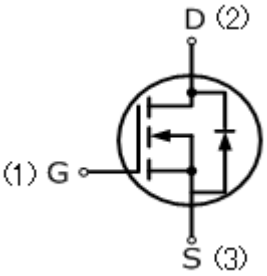
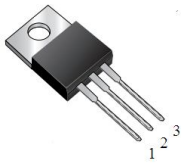
MIC-IRF3205

120 Amps,60 Volts N-CHANNEL MOSFET

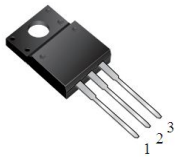
FEATURE

- 120A,60V,$R_{DS(ON)}$=0.8 mΩ @V_{GS}=10V/60A
- Low gate charge
- Low C_{iss}
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

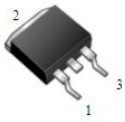




TO-220AB



ITO-220AB



TO-263

TO-262

Absolute Maximum Ratings(T_C=25℃,unless otherwise noted)

Parameter		Symbol	MIC-IRF3205	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±30	
Continuous Drain Current		I_D	120	A
Pulsed Drain Current(Note1)		I_{DM}	480	
Single Pulse Avalanche Energy (Note 2)		E_{AS}	800	mJ
Avalanche Current(Note1)		I_{AR}	120	A
Repetitive Avalanche Energy (Note1)		E_{AR}	20	mJ
Reverse Diode dV/dt (Note 3)		dv/dt	5.5	V/ns
Operating Junction and Storage Temperature Range		T_J,T_{STG}	-55 to +150	℃
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

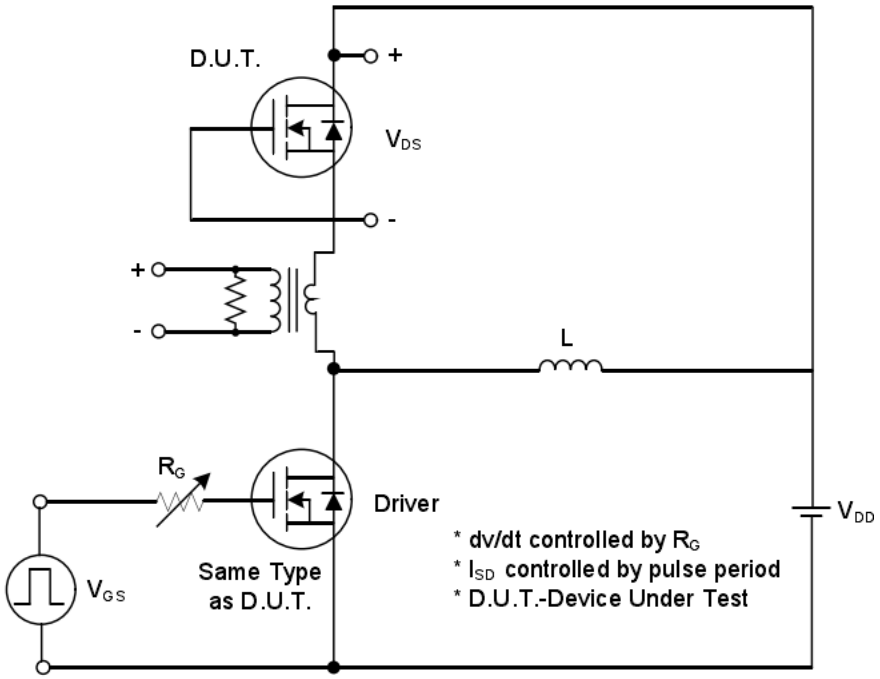
Parameter		Symbol	ITO-220	TO-220	TO-262/263	Units
Thermal resistance , Junction to Case		$R_{th(J-c)}$	1.5	0.54	0.54	℃/W
Thermal resistance , Channel to Case		$R_{th(ch-c)}$	1.5	0.54	0.54	℃/W
Thermal resistance , Channel to Ambient		$R_{th(ch-a)}$	80	62	62	℃/W
Maximum Power Dissipation	T_C=25℃	P_D	83	230	230	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
Breakdown Temperature Coefficient	ΔBV_{DSS} /ΔT_J	Reference to 25℃, I_D=250uA	—	0.6	—	V/℃
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=600V,V_{GS}=0V	—	—	1	μA
Gate-Body Leakage Current,Forward	I_{GSSF}	V_{GS}=20V,V_{DS}=0V	—	—	1	μA
Gate-Body Leakage Current,Reverse	I_{GSSR}	V_{GS}=-20V,V_{DS}=0V	—	—	-1	μA
On Characteristics						
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS}=10V,I_D=250uA	1	—	3	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=60A	—	0.08	0.012	Ω
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS}=4.5V,I_D=60A	—	0.014	0.016	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V, f=1.0MHZ	—	4700	—	pF
Output Capacitance	C_{oss}		—	580	—	pF
Reverse Transfer Capacitance	C_{rss}		—	340	—	pF
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{DD}=30V,I_D=60A, R_G=0.4Ω (Note4,5)	—	21	—	ns
Turn-On Rise Time	t_r		—	39	—	ns
Turn-Off Delay Time	$t_{d(off)}$		—	70	—	ns
Turn-Off Fall Time	t_f		—	24	—	ns
Total Gate Charge	Qg	V_{DS}=30V,I_D=60A, V_{GS}=10V, (Note4,5)	—	150	—	nC
Gate-Source Charge	Qgs		—	50	—	nC
Gate-Drain Charge	Qgd		—	32	—	nC
Drain-Source Body Diode Charcteristics and Maximum Ratings						
Continuous Diode Forward Current	I_S		—	—	120	A
Pulsed Diode Forward Current	I_{SM}		—	—	480	A
Diode Forward Voltage	V_{SD}	I_S=120A,V_{GS}=0V	—	—	1.5	V

