≤300us;duty cycle≤2%.
5. Repetitive rating; pulse width limited by maximum junction temperature.

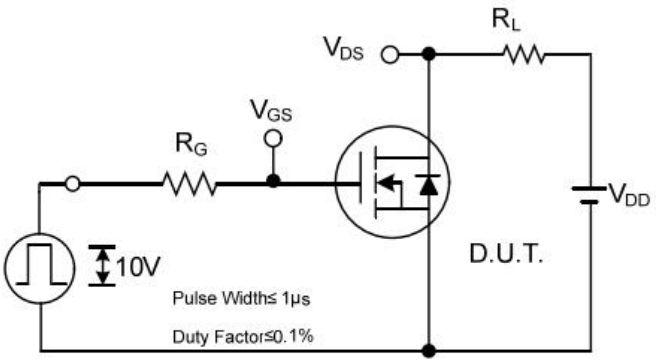
RATINGAND CHARACTERISTIC CURVES



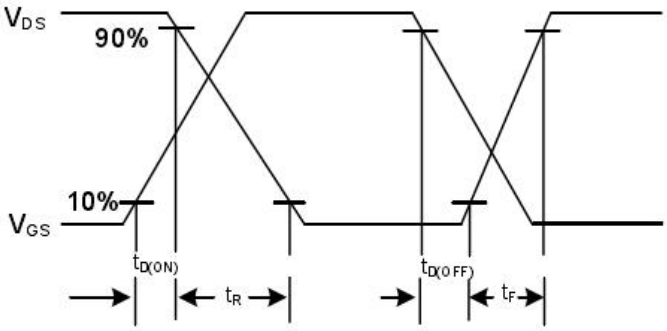
Peak Diode Recovery dv/dt Test Circuit



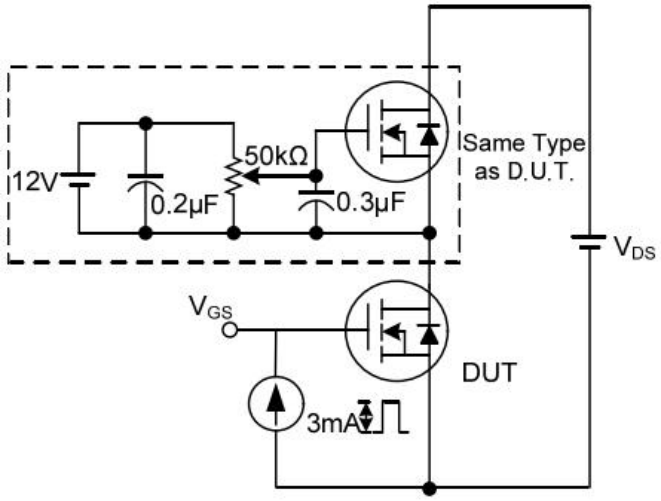
Peak Diode Recovery dv/dt Waveforms



