上海捷瑞德半导体
Jerrett Semiconductor

JRP12N10G

MOSFET

1. Description

JRP12N10G, the N-channel Enhanced Power MOSFETs, is obtained by advanced double trench technology which reduce the conduction loss, and improve switching performance. This is suitable device for synchronous rectifier and high speed switching applications.

KEY CHARACTERISTICS

Parameter	Value	Unit
V_{DSS}	100	V
I_D	55	A
$R_{DS(on).typ}$	10.5	mΩ

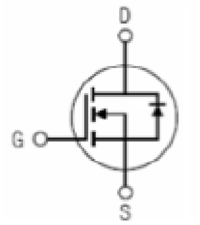
FEATURES

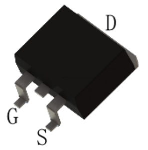
- Fast Switching
- Low On-Resistance ($R_{DS(on)} \leqslant 12m\Omega$)
- Low Gate Charge
- Low Reverse transfer capacitances
- High avalanche ruggedness
- RoHS product

APPLICATIONS

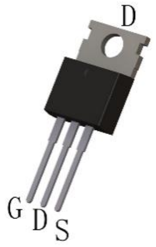
- Synchronous rectifiers
- High speed switching applications

Inner Equivalent Principium Chart





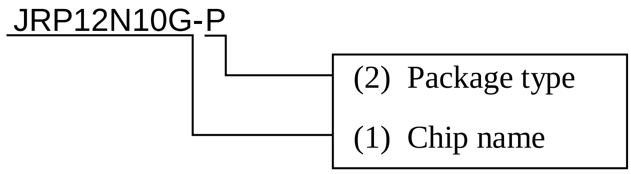
TO-263



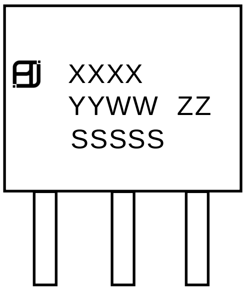
TO-220

ORDERING INFORMATION

Ordering Codes	Package	Product Code	Packing
JRP12N10G-B	TO-263	P12N10G	Reel
JRP12N10G-P	TO-220	P12N10G	Tube



(1) JRP12N10G：12mΩ/100V
(2) P：TO-220



XXXX：Product Code
YYWW：Year&Week
ZZ：Assembly Code
SSSSS：Lot Code

2. ABSOLUTE RATINGS

at T_C=25°C，unless otherwise specified

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-Source Voltage	100	V
I_D	Continuous Drain Current, Silicon Limited	55	A
	Continuous Drain Current, Package Limited	60	A
	Continuous Drain Current @T_C=100°C, Silicon Limited	35.1	A
I_{DM} Note1	Pulsed Drain Current	220	A
V_{GS}	Gate-Source Voltage	±20	V
E_{AS} Note2	Avalanche Energy	56.25	mJ
P_D	Power Dissipation	69.4	W
	Derating Factor above 25°C	0.56	W/℃
T_J，T_{stg}	Operating Junction and Storage Temperature Range	150，–55 to 150	℃
T_L	Maximum Temperature for Soldering	260	℃

Note1：Repetitive Rating：Pulse width limited by maximum junction temperature

Note2：L=0.5mH, Ias=15A, Start T_J=25℃

3. Thermal characteristics

Symbol	Parameter	Max	Units
$R_{\theta JC}$	thermal resistance, Junction-Case	1.8	℃/W
$R_{\theta JA}$	thermal resistance, Junction-Ambient	62.5	℃/W

4. Electrical Characteristics

at T_C=25°C, unless otherwise specified

OFF Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
V_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	100	110	--	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=100V, V_{GS}=0V	--	--	1	μA
		V_{DS}=80V, V_{GS}=0V @T_C=125°C	--	--	100	μA
$I_{GSS(F)}$	Gate-Source Forward Leakage	V_{GS}=+20V	--	--	100	nA
$I_{GSS(R)}$	Gate-Source Reverse Leakage	V_{GS}=-20V	--	--	-100	nA

ON Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=10V, I_D=20A	--	10.5	12	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	2	3	4	V