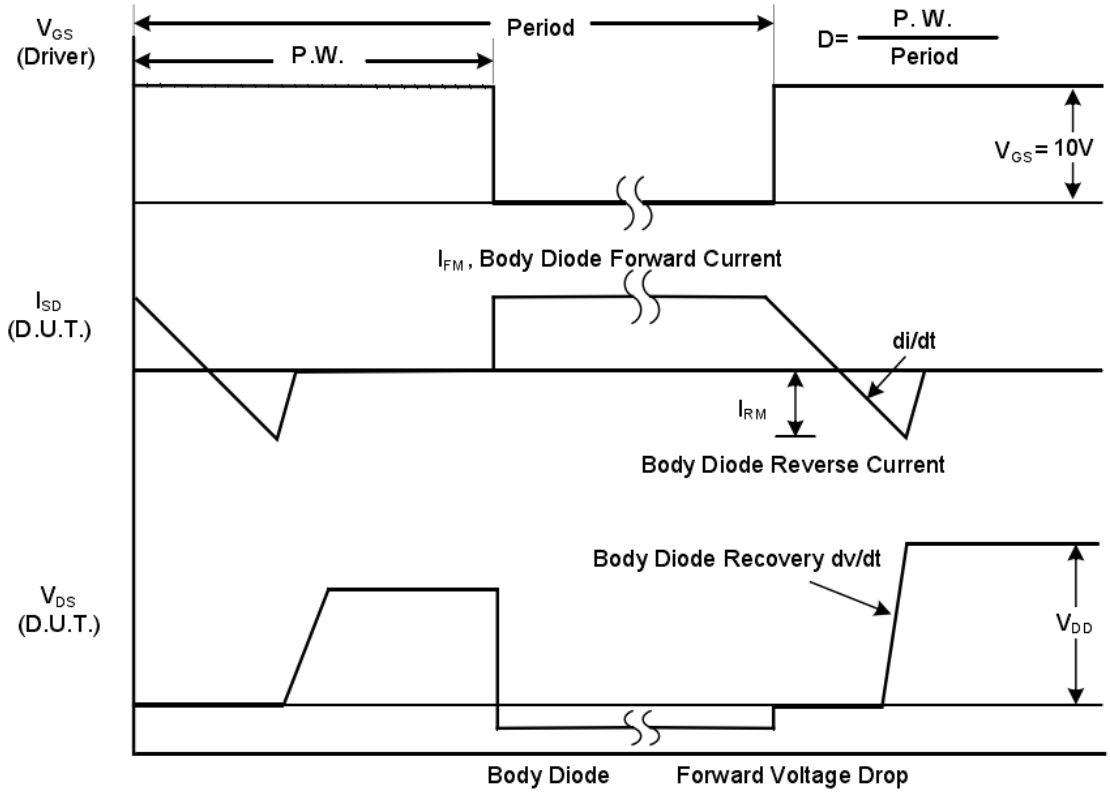
Notes

1. Repetitive Rating:pulse width limited by maximum junction temperature.
2. V_{DD}=50V,L=0.1mH,R_g=25Ω,I_{AS}=120A , 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.

