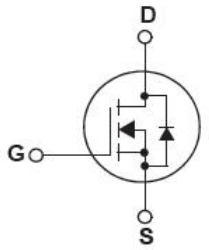
800V N-Channel MOSFET

Description

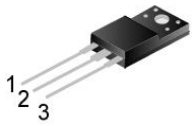
SR80R240 is new generation of high voltage MOSFET family that is utilizing an advanced charge balance mechanism for outstanding low on-resistance and lower gate charge performance.

This advanced technology has been tailored to minimize conduction loss, provide superior switching performance, and withstand extreme dv/dt rate and higher avalanche energy.

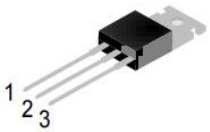
SJ-FET is suitable for various AC/DC power conversion in switching mode operation for higher efficiency..



1.Gate 2.Drain 3.Source



TO-220F-



TO-220-3

TO-263-2L

Features

•Multi-Epi process SJ-FET

•850V @TJ = 150 ℃

•Typ. RDS(on) = 0.22Ω

•Ultra Low Gate Charge (typ. Qg = 27.5nC)

100% avalanche tested

Package Marking and Ordering Information:

Marking	Package	Part #	Hazardous Substance Control	Packing
SR80R240F	T0-220F-3L	SR80R240F	Pb free	Tube
SR80R240T	T0-220-3L	SR80R240T	Pb free	Tube
SR80R240S	TO-263-2L	SR80R240S	Pb free	Tube

Absolute Maximum Ratings

Symbol	Parameter	SR80R240T/S	SR80R240F	Unit
VDSS	Drain-Source Voltage	800		V
ID	Drain Current -Continuous (TC = 25℃) -Continuous (TC = 100℃)	18.4* 11.6*		A
IDM	Drain Current – Pulsed (Note 1)	51*		A
VGSS	Gate-Source voltage	±30		V
EAS	Single Pulsed Avalanche Energy (Note 2)	485		mJ
IAR	Avalanche Current (Note 1)	3.5		A
dv/dt	Peak Diode Recovery dv/dt (Note 3)	15		V/ns
dVds/dt	Drain Source voltage slope (Vds=640V)	50		V/ns
PD	Power Dissipation (TC = 25℃)	151	35	W
TJ, TSTG	Operating and Storage Temperature Range	-55 to +150		℃
TL	Maximum Lead Temperature for Soldering Purpose,1/8" from Case for 5 Seconds	300		℃

* Drain current limited by maximum junction temperature . Maximum duty cycle D=0.75.

Thermal Characteristics

Symbol	Parameter	SR80R240T/S	SR80R240F	Unit
$R_{\theta JC}$	Thermal Resistance, **J**unction-to-Case	0.83	3.7	℃/W
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink Typ.	0.5	-	℃/W
$R_{\theta JA}$	Thermal Resistance, **J**unction-to-Ambient	62	80	℃/W

Electrical Characteristics TC = 25℃ unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA, T_J = 25℃	800	-	-	V
		V_{GS} = 0V, I_D = 250μA, T_J = 150℃	-	850	-	V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250μA, Referenced to 25℃	-	0.6	-	V/℃
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 800V, V_{GS} = 0V -T_J = 150℃	-	- 10	1 -	μA μA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30V, V_{DS} = 0V	-	-	100	nA
I_{GSSR}	Gate-BodyLeakageCurrent,Reverse	V_{GS} = -30V, V_{DS} = 0V	-	-	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	2.5	3.5	4.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10V, I_D = 9A	-	0.22	0.26	Ω
g_{FS}	Forward Trans conductance	V_{DS} = 40V, I_D = 18A	-	19	-	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1MHz	-	1290	-	pF
C_{oss}	Output Capacitance		-	380	-	pF
C_{rss}	Reverse Transfer Capacitance		-	22	-	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 400V, I_D = 10A R_G = 25Ω(Note 4)	-	40	-	ns
t_r	Turn-On Rise Time		-	21	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	139	-	ns
t_f	Turn-Off Fall Time		-	21	-	ns
Q_g	Total Gate Charge	V_{DS}=450V,I_D=10A V_{GS} = 10V (Note 4)	-	27.5		nC
Q_{gs}	Gate-Source Charge		-	6.3	-	nC
Q_{gd}	Gate-Drain Charge		-	11.2	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		-	-	18	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		-	-	51	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0V, I_F = 20A	-	1	1.5	V

trr	Reverse Recovery Time	VR = 400V, VGS = 0V, IF = 20A, dIF/dt =100A/μs	-	710	-	ns
Qrr	Reverse Recovery Charge		-	13	-	μC
Irrm	Peak reverse recovery Current		-	33	-	A

