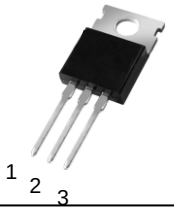
XM120M80CX0LG

N-channel Enhanced mode Power MOSFET

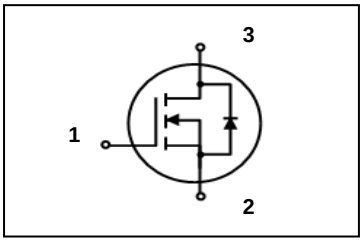
Description

The XM120M80CX0LG uses advanced trench technology and Design to provide excellent RDS(ON) with low gate charge. The device is suitable for use in PWM, load switching and general Purpose applications

TO-220 Package



1. Gate 2. Drain 3. Source



Features

- 80V,120A
- RDS(on)=6.5mΩ(Typ.) @VGS=10V,ID=20A
- Pb-free lead plating; RoHS compliant

Absolute Maximum Ratings (Tc= 25℃ unless otherwise noted.)

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	80	V
V_{GSS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current (T_C=25 ℃)	120	A
I_{DM}[1]	Pulsed Drain Current	480	A
I_F	Diode Continuous Forward Current (T_C=25℃)	120	A
P_D	Power Dissipation (T_C=25 ℃)	137	W
E_{AS}	Avalanche Energy, Single pulse (V_{DD}=40V,V_{GS}=10V,L=0.5mH,R_G=25Ω)	342	mJ
T_J	Operating Junction Temperature Range	-55 to 150	℃
T_{STG}	Storage Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance-Junction to case (Steady State)	0.91	℃/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient (Steady State)	58.5	℃/W

Note:
1 : Pulse width is limited by safe operating area. Pulse test ; pulse width≤300μs, duty cycle≤2%

Electrical characteristic (@T_J = 25°C, unless otherwise specified)

Static characteristics

Parameter	Symbol	Values			Unit	Note/Test Condition
		Min.	Typ.	Max.		
Drain to source breakdown voltage	$V_{(BR)DSS}$	80	--	--	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(TH)}$	2	--	4	V	V_{DS}=V_{GS}, I_D=250uA
Zero gate voltage drain current	I_{DSS}	--	--	1	uA	V_{DS}=64V, V_{GS}=0V
Gate to source leakage current	I_{GSS}	--	--	±100	nA	V_{GS}=±20V, V_{DS}=0V
Drain-source on-state resistance	$R_{DS(On)}$	--	6.5	--	mΩ	V_{GS}=10V, I_D=20A

Dynamic characterristics

Parameter	Symbol	Values			Unit	Note/Test Condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}	--	5622	--	pF	V_{GS}=0V, V_{DS}=25V, F=1MHz
Output capacitance	C_{oss}	--	410	--	pF	
Reverse transfer capacitance	C_{rss}	--	184	--	pF	
Turn on delay time	$t_{d(on)}$	--	19	--	ns	V_{DS}=30V, R_L=15Ω, R_G=2.5Ω, V_{GS}=10V
Rising time	T_r	--	22	--	ns	
Turn off delay time	$t_{d(off)}$	--	47	--	ns	
Fall time	t_f	--	32	--	ns	
Total gate charge	Q_g	--	106	--	nC	V_{DS}=50V, V_{GS}=10V I_D=40A
Gate-source charge	Q_{gs}	--	36	--	nC	
Gate-drain charge	Q_{gd}	--	32	--	nC	

Reverse diode characteristics

Parameter	Symbol	Values			Unit	Note/Test Condition
		Min.	Typ.	Max.		
Diode forward voltage	V_{SD}	--	0.89	0.95	V	I_F=20A, V_{GS}=0V, T_J = 25°C
Reverse recovery time	t_{rr}	--	34	--	ns	I_F=40A,V_{DS}=30V dI$_F$/dt=100A/us
Reverse recovery charge	Q_{rr}	--	50	--	uC	
Peak reverse recovery current	I_{rrm}	--	2.83	--	A	

