

Description

MLS65R190F, the silicon N-channel Enhanced MOSFETs, is obtained by advanced Super Junction technology which reduce the conduction loss, improve switching performance. The transistor is suitable device for SMPS, high speed switching and general purpose applications.

KEY CHARACTERISTICS

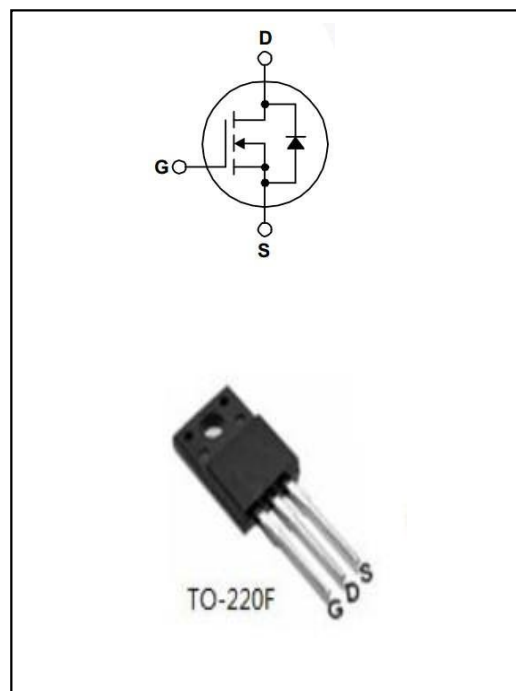
- ① $V_{DS}=650V, I_D=20A$ $R_{DS(ON)} < 0.23\Omega @ V_{GS}=10V$

FEATURES

- ① Fast Switching
- ② 100% avalanche tested
- ③ Improved dv/dt capability

APPLICATIONS

- ① PFC Power Supply Stages
- ② Switching Applications
- ③ Adapter
- ④ Motor Control
- ⑤ DC – DC Converters



Package Marking And Ordering Information:

Ordering Codes	Package	Product Code	Packing
MLS65R190F	TO-220F	M65R190F	Tube

Electrical Characteristics @ $T_a=25^{\circ}C$ (unless otherwise specified)

Limited Parameters:

Symbol	Parameter	Value	Units
V_{DSS}	Drain-to-Source Breakdown Voltage	650	V
I_D	Drain Current (continuous) at $T_c=25^{\circ}C$	20	A
I_{DM}	Drain Current (pulsed)	80	A
V_{GS}	Gate to Source Voltage	± 30	V
P_{tot}	Total Dissipation at $T_c=25^{\circ}C$	43	W
T_j	Max. Operating Junction Temperature	150	$^{\circ}C$
Eas	Single Pulse Avalanche Energy	806	mJ



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Electrical Parameters:

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{DS}	Drain-source Voltage	$V_{GS}=0V, I_D=250\mu A$	650			V
$R_{DS(on)}$	Static Drain-to-Source on-Resistance	$V_{GS}=10V, I_D=10A$		0.19	0.23	Ω
$V_{GS(th)}$	Gated Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2		4	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=650V, V_{GS}=0V$			1.0	μA
$I_{GSS(F)}$	Gate-Source Forward Leakage	$V_{GS}=+30V$			100	nA
$I_{GSS(R)}$	Gate-Source Reverse Leakage	$V_{GS}=-30V$			-100	nA
C_{iss}	Input Capacitance	$V_{GS}=0V$ $V_{DS}=100V$ $V_f=1.0MHz$		1197		pF
C_{oss}	Output Capacitance			67		pF
C_{rss}	Reverse Transfer Capacitance			3.7		pF
Q_g	Total Gate Charge	$I_D=20A$ $V_{DD}=520V$ $V_{GS}=10V$ (注4、5)		38		nC
Q_{gs}	Gate-Source Charge			9.0		nC
Q_{gd}	Gate-Drain Charge			20		nC

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
$t_{d(on)}$	Turn-on Delay Time	$I_D=4.0A$ $V_{DD}=325V$ $V_{GS}=10V$ $R_G=25\Omega$ (注4、5)		20		nS
t_r	Turn-on Rise Time			56		nS
$t_{d(off)}$	Turn-off Delay Time			106		nS
t_f	Turn-off Fall Time			41		nS

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)	$T_C=25^\circ C$	--	--	20	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	80	A
V_{SD}	Diode Forward Voltage	$I_D=20A, V_{GS}=0V$	--	--	1.4	V
T_{rr}	Reverse Recovery Time	$V_{DD}=50V, I_F=20A,$ $di_F/dt=100A/\mu s$ (注4)	--	214.3	--	ns
Q_{rr}	Reverse Recovery Charge		--	1.7	--	nC

注:

1. $L=79mH$, $I_{AS}=4.2A$, $V_{DD}=100V$, $R_G=25\Omega$, 开始温度 $T_J=25^\circ C$;

2. $V_{DS}=0\sim 400V$, $I_{SD}\leq 20A$, $T_J=25^\circ C$;

3. $V_{DS}=0\sim 480V$;

4. 脉冲测试: 脉冲宽度 $\leq 300\mu s$, 占空比 $\leq 2\%$;

5. 基本上不受工作温度的影响。

Characteristic Graph

Fig.1 On-Region Characteristics.