Pulse width tp≤300μs, δ≤2%

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
C_{iss}	Input Capacitance	V_{DS}=50V, V_{GS}=0, f=1MHz	--	1680	--	pF
C_{oss}	Output Capacitance		--	271	--	
C_{rss}	Reverse Transfer Capacitance		--	10	--	
Q_g	Total Gate Charge	V_{DD}=50V, I_D=20A, V_{GS}=10V	--	37	--	nC
Q_{gs}	Gate-Source charge		--	10.2	--	
Q_{gd}	Gate-Drain charge		--	11.3	--	
R_G	Gate resistance	V_{GS}=0, V_{DS}=0		1.3		Ω

Switching Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
$t_{d(on)}$	Turn-On Delay Time	V_{DD}=50V, I_D=10A, V_{GS}=10V, R_G=5Ω, Resistive Load	--	14.4	--	ns
t_r	Rise Time		--	13	--	
$t_{d(off)}$	Turn-Off Delay Time		--	28.8	--	
t_f	Fall Time		--	15.2	--	

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
I_S	Continuous Source Current		--	--	55	A
I_{SM}	Maximum Pulsed Current		--	--	220	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V, I_S=20A	--	--	1.2	V
T_{rr}	Reverse Recovery Time	I_s=10A,V_{GS}=0, di/dt=250A/us	--	168	--	ns
Q_{rr}	Reverse Recovery Charge		--	335.8	--	nC