Electrical characteristics diagrams

Table 1

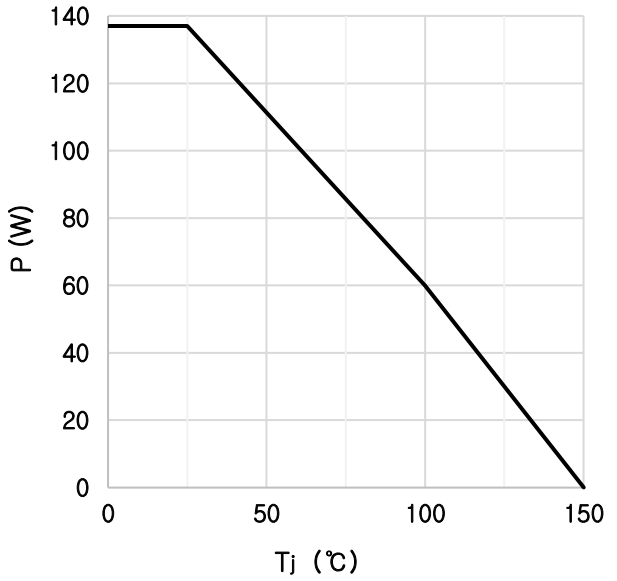
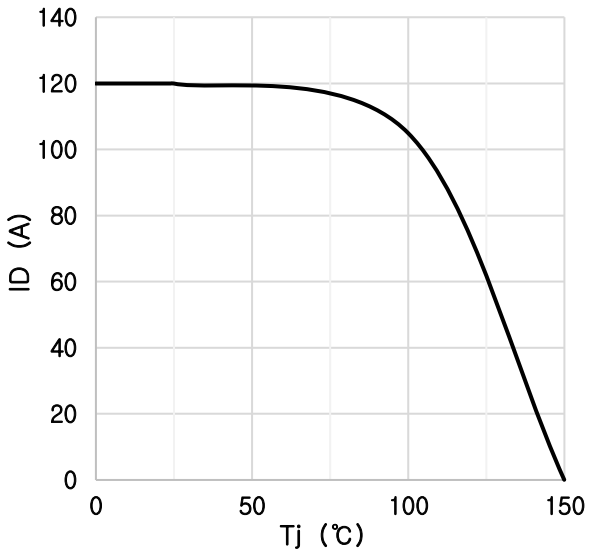
Power dissipation	Drain Current
	
$P_{tot}=f(T_C)$	$I_D=f(T_C)$

Table 2

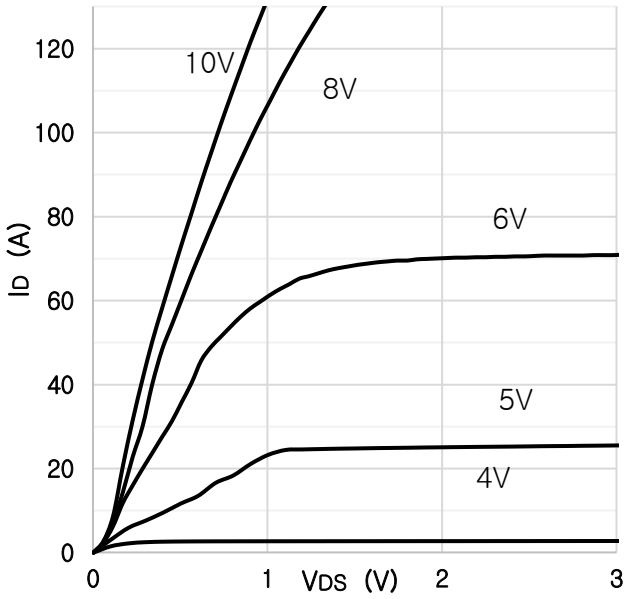
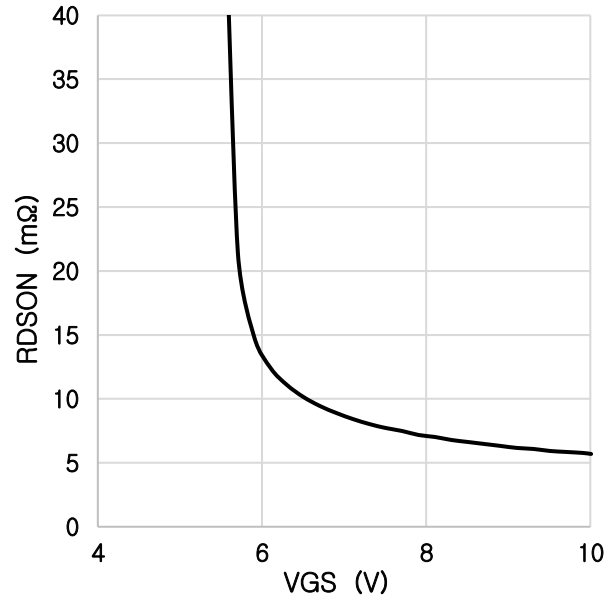
output characteristics	Gate-Source On Resistance
	