NOTES:

1.Repetitive Rating: Pulse width limited by maximum junction temperature

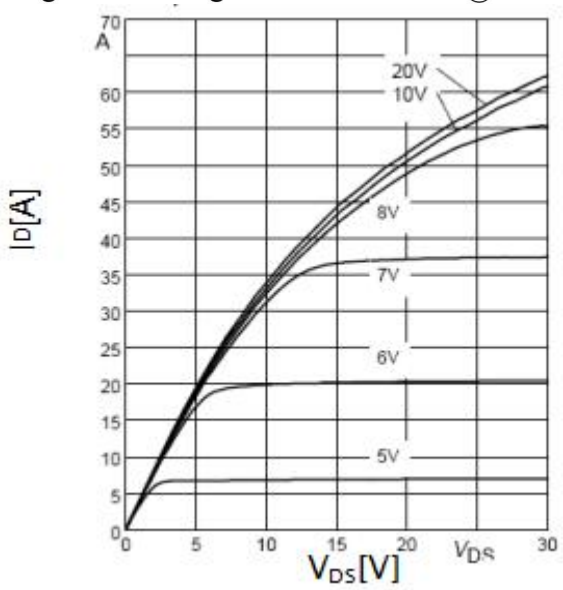
2.IAS=3.5A, VDD=50V, Starting TJ=25 ℃

3.ISD≤ID, di/dt ≤ 200A/us, VDD ≤ BVDSS, Starting TJ = 25 ℃

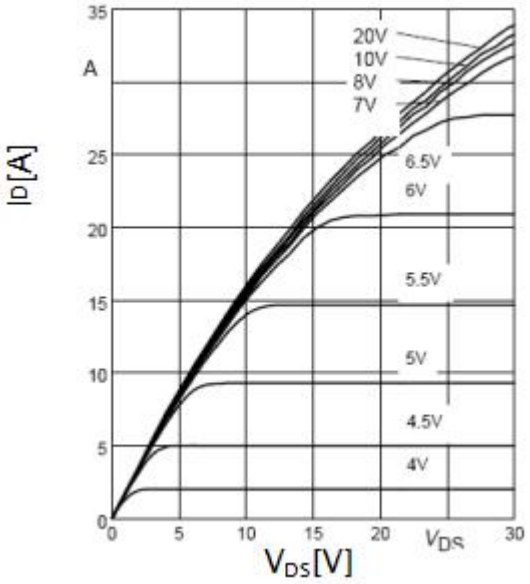
4.Essentially Independent of Operating Temperature Typical Characteristics