5. Characteristics Curves

Figure 1. Safe Operating Area

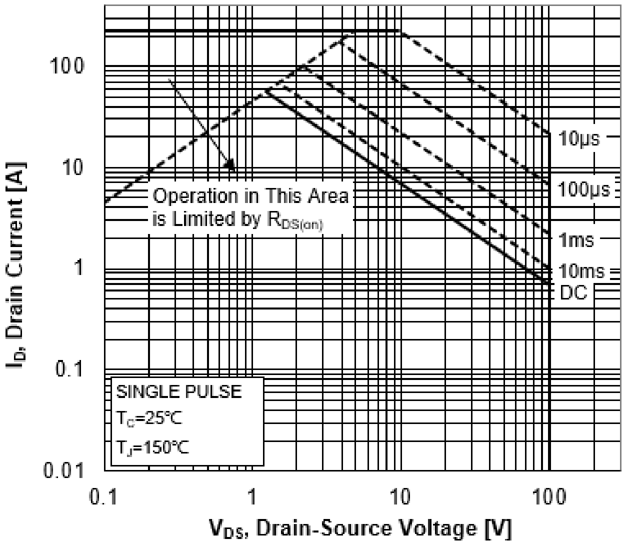


Figure 2. Maximum Power Dissipation vs Case Temperature

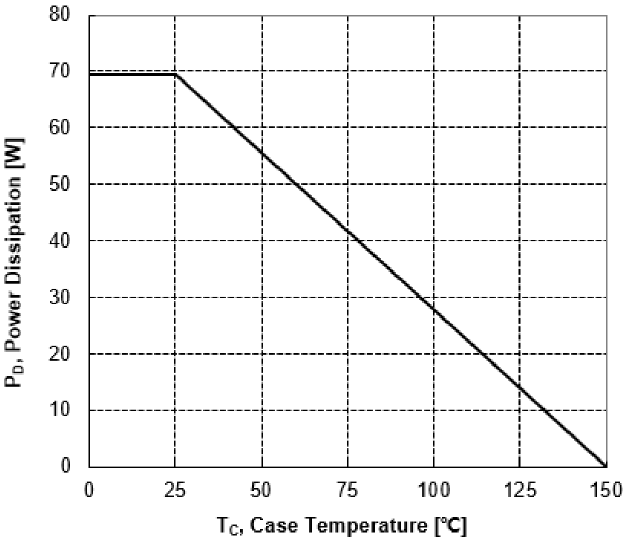


Figure 3. Maximum Continuous Drain Current vs Case Temperature

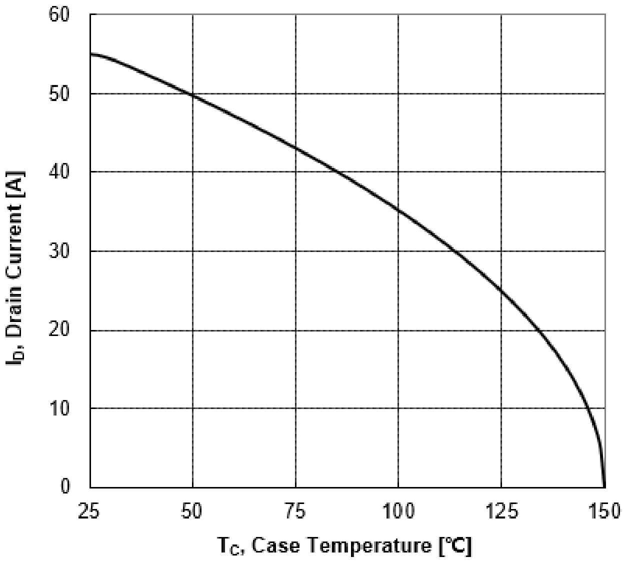