$I_D=f(V_{DS})$; T_j = 25ºC ;parameter:V_{GS}	$R_{DS(On)}=f(V_{GS})$; I_D=20A

Table 3

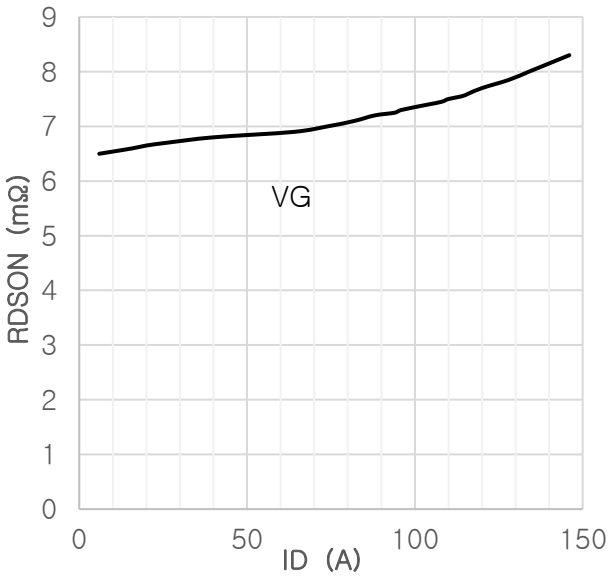
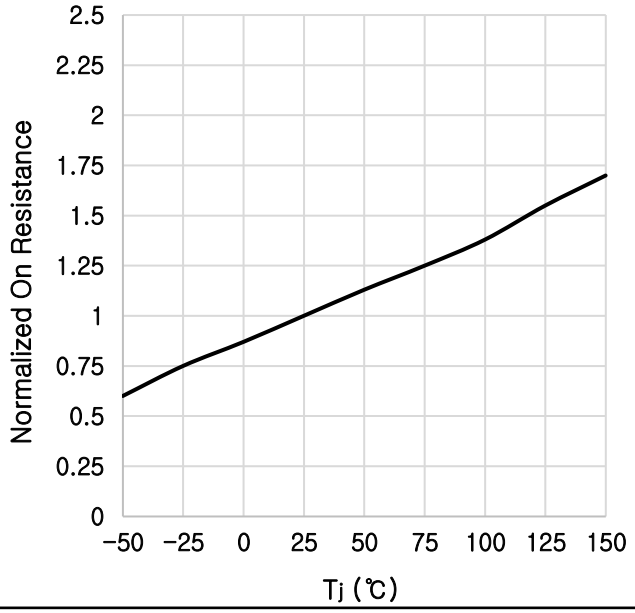
Drain-source on-state resistance	Drain-source on-state resistance
	