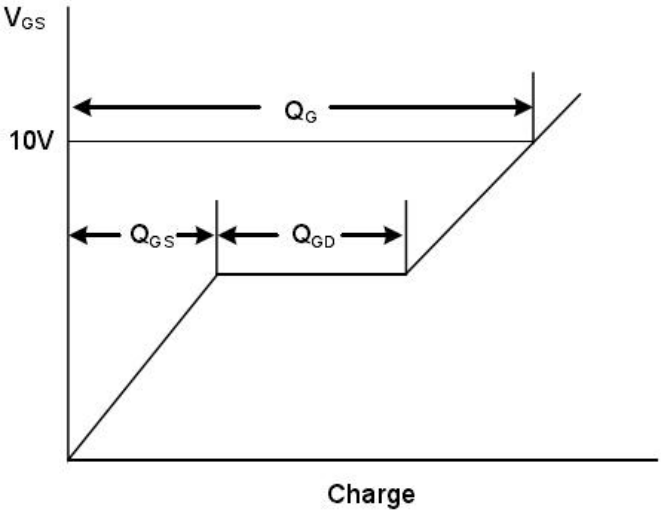
Switching Test Circuit



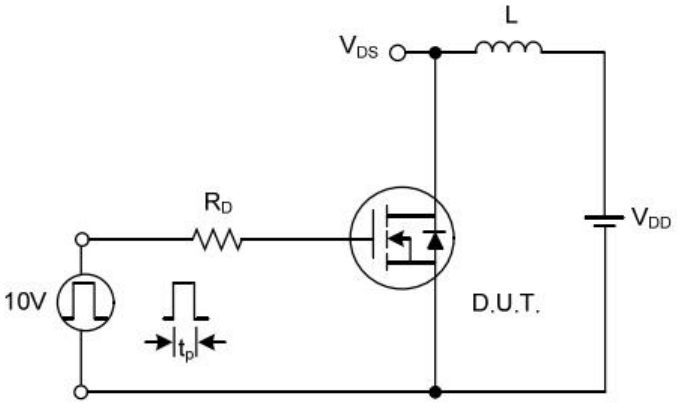
Switching Waveforms



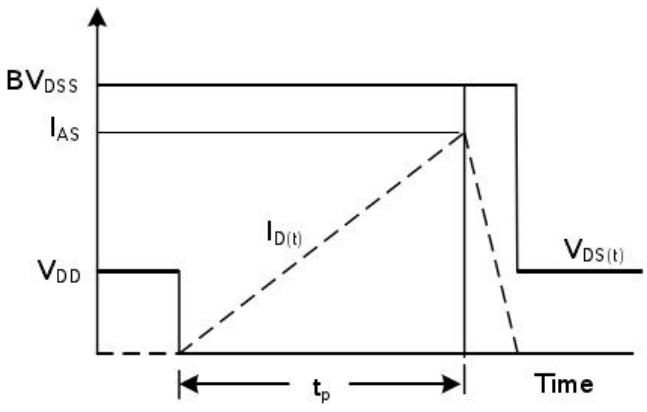
Gate Charge Test Circuit



Gate Charge Waveform

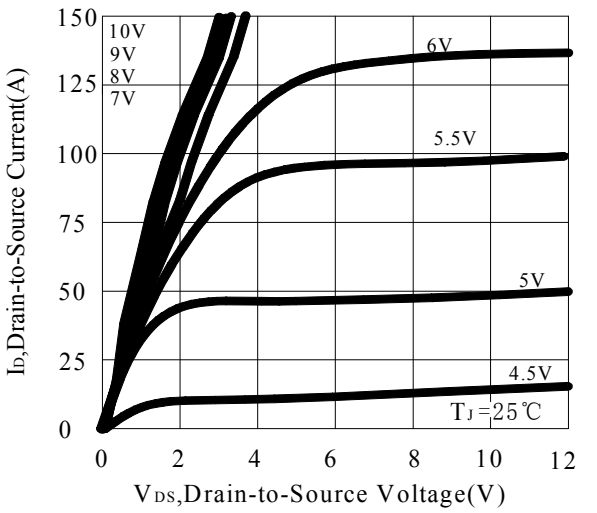


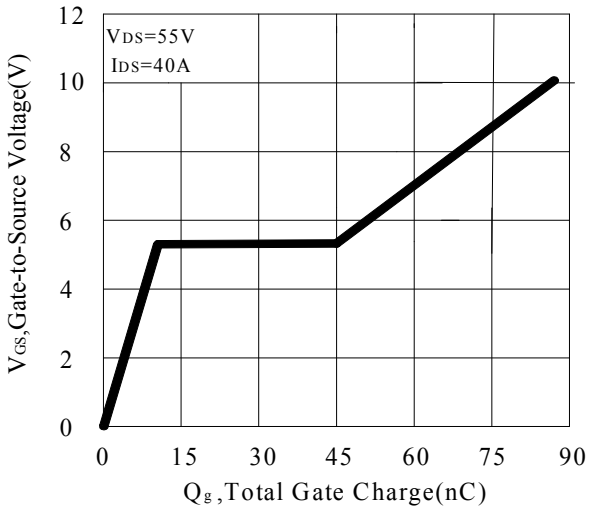
Unclamped Inductive Switching Test Circuit