Figure 4. Typical Output Characteristics

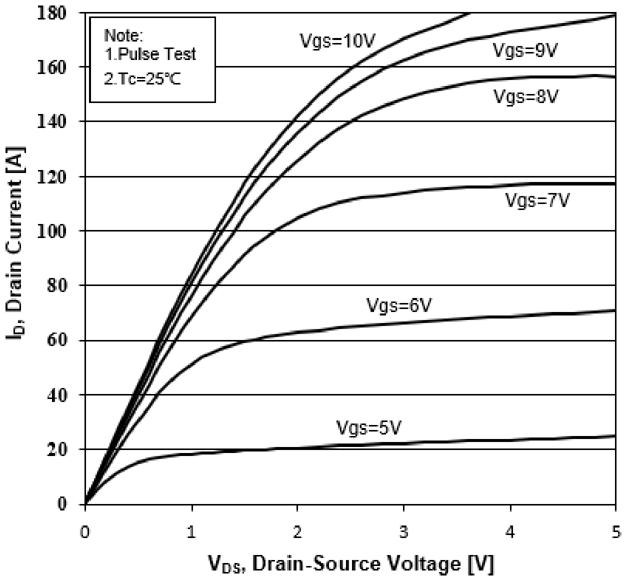


Figure 5. Transient Thermal Impedance

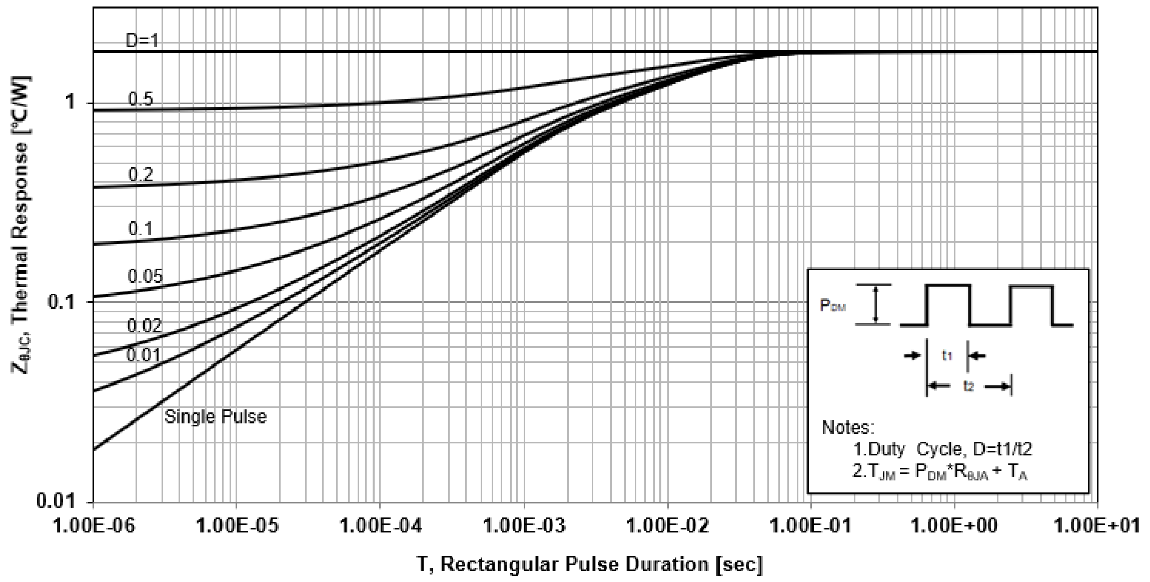


Figure 6. Typical Transfer Characteristics

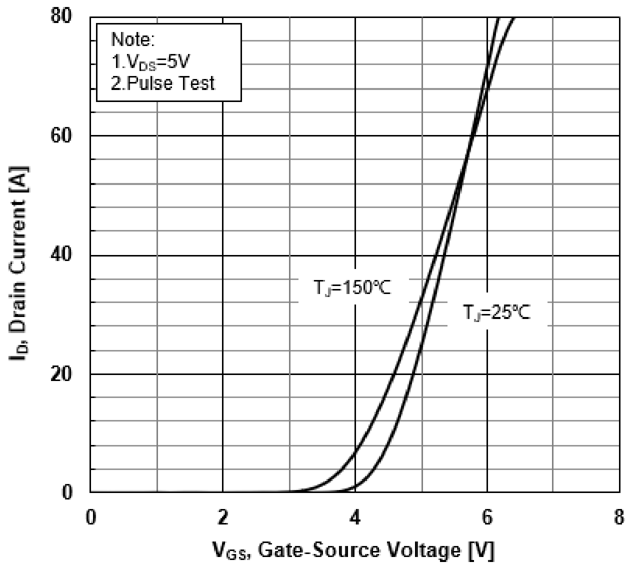