Typical Performance Characteristics

Figuer1:On-Region Characteristics@25℃

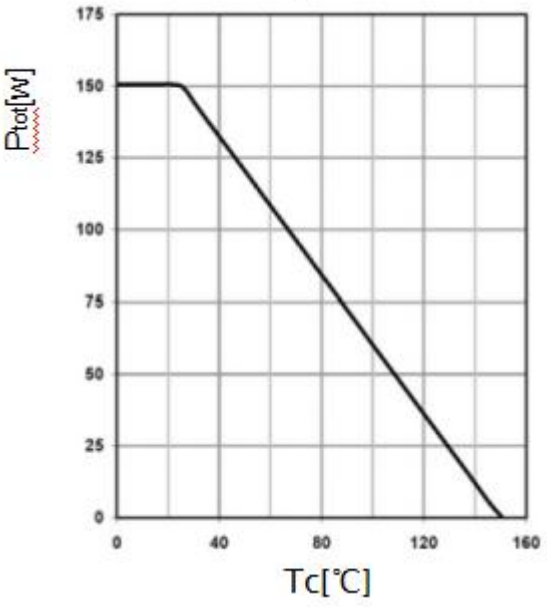


Figuer2:On-Region Characteristics@125℃



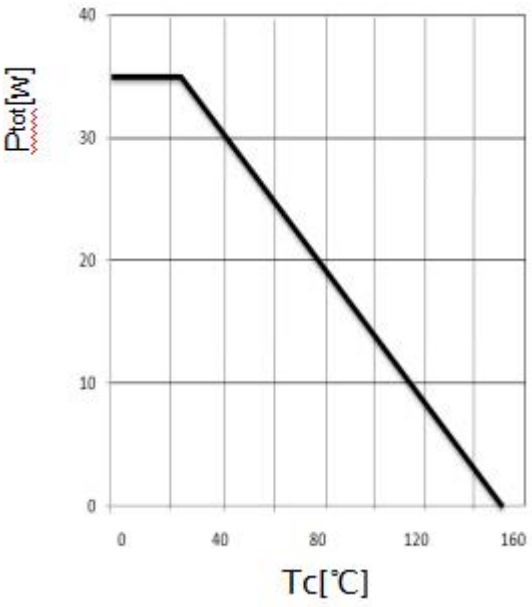
Figuer3:Power Dissipation

TO-220/263



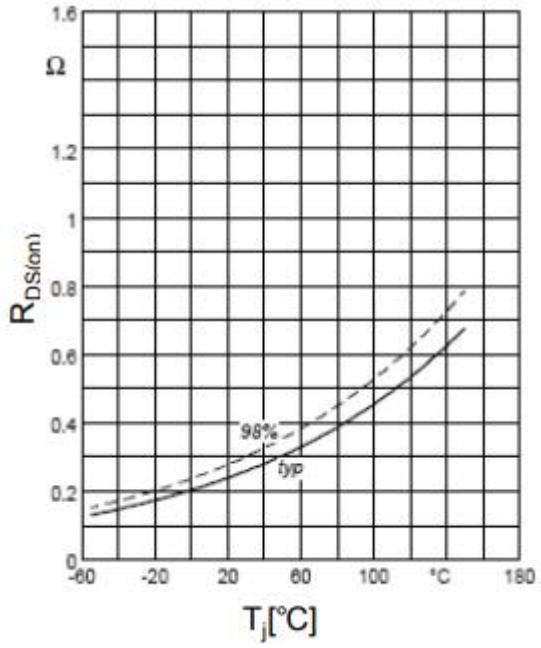
Figuer4:Power Dissipation

TO-220FullPAK

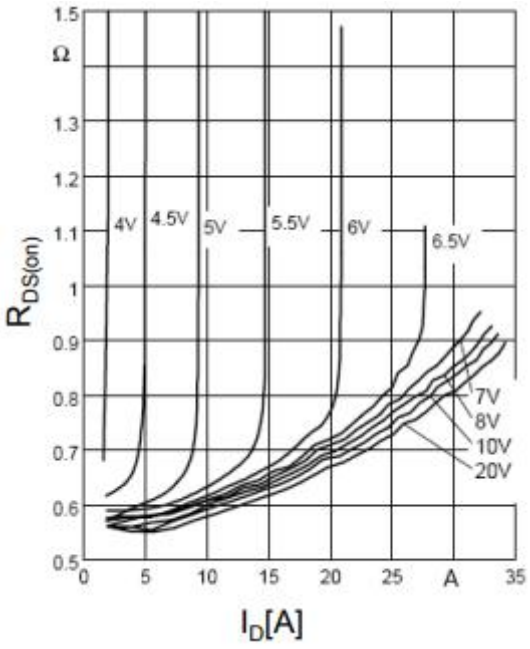


Typical Performance Characteristics

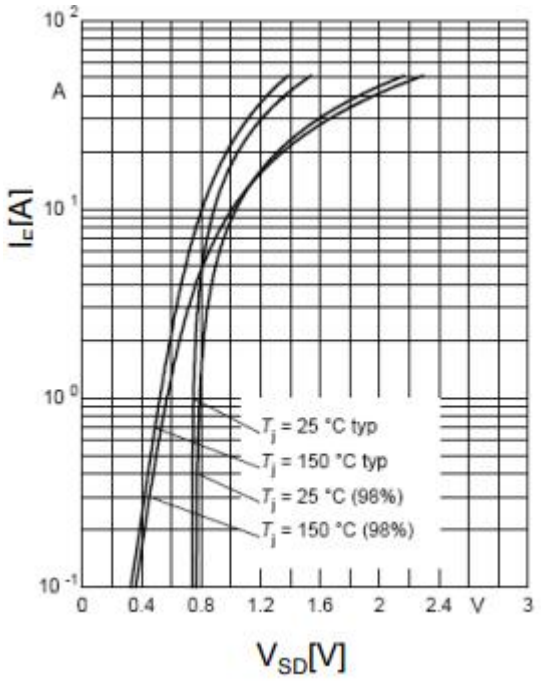
Figuer5:On-Resistance vs. Junction Temperature



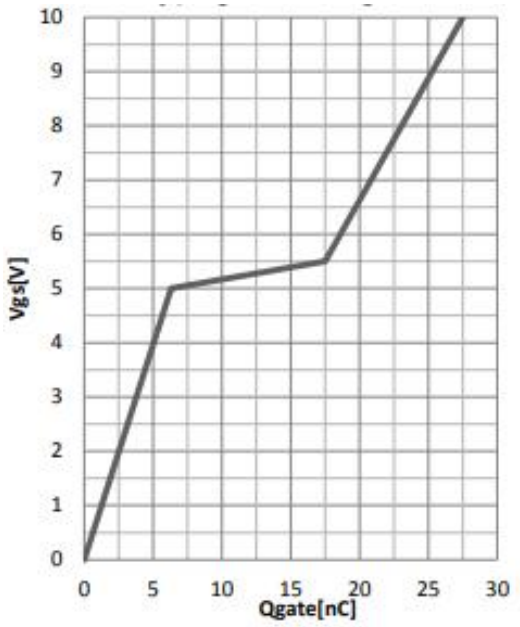
Figuer6:On-Resistance vs. Drain Current,Tj=125℃