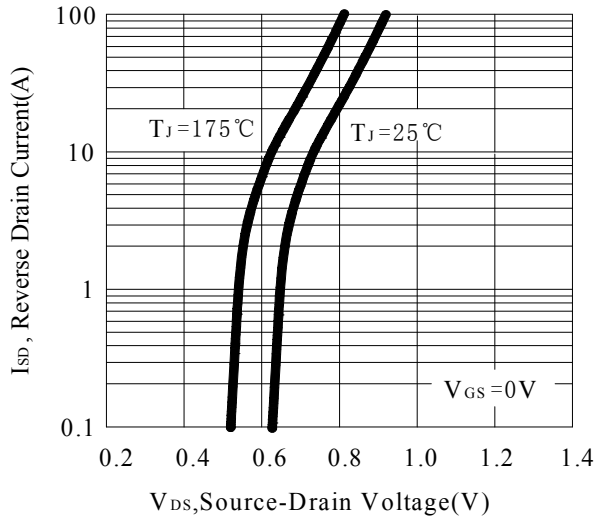


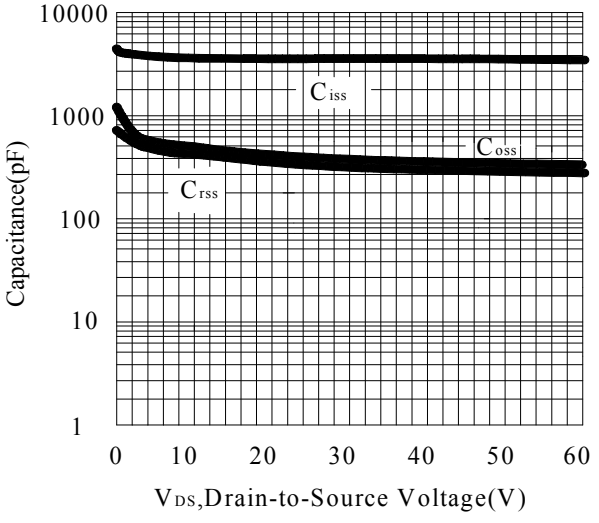
Unclamped Inductive Switching Waveforms

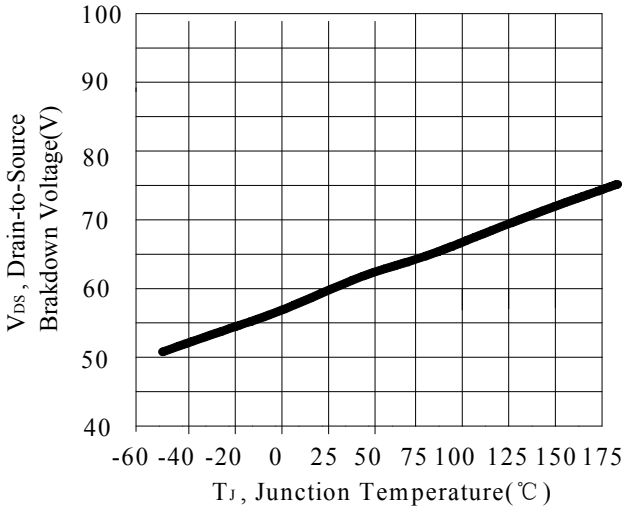
RATINGAND CHARACTERISTIC CURVES

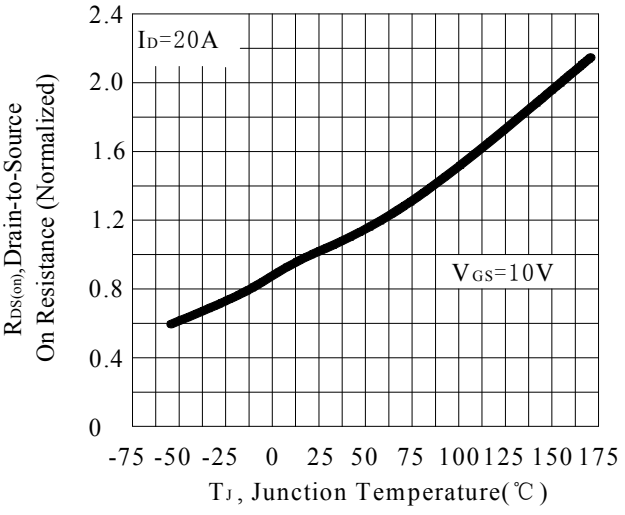


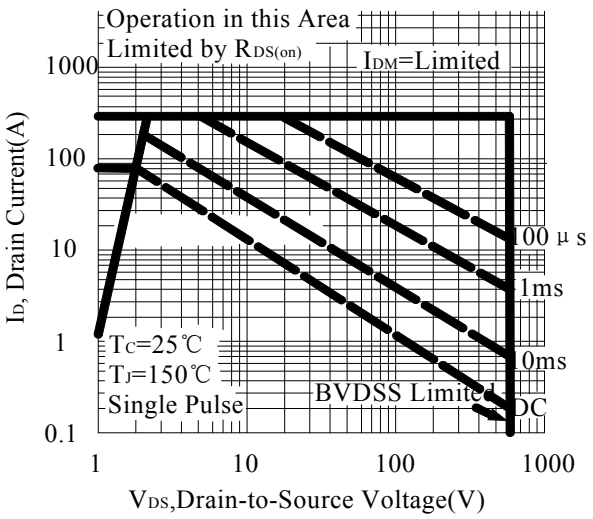


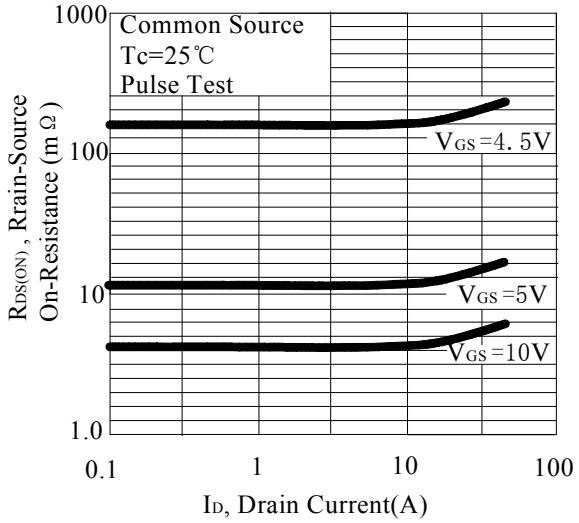


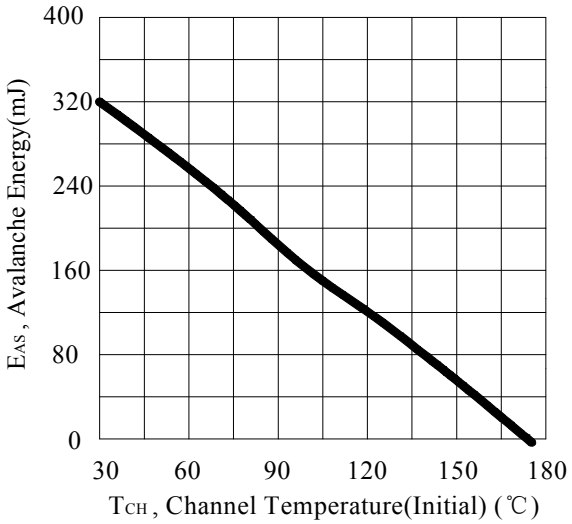


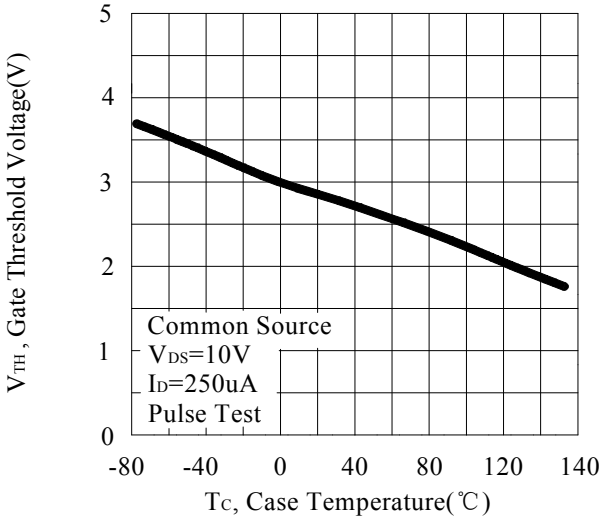