Figure 7. Source-Drain Diode Forward Characteristics

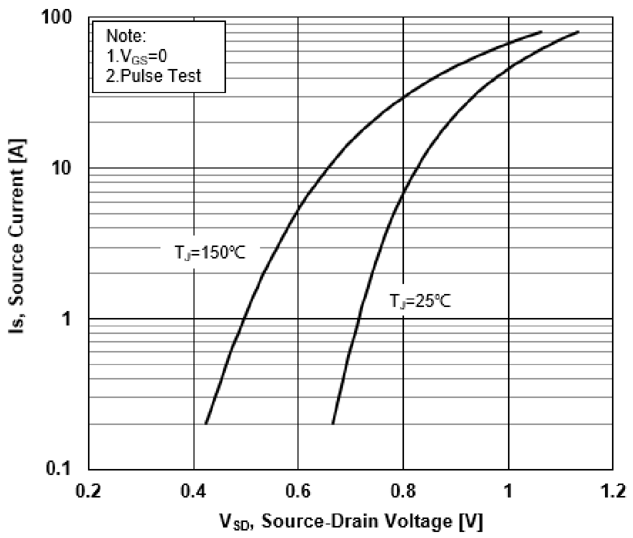


Figure 8. Drain-Source On-Resistance vs Drain Current

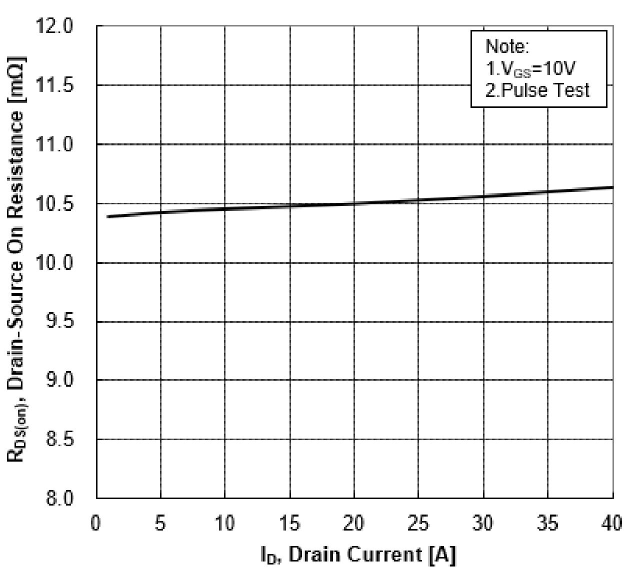


Figure 9. Normalized On-Resistance vs Junction Temperature

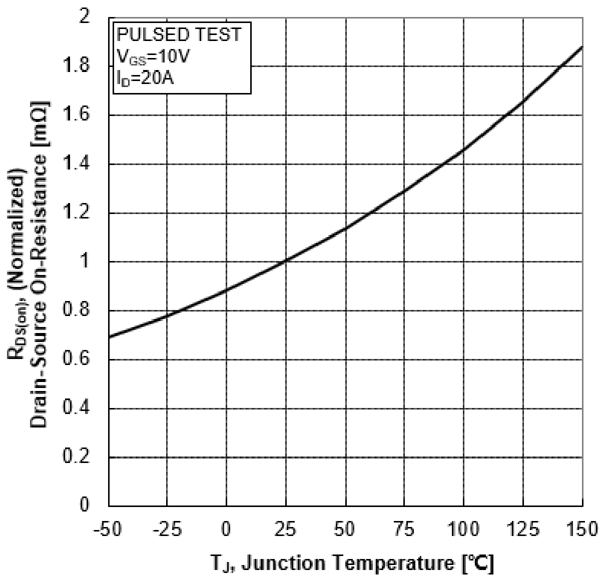