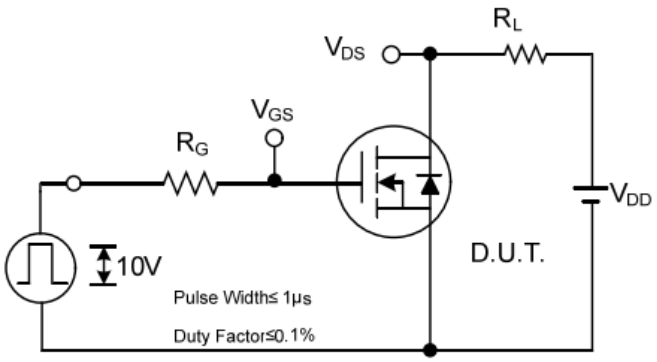
RATINGAND CHARACTERISTIC CURVES



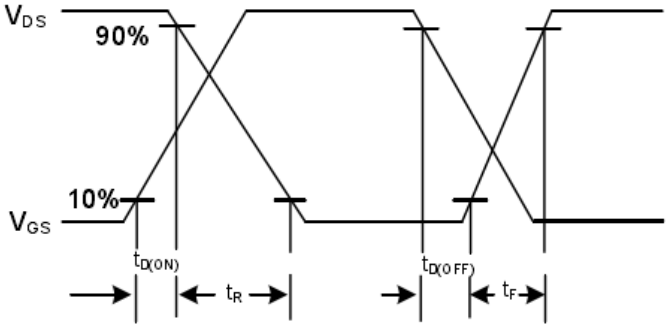
Peak Diode Recovery dv/dt Test Circuit



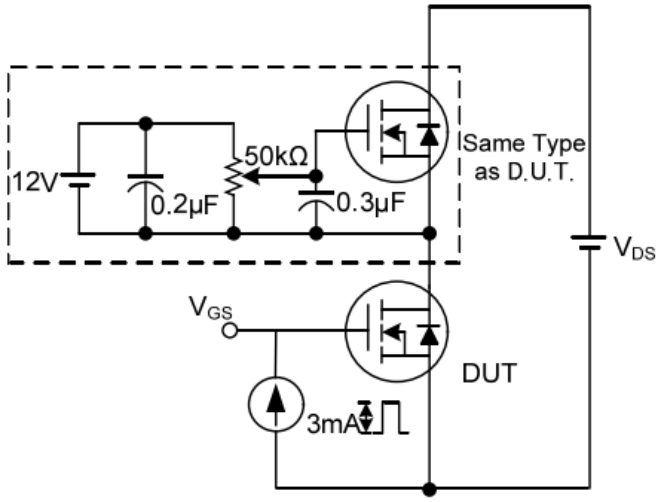
Peak Diode Recovery dv/dt Waveforms



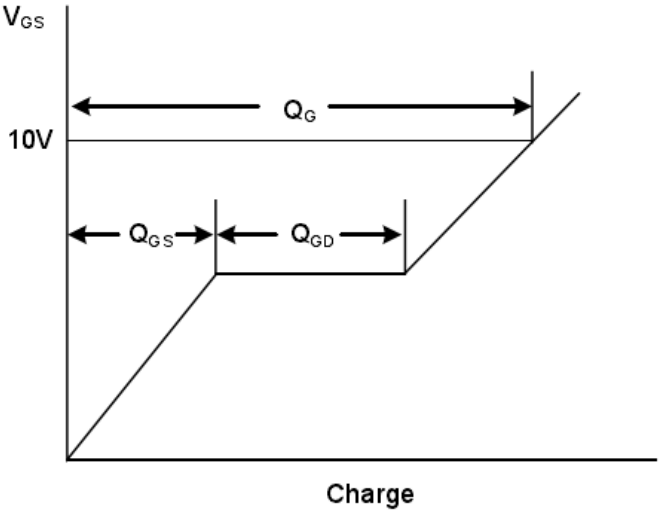
Switching Test Circuit