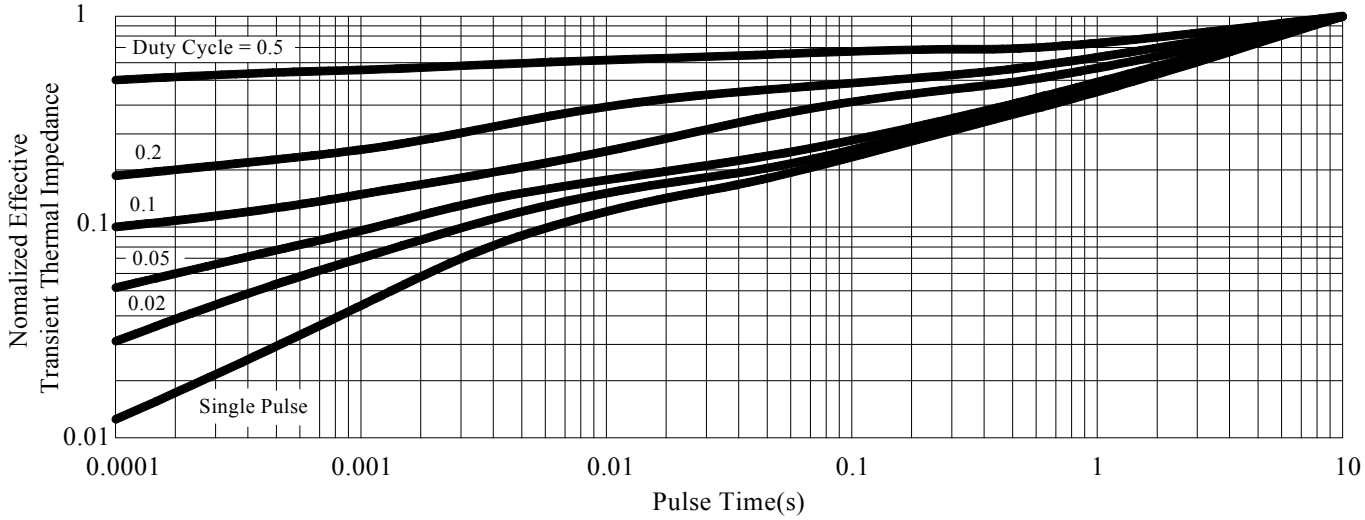



Operation in this Area
Limited by RDS(on)
IDM=Limited
100 μs
1ms
10ms
DC
TC=25℃
TJ=150℃
Single Pulse
BVDSS Limited
ID, Drain Current(A)
VDS,Drain-to-Source Voltage(V)
1000
100
10
1
0.1
1
10
100
1000


Common Source
Tc=25℃
Pulse Test
VGS=4.5V
VGS=5V
VGS=10V
RDS(ON), Rrain-Source On-Resistance (mΩ)
ID, Drain Current(A)
1000
100
10
1.0
0.1
1
10
100