Figure 10. Normalized Threshold Voltage vs Junction Temperature

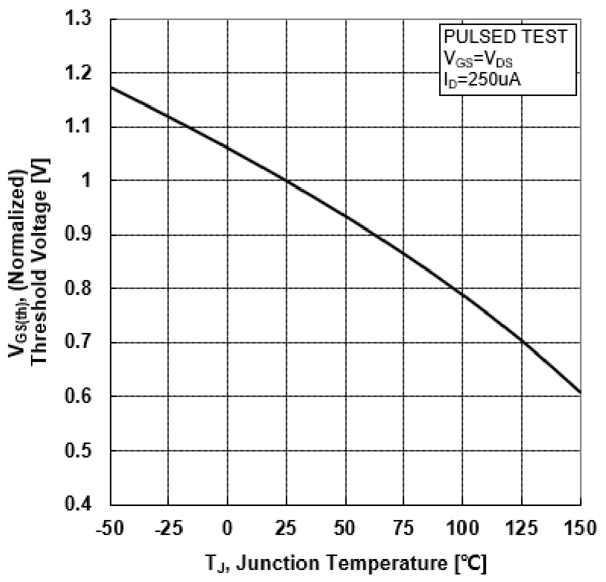


Figure 11. Normalized Breakdown Voltage vs Junction Temperature

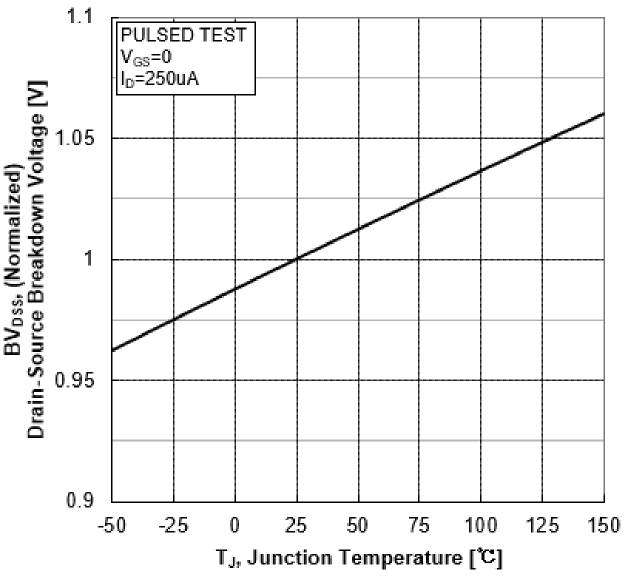
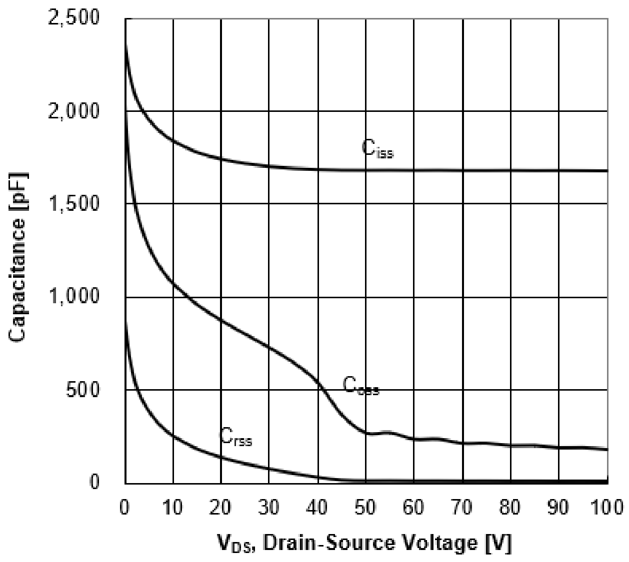
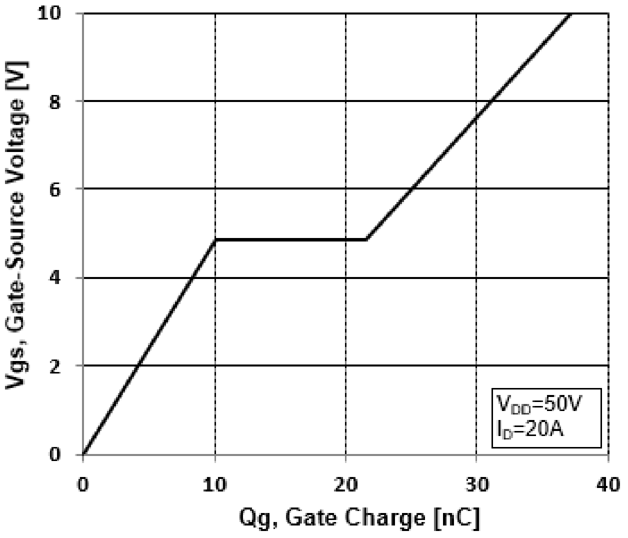