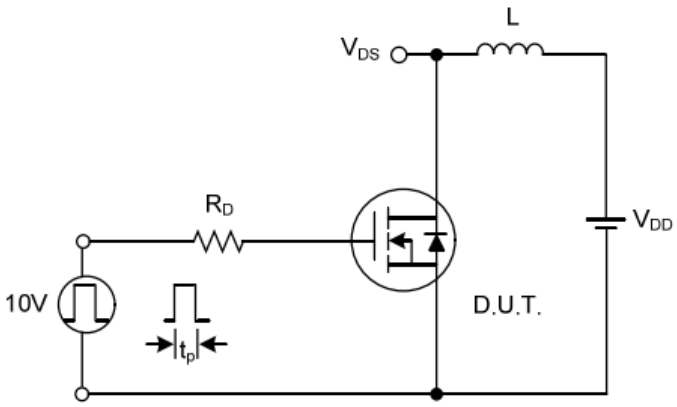
Switching Waveforms



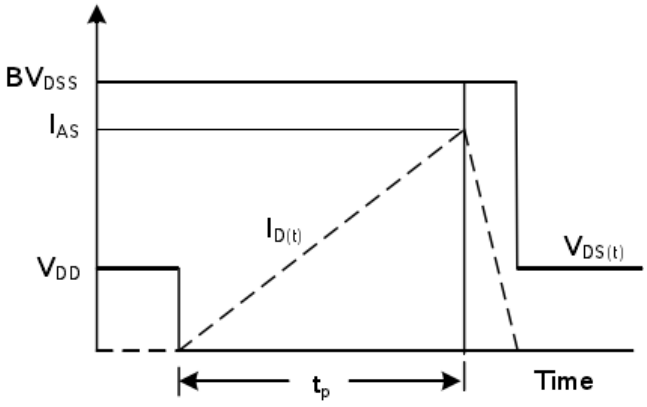
Gate Charge Test Circuit



Gate Charge Waveform

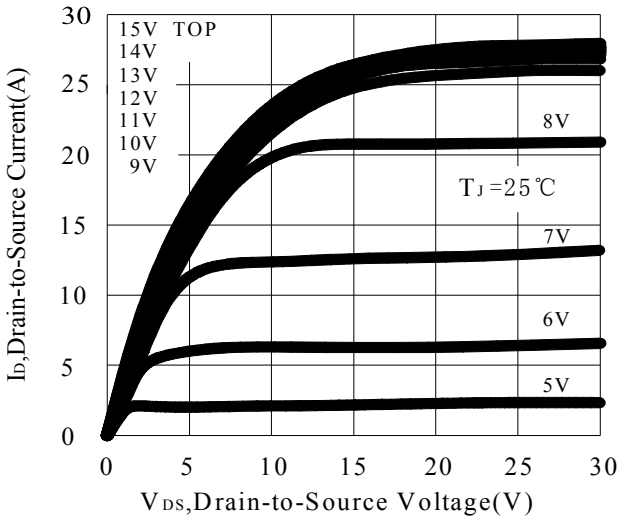


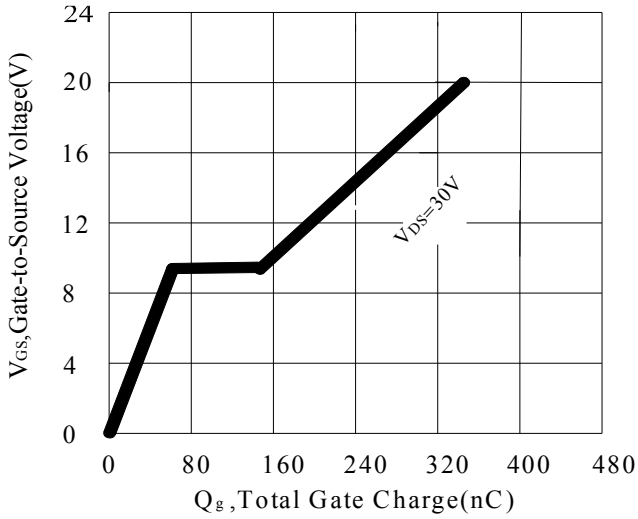
Unclamped Inductive Switching Test Circuit