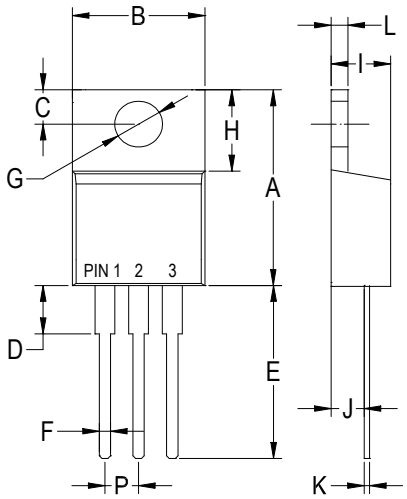

EAS, Avalanche Energy(mJ)
TCH, Channel Temperature(Initial) (℃)
400
320
240
160
80
0
30
60
90
120
150
180


Common Source
VDS=10V
ID=250uA
Pulse Test
VTH, Gate Threshold Voltage(V)
TC, Case Temperature(℃)
5
4
3
2
1
0
-80
-40
0
40
80
120
140


Duty Cycle = 0.5
0.2
0.1
0.05
0.02
Single Pulse
Nomalized Effective Transient Thermal Impedance
Pulse Time(s)
1
0.1
0.01
0.0001
0.001
0.01
0.1
1
10