$R_{DS(On)}$=f(I_D); V_{GS}=10V	$R_{DS(On)}$=f(T_j); I_D = 20A ; V_{GS}=10V

Table 4

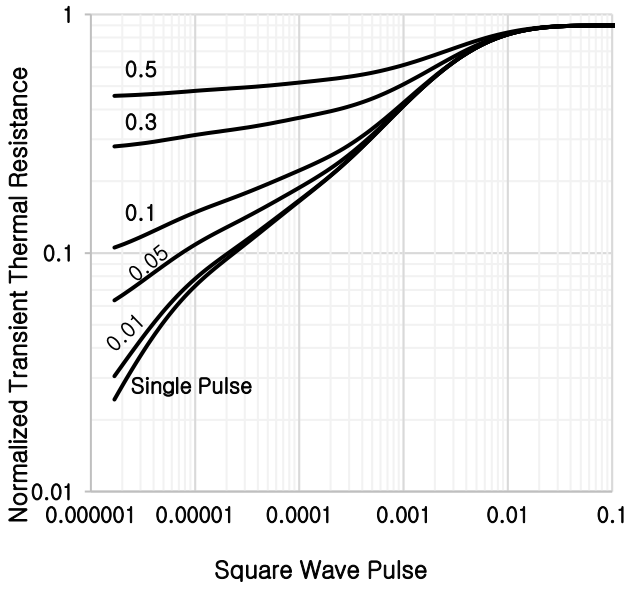
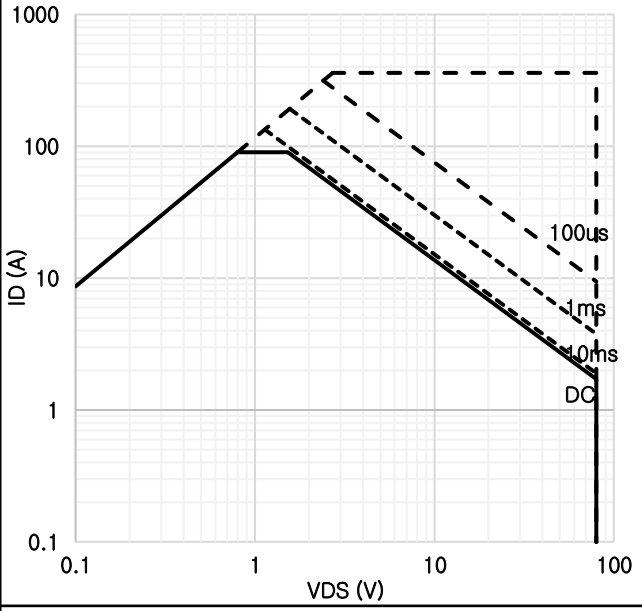
Thermal Transient Impedance	Safe operating area T_C= 25ºC
	
Z_{thJC}=f(t_P);parameter:D=t_P/T	I_D=f(V_{DS}); T_C = 25ºC ;D=0;parameter:t_P

Table 5

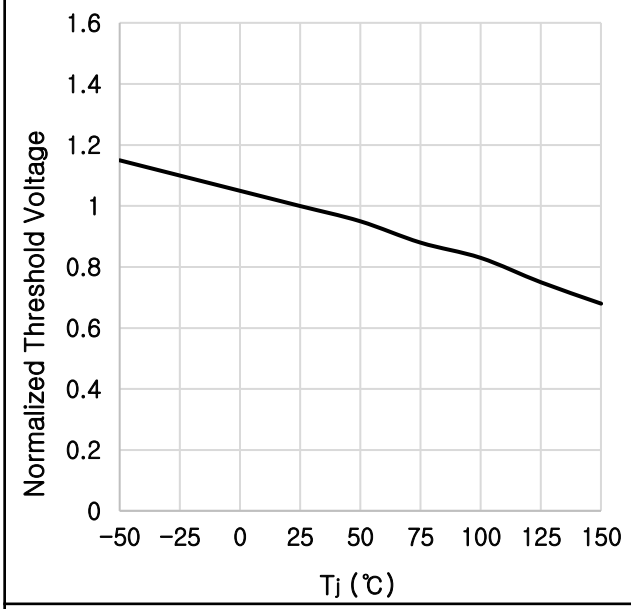
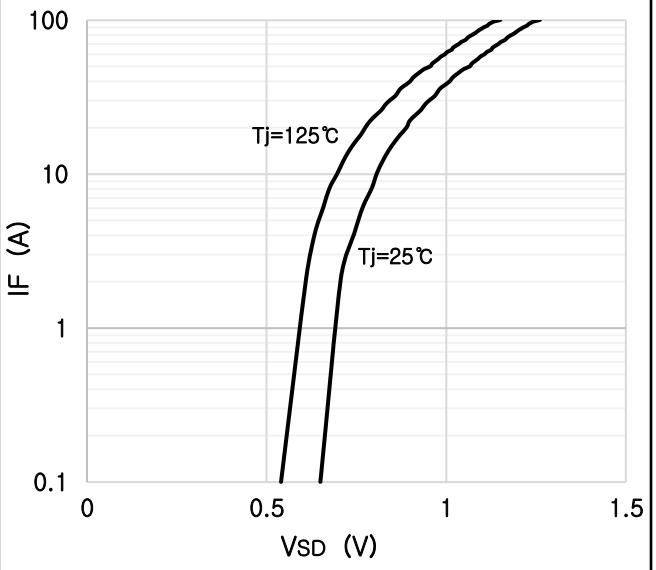
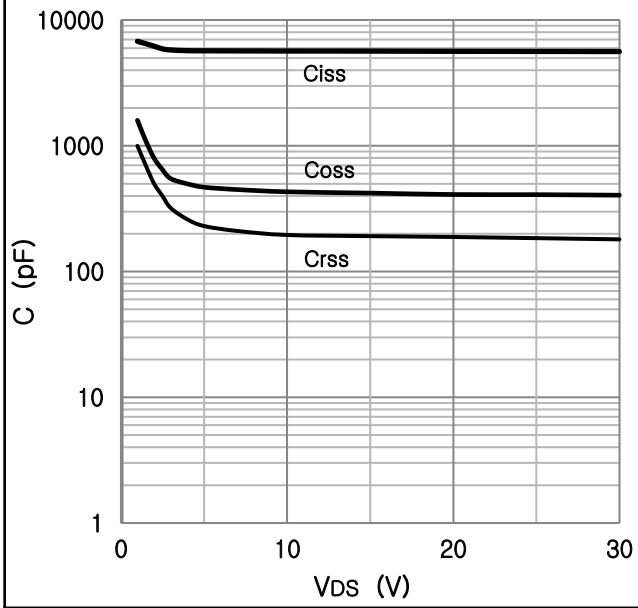
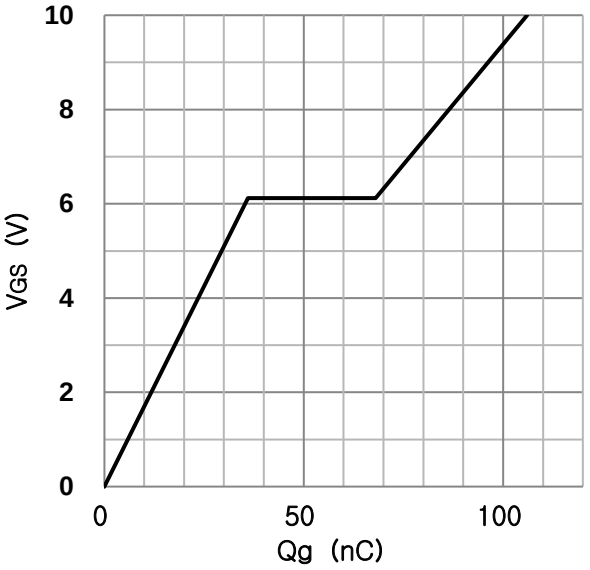
$V_{GS(th)}$ VS Junction Temperature	Source-Drain Diode Forward
	