Figuer7:Body-Diode Characteristics

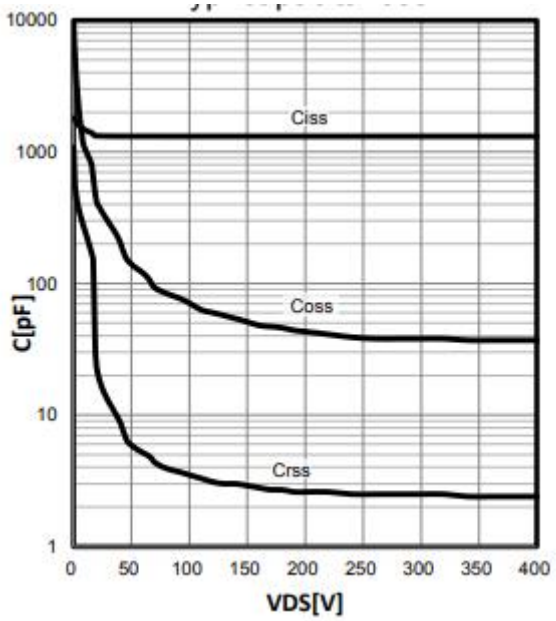


Figuer8:Gate-Charge Characteristics

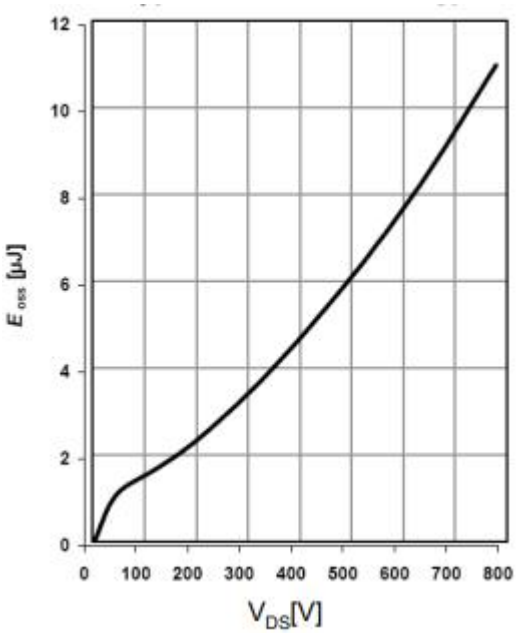


Typical Performance Characteristics

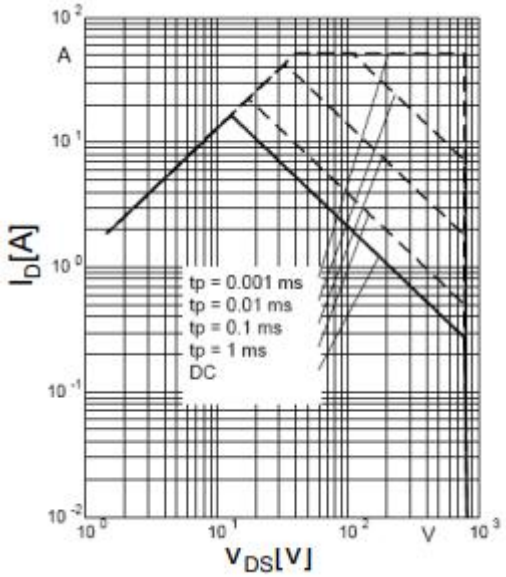
Figuer9:Capacitance Characteristics



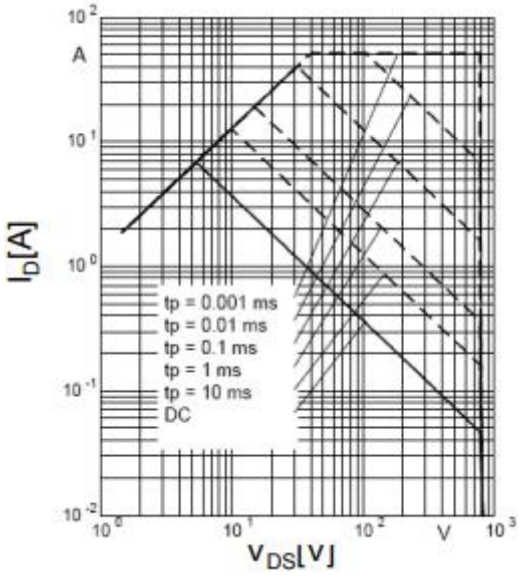
Figuer10:Coss stored Energy



Figuer11:Maximum Forward Biased Safe Operating Area
Tc=25℃，TO-220,TO-263

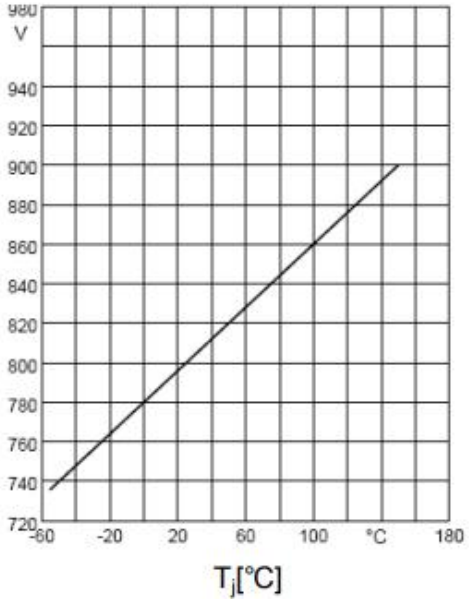


Figuer12:Maximum Forward Biased Safe Operating Area
Tc=25℃，TO-220 FullPAK

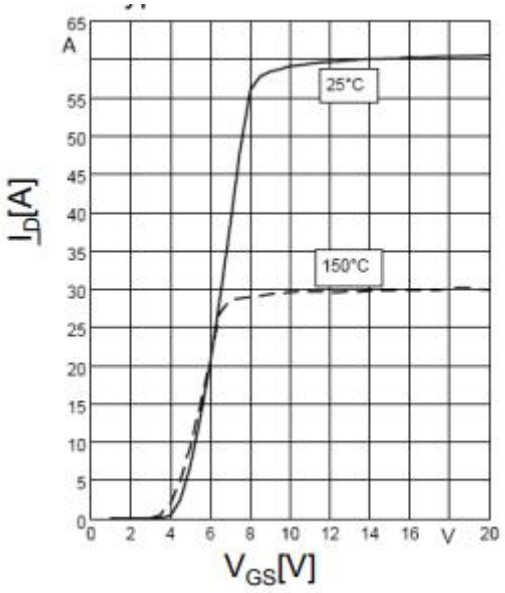


Typical Performance Characteristics

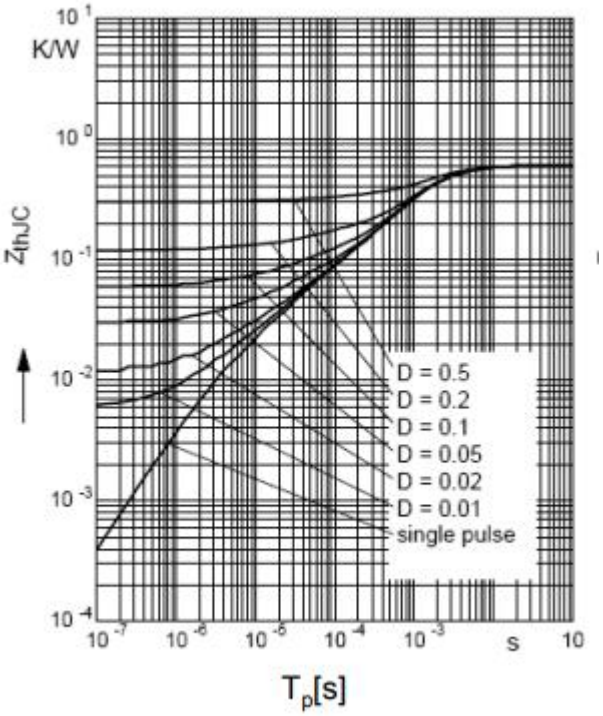
Figuer13:Break Down vs. Junction Temperature