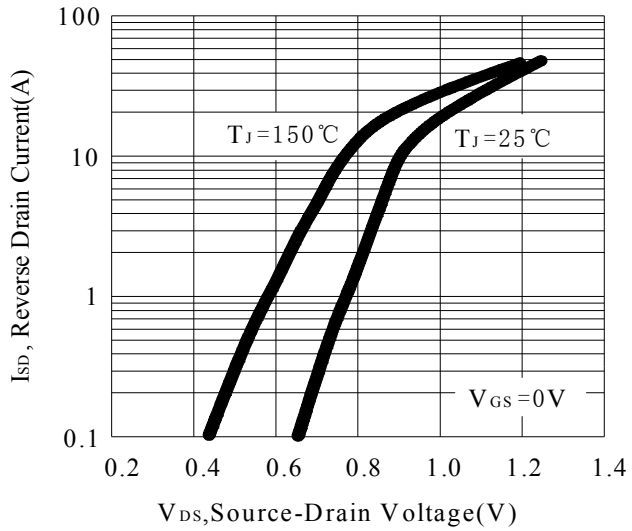


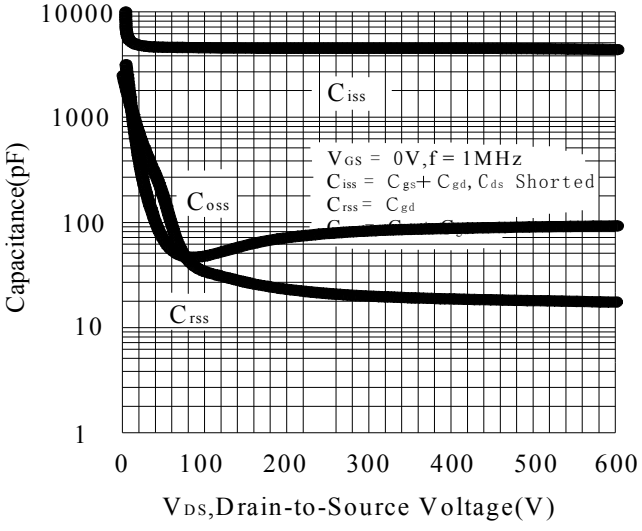
Unclamped Inductive Switching Waveforms

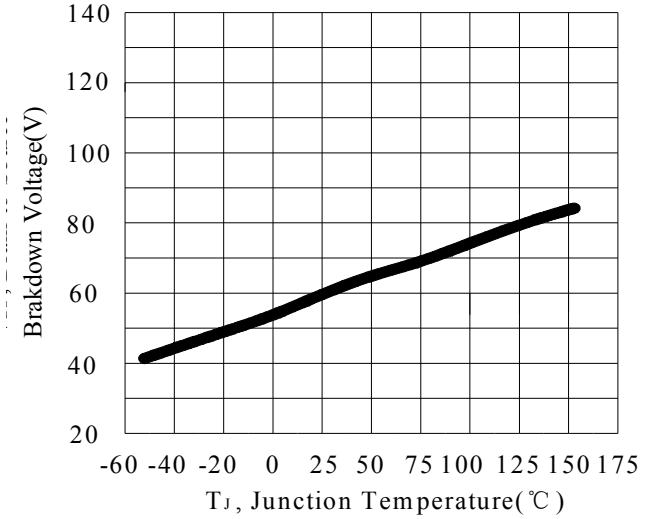
RATINGAND CHARACTERISTIC CURVES

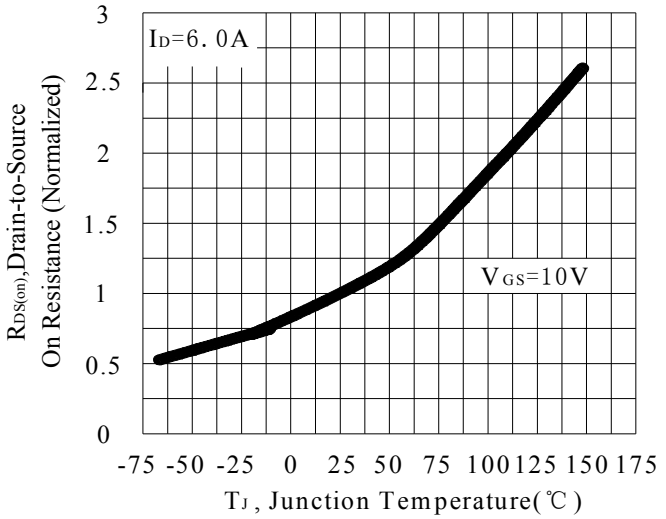