V_{GS}=f(T_j); V_{DS}=V_{GS}; I_D=250uA	I_F=f(V_{SD});; parameter:Tj

Table 6

Capacitance	Gate Charge
	
C=f(V_{DS}); V_{GS} = 0V ;Freq=1MHZ	VGS=f(Qg), ID=40A

Test Circuit & Waveform

Table 7 Diode Recovery Characteristic

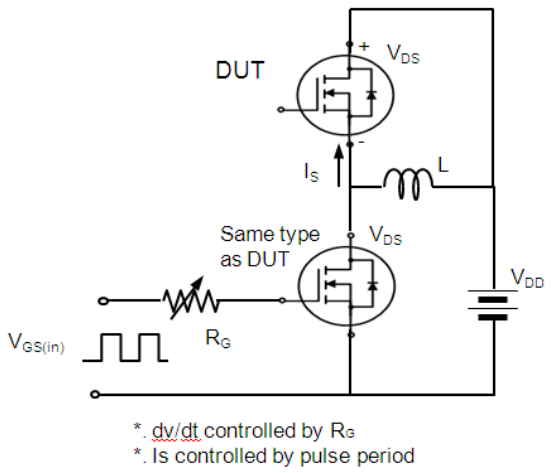
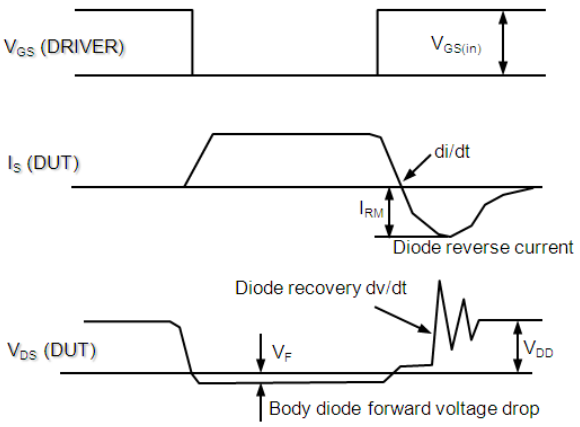
Test Ciruit For Diode Recovery	Test Waveform For Diode Recovery
	