Figure 12. Capacitance Characteristics	Figure 13. Typical Gate Charge vs Gate-Source Voltage
	

6. Test Circuit and Waveform

Figure 14. Resistive Switching Test Circuit

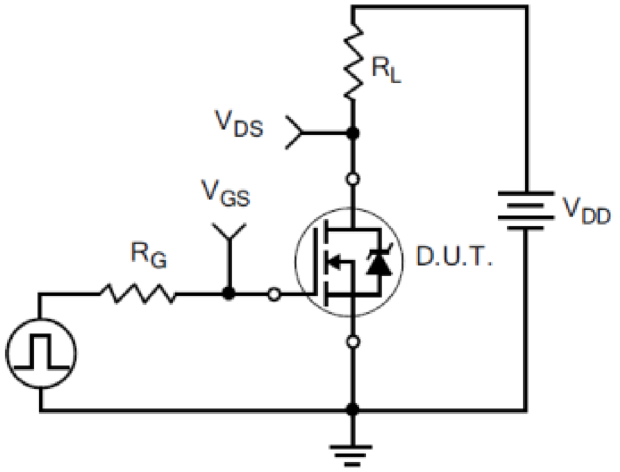


Figure 15. Resistive Switching Waveforms

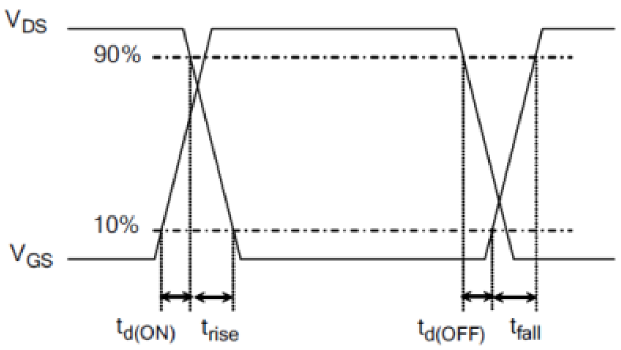


Figure 16. Gate Charge Test Circuit

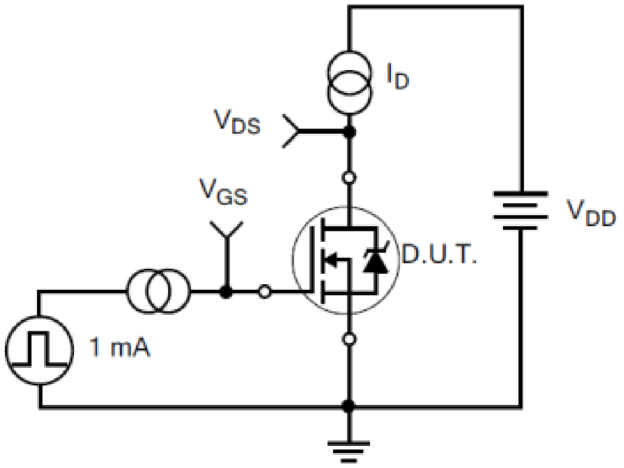


Figure 17. Gate Charge Waveforms

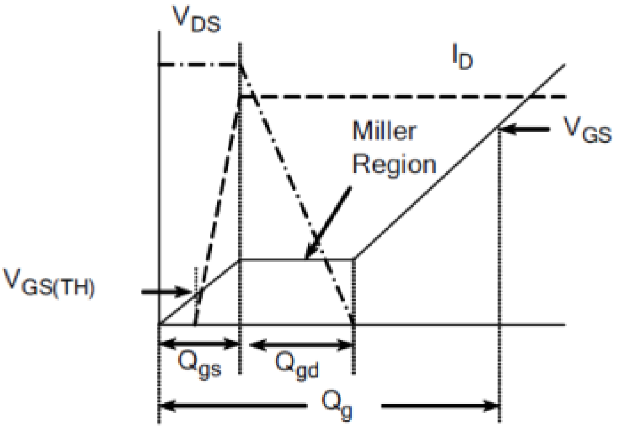


Figure 18. Diode Reverse Recovery Test Circuit

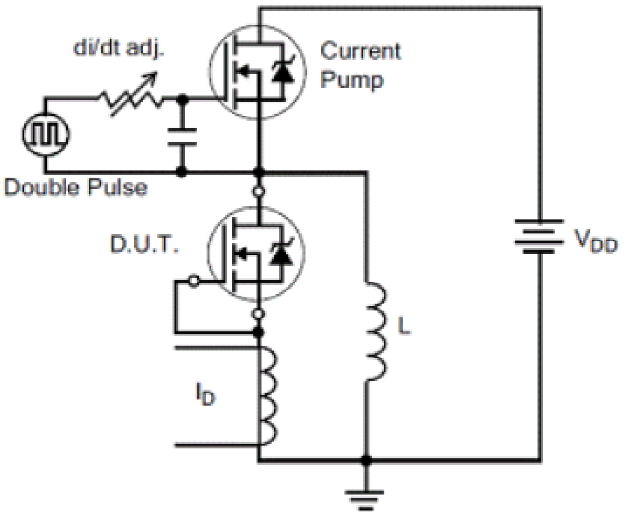


Figure 19. Diode Reverse Recovery Waveform

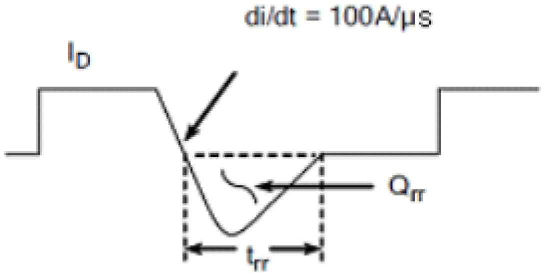


Figure 20. Unclamped Inductive Switching Test Circuit

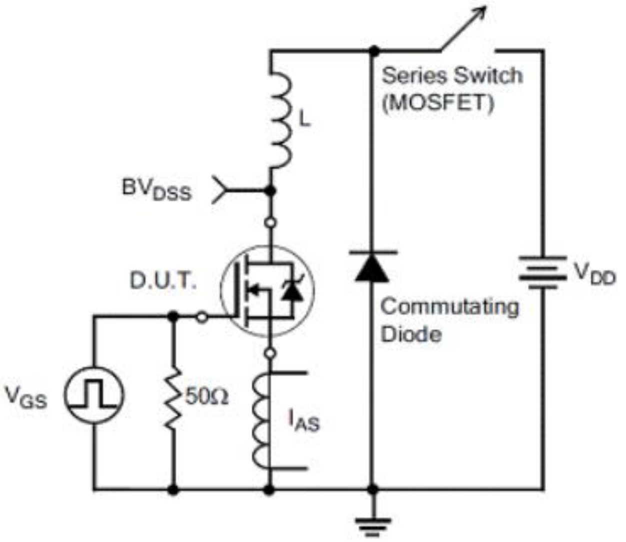
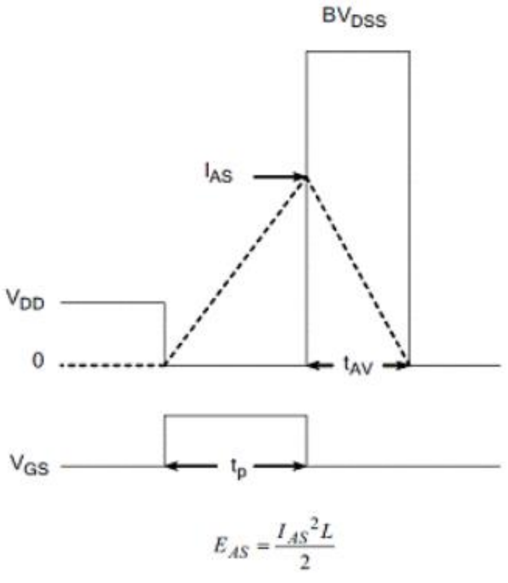
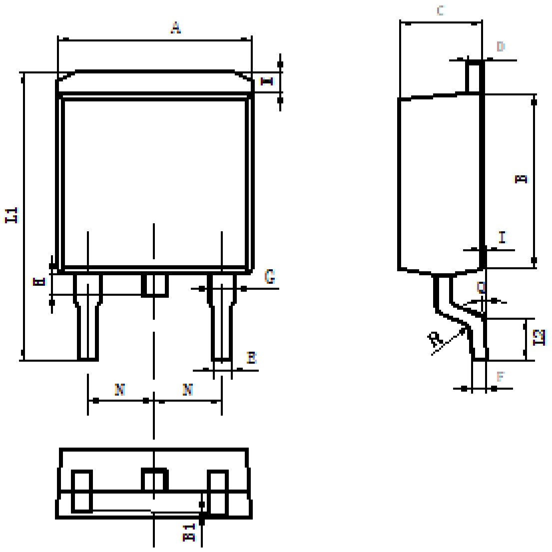


Figure 21. Unclamped Inductive Switching Waveform



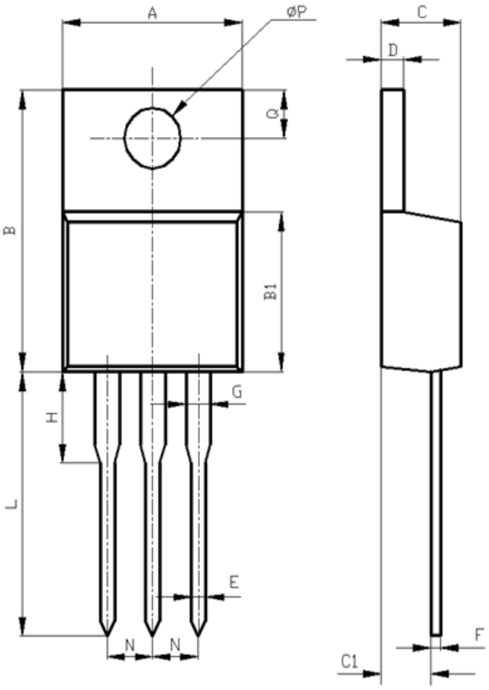
7. Package Description

TO-263 Package



Items	Values(mm)	
	MIN	MAX
A	9.80	10.40
B	8.90	9.50
B1	0	0.10
C	4.40	4.80
D	1.16	1.37
E	0.70	0.95
F	0.30	0.60
G	1.07	1.47
H	1.30	1.80
K	0.95	1.37
L1	14.50	16.50
L2	1.60	2.30
I	0	0.2
Q	0°	8°
R	0.4	0.4
N	2.39	2.69

TO-220 Package



Items	Values(mm)	
	MIN	MAX
A	9.60	10.6
B	15.0	16.0
B1	8.90	9.50
C	4.30	4.80
C1	2.30	3.10
D	1.20	1.40
E	0.70	0.90
F	0.30	0.60
G	1.17	1.37
H	2.70	3.80
L	12.6	14.8
N	2.34	2.74
Q	2.40	3.00
ΦP	3.50	3.90

NOTE:

1. Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. Please do not exceed the absolute maximum ratings of the device when circuit designing.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. MOSFETs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
4. Shanghai Jerrett reserves the right to make changes in this specification sheet and is subject to change without prior notice.