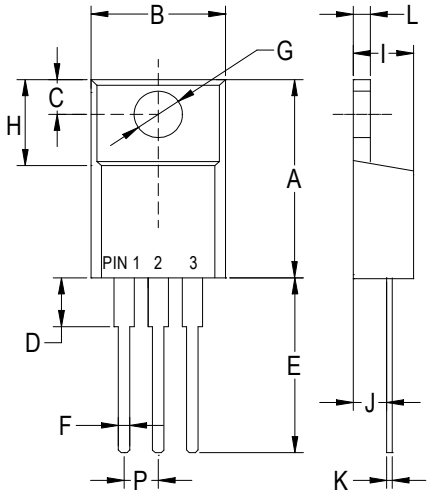
PACKAGE OUTLINE DIMENSIONS

TO-220AB



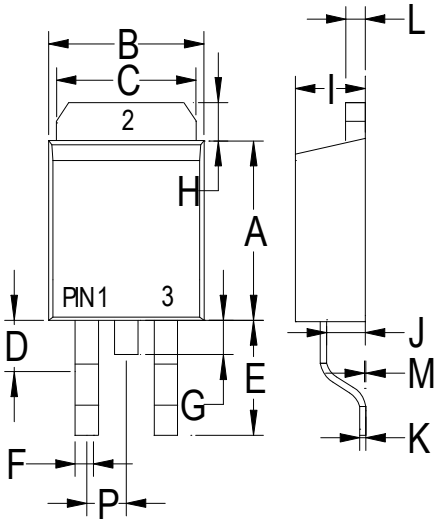
TO-220AB		
Dim	Min	Max
A	.573(14.55)	.603(15.32)
B	——	.412(10.5)
C	.103(2.62)	.113(2.87)
D	.140(3.56)	.160(4.06)
E	.510(13.0)	.560(14.3)
F	.027(0.68)	.037(0.94)
G	.148(3.74)	.154(3.91)
H	.230(5.84)	.270(6.86)
I	.175(4.44)	.185(4.86)
J	.100(2.54)	.110(2.79)
K	.014(0.35)	.025(0.64)
L	.045(1.14)	.055(1.40)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

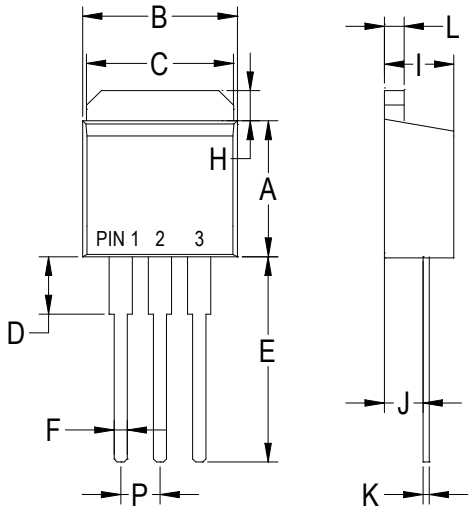
TO-263



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)

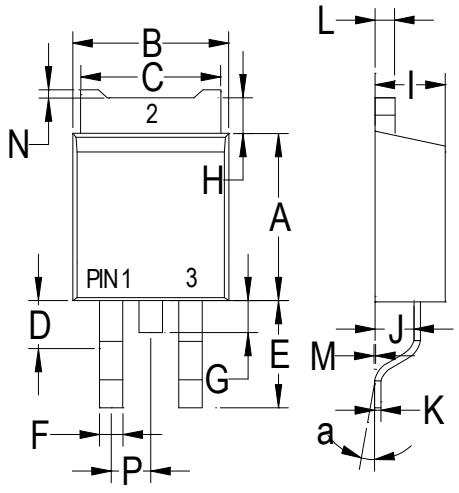
TO-262



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)

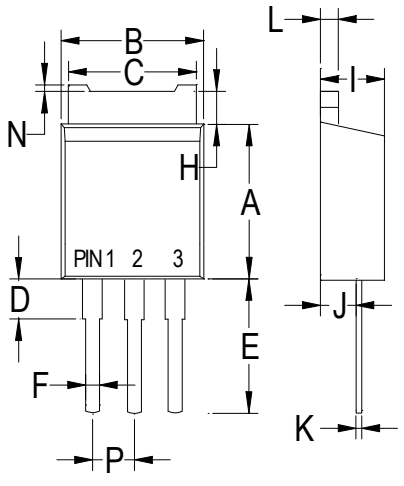
TO-252



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)