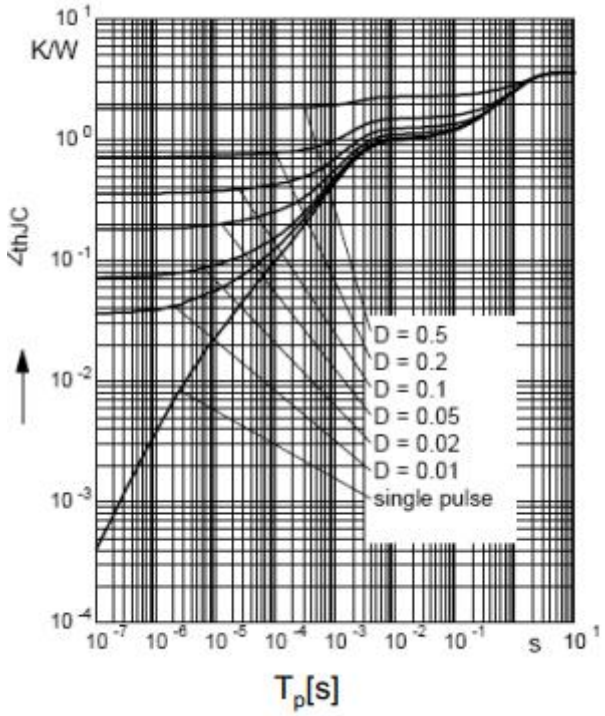
Figuer14:Typical transfer charactnristics