Table 8 Switching Time Characteristic

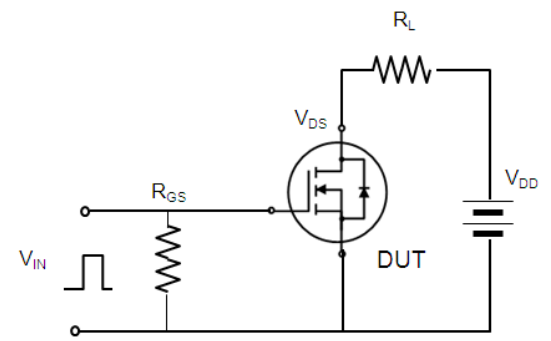
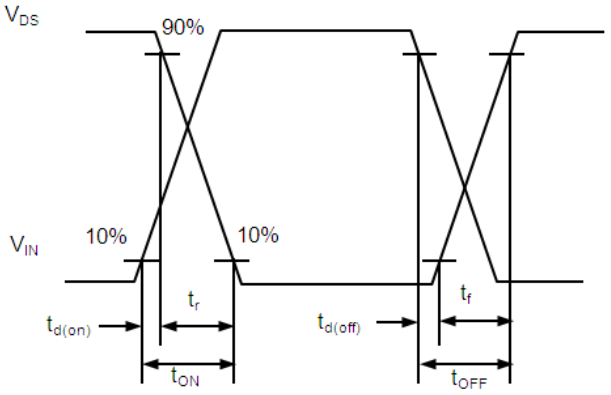
Test Ciruit for Switching Time	Test Waveform for Switching Time
	