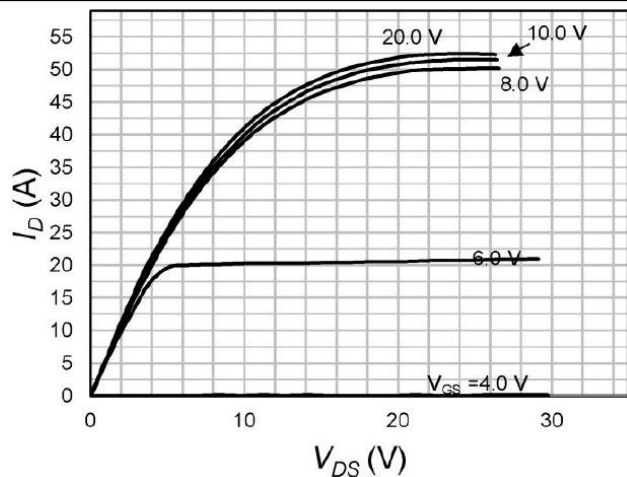


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

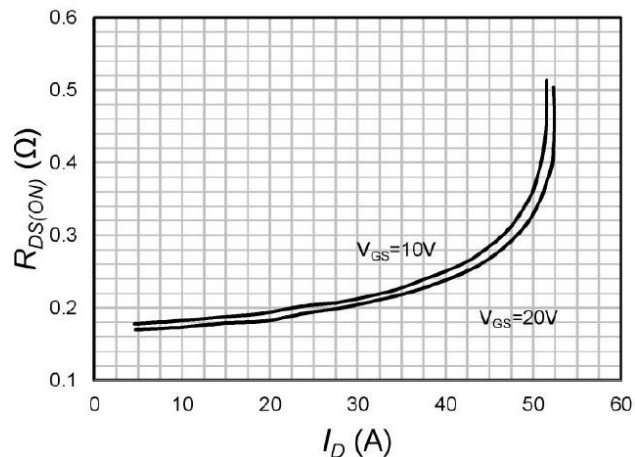


Fig.3 On-Resistance Variation with Temperature(Normalized)

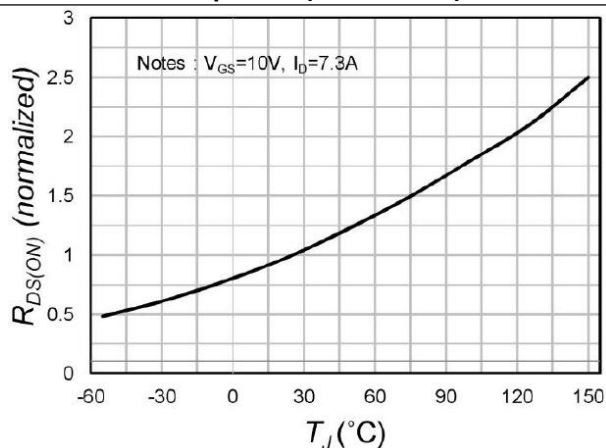


Fig.4 Breakdown Voltage Variation vs. Temperature(Normalized)

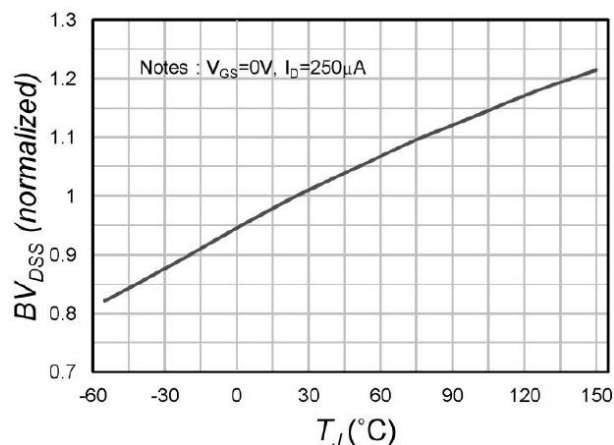


Fig.5 Transfer Characteristics