Figuer15:Maximum Transient Thermal Impedance TO-220,TO-263

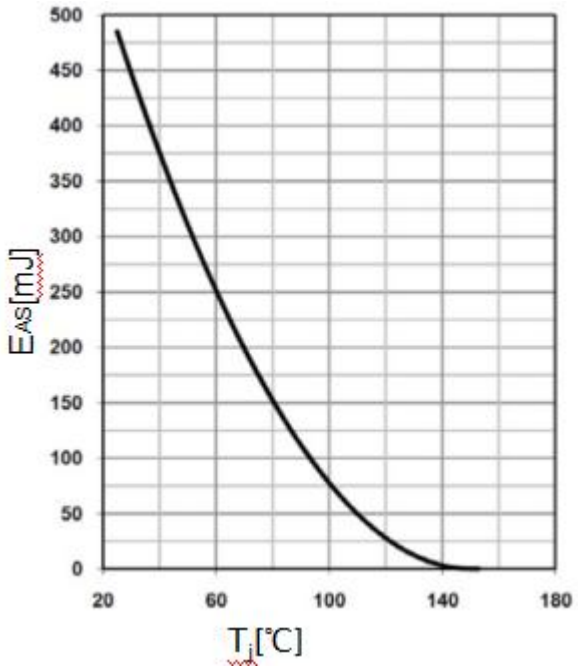


Figuer16:Maximum Transient Thermal Impedance TO-220 FullPAK



Typical Performance Characteristics

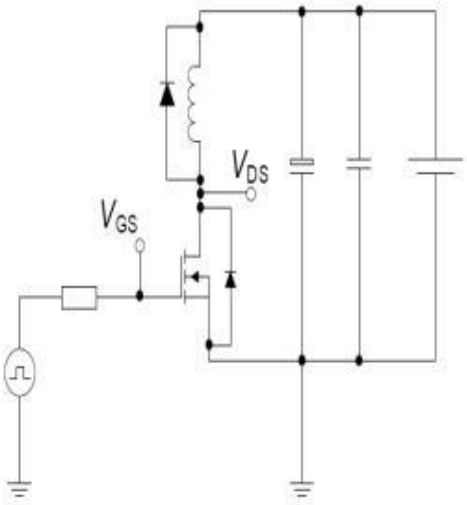
Figuer17:Avalanche energy



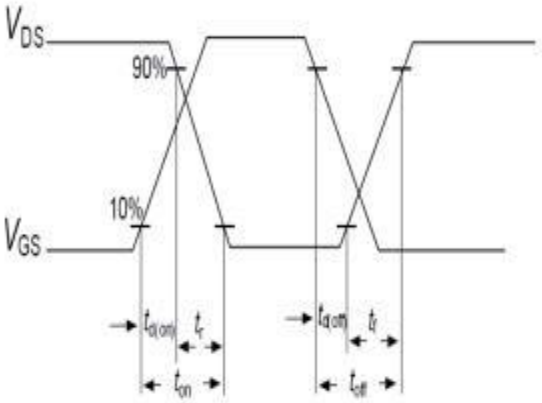
Test circuits

Switching times test circuit and waveform for inductive load

Switching times test circuit for inductive load

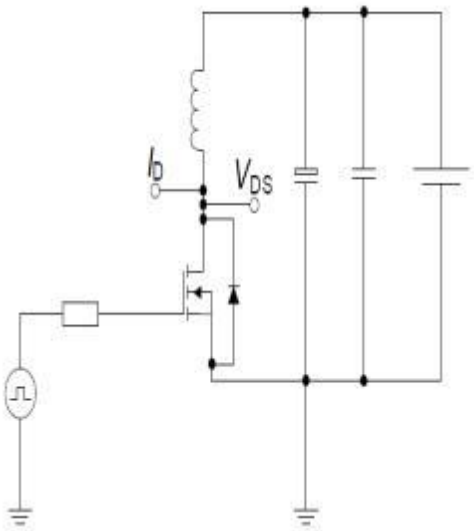


Switching time waveform

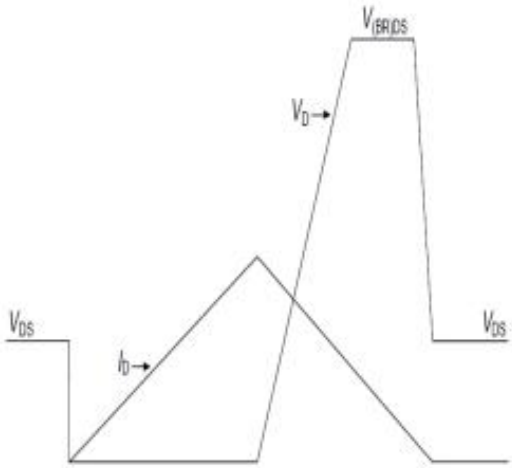


Unclamped inductive load test circuit waveform

Unclamped inductive load test circuit