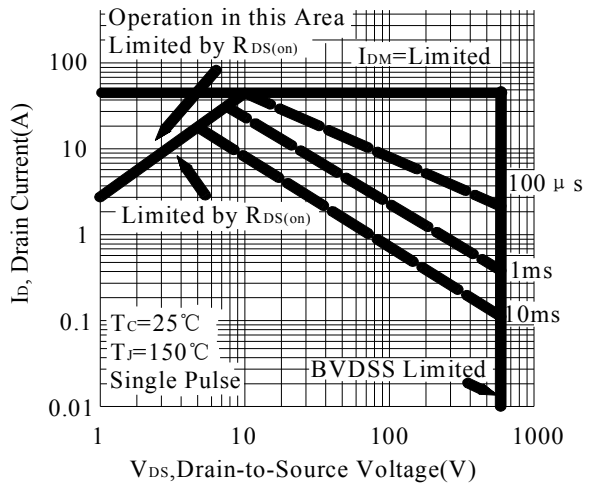


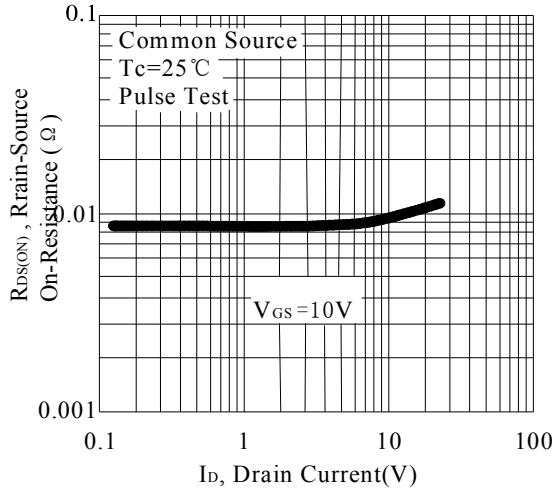


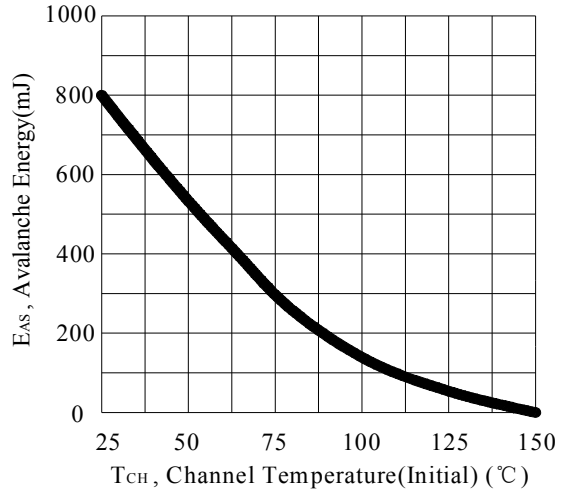


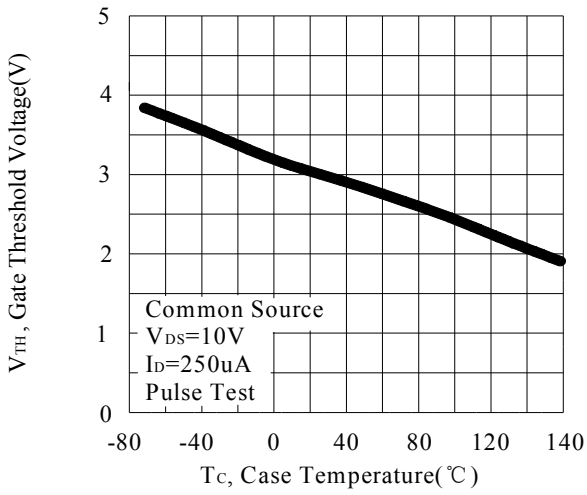


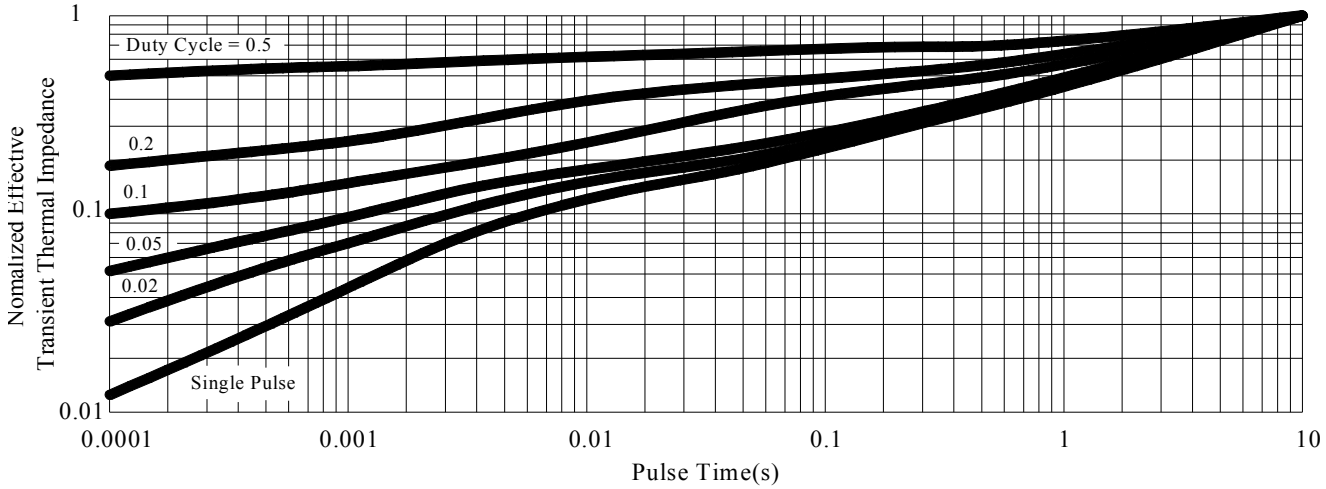



Operation in this Area
Limited by RDS(on)
IDM=Limited
100 μs
1ms
10ms
Limited by RDS(on)
TC=25℃
TJ=150℃
Single Pulse
BVDSS Limited
ID, Drain Current(A)
VDS,Drain-to-Source Voltage(V)


Common Source
Tc=25℃
Pulse Test
VGS=10V
RDS(ON), Rrain-Source On-Resistance (Ω)
ID, Drain Current(V)