Table 9 Gate Charge Characteristic

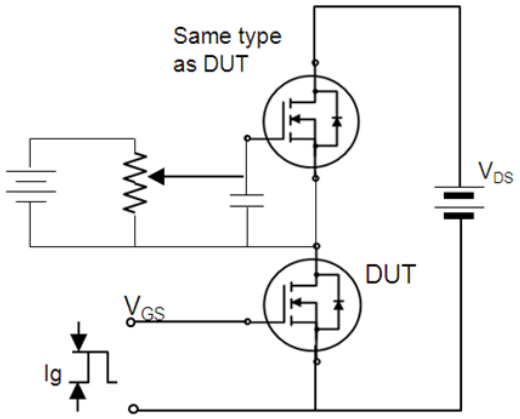
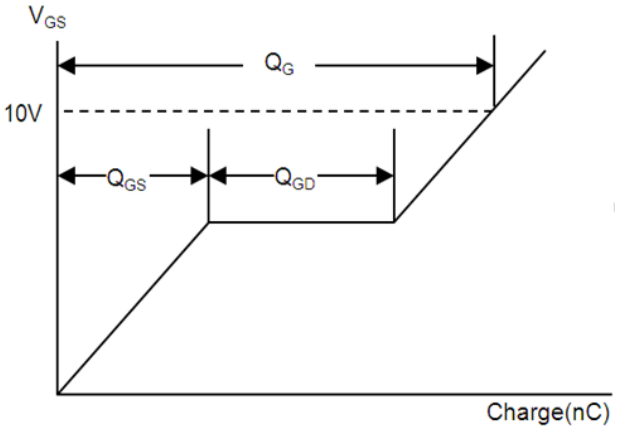
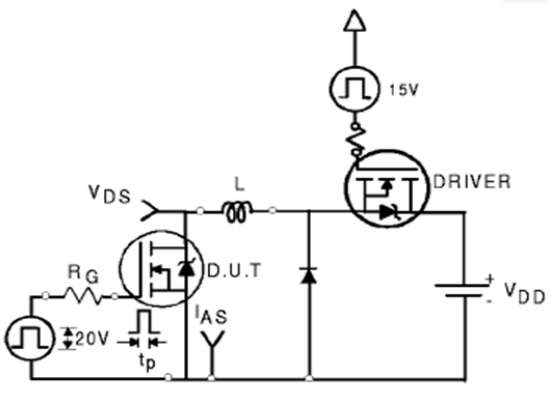
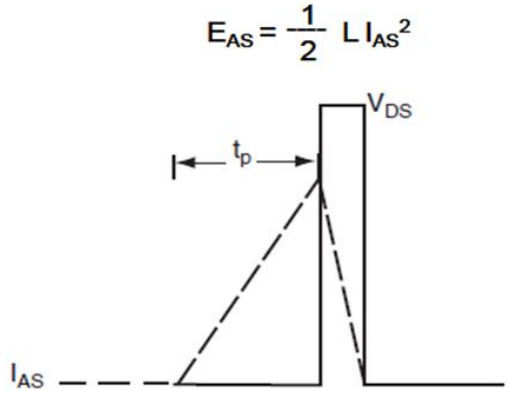
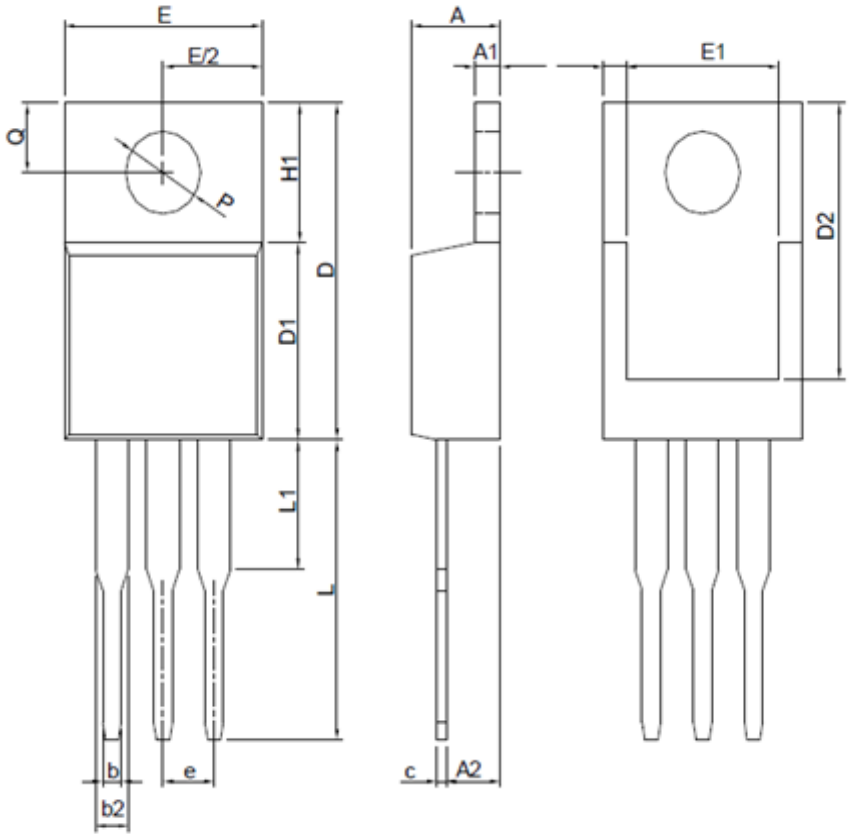
Test Ciruit For Gate Charge	Test Waveform For Gate Charge
	

Table 10 Unclamped Inductive Characteristic

Test Ciruit For Unclamped Inductive	Test Waveform For Unclamped Inductive
	



SYMBOL	TO-220			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	3.56	4.83	0.140	0.190
A1	0.51	1.40	0.020	0.055
A2	2.03	2.92	0.080	0.115
b	0.38	1.02	0.015	0.040
b2	1.14	1.78	0.045	0.070
c	0.36	0.61	0.014	0.024
D	14.22	16.51	0.560	0.650
D1	8.38	9.02	0.330	0.355
D2	12.19	13.65	0.480	0.537
E	9.65	10.67	0.380	0.420
E1	6.86	8.89	0.270	0.350
e	2.54 BSC		0.100 BSC	
H1	5.84	6.86	0.230	0.270
L	12.70	14.73	0.500	0.580
L1	-	6.35	-	0.250
P	3.53	4.09	0.139	0.161
Q	2.54	3.43	0.100	0.135

Note: Follow JEDEC TO-220 AB.

Revision History

Ver.	Date	Change Notice
1.0	2019/10/15	Release