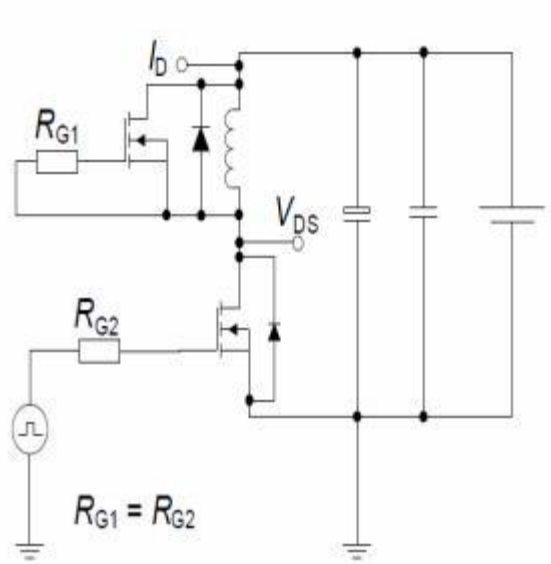
Unclamped inductive waveform



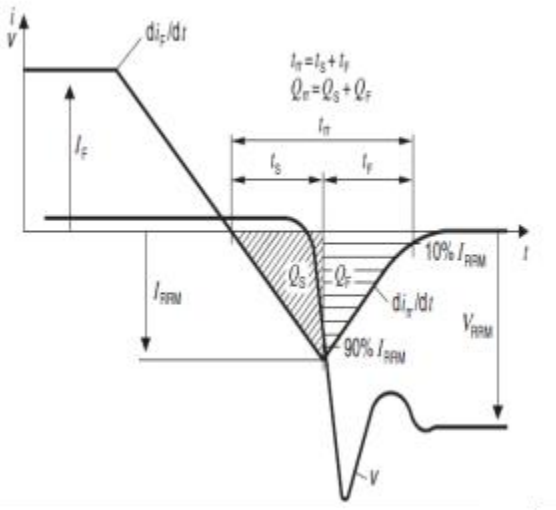
Test circuits

Test circuit and waveform for diode characteristics

Test circuit for diode characteristics

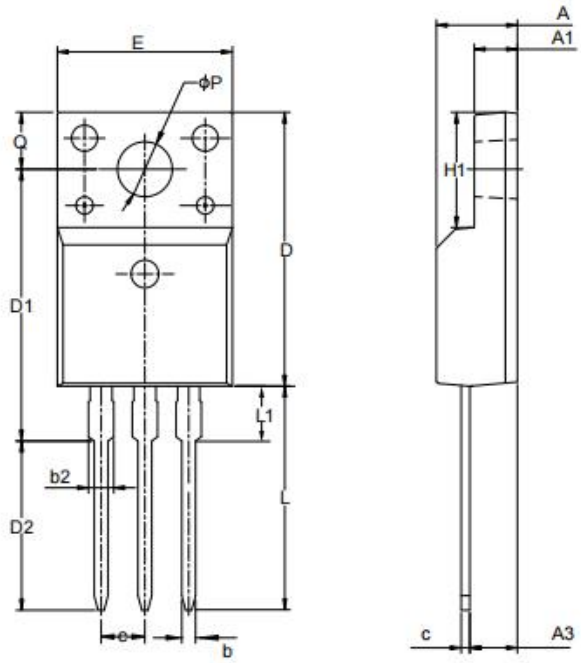


Diode recovery waveform



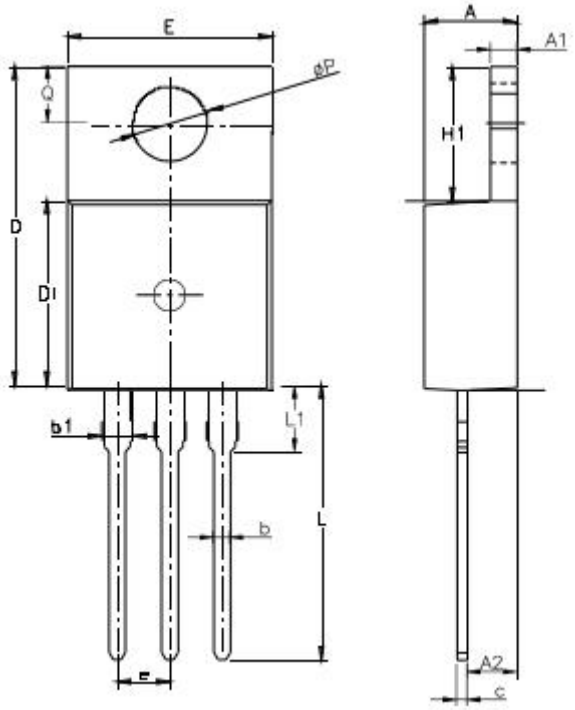
Package Outline

TO-220 Full PAK



COMMON DIMENSIONS			
Items	**Values(mm)**		
	MIN	NOM	MAX
A	4.42	4.7	5.02
A1	2.3	2.54	2.8
A3	2.5	2.76	3.1
b	0.7	0.8	0.9
b2	--	--	1.47
c	0.35	0.5	0.65
D	15.25	15.87	16.25
D1	15.3	15.75	16.3
D2	9.3	9.8	10.3
E	9.73	10.16	10.36
e	2.54BSC		
H1	6.4	6.68	7
L	12.48	12.98	13.48