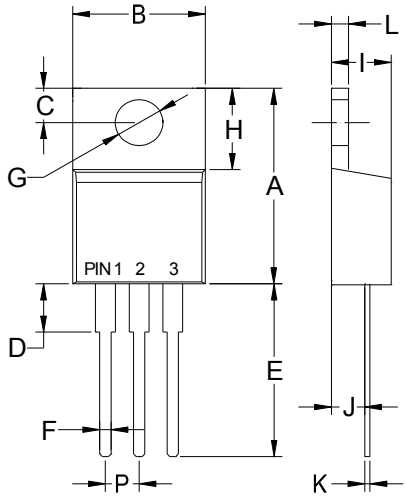

EAS, Avalanche Energy(mJ)
TCH, Channel Temperature(Initial) (℃)


Common Source
VDS=10V
ID=250uA
Pulse Test
VTH, Gate Threshold Voltage(V)
TC, Case Temperature(℃)


Duty Cycle = 0.5
0.2
0.1
0.05
0.02
Single Pulse
Nomalized Effective Transient Thermal Impedance
Pulse Time(s)

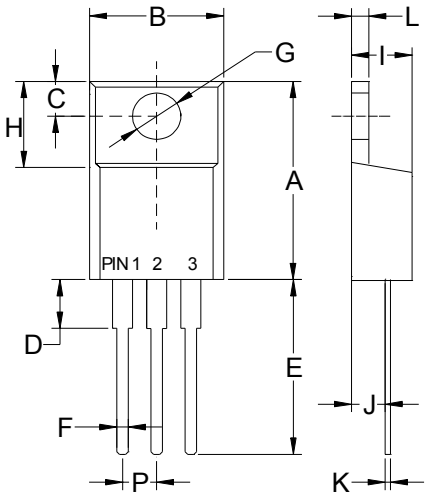
PACKAGE OUTLINE DIMENSIONS

TO-220AB



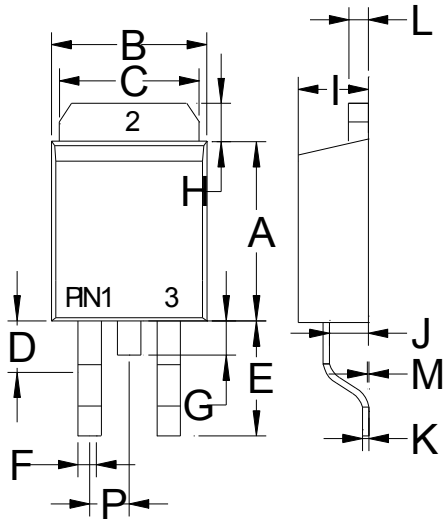
TO-220AB		
Dim	Min	Max
A	.573(14.55)	.603(15.32)
B	——	.412(10.5)
C	.103(2.62)	.113(2.87)
D	.140(3.56)	.160(4.06)
E	.510(13.0)	.560(14.3)
F	.027(0.68)	.037(0.94)
G	.148(3.74)	.154(3.91)
H	.230(5.84)	.270(6.86)
I	.175(4.44)	.185(4.86)
J	.100(2.54)	.110(2.79)
K	.014(0.35)	.025(0.64)
L	.045(1.14)	.055(1.40)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

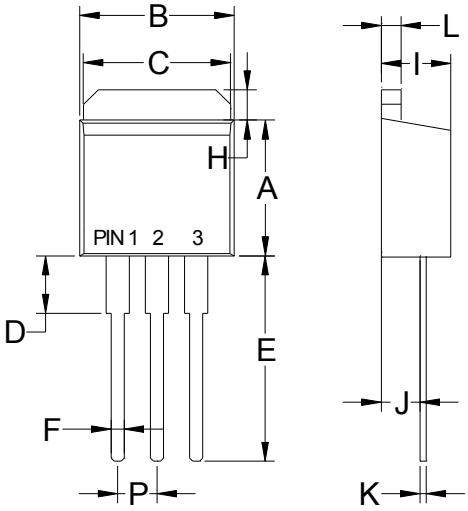
TO-263



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)