L1	--	--	3.5
øP	3	3.18	3.4
Q	3.05	3.3	3.55

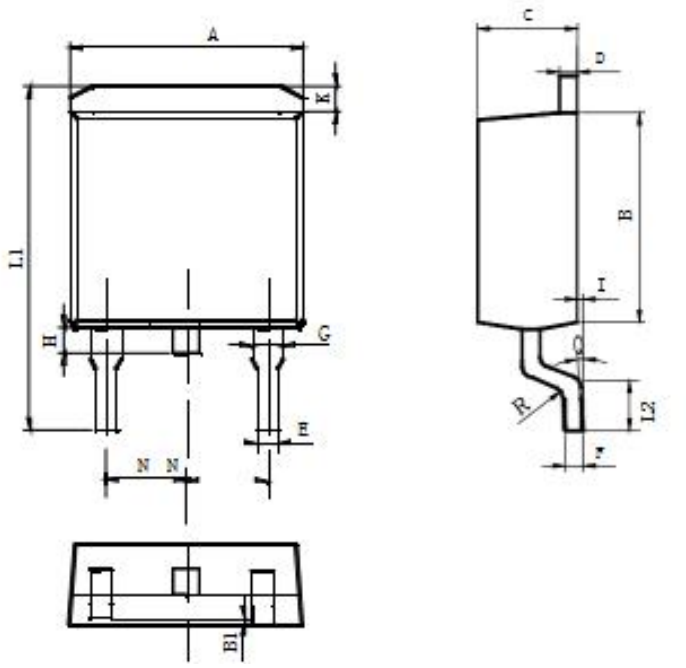
TO-220-3L



COMMON DIMENSIONS			
Items	**Values(mm)**		
	MIN	NOM	WAX
A	4.3	4.5	4.7
A1	1	1.3	1.5
A2	1.8	2.4	2.8
b	0.6	0.8	1
b1	1	-	1.6
c	0.3	-	0.7
D	15.1	15.7	16.1
D1	8.1	9.2	10
F	9.6	9.9	10.4
e	2.54BSC		
H1	6.1	6.5	7
L	12.6	13.08	13.6
L1			3.95
ΦP	3.4	3.7	3.9
Q	2.6		3.2

Package Outline

TO-263-2L



Items	Values(mm)		
	MIN	NOM	MAX
A	9.8	10	10.4
B	8.9	9.6	9.5
B1	0	-	0.1
C	4.4	4.5	4.8
D	1.16	1.4	1.5
E	0.7	0.75	0.95
F	0.3	0.45	0.6
G	1.07	1.38	1.47
H	1.3	-	1.8
K	0.95	1	1.37
L1	14.5	15.2	16.5
L2	1.6	2	2.3
I	0	-	0.2
Q	0°	3°	8°
R		0.4	
N	2.35	2.4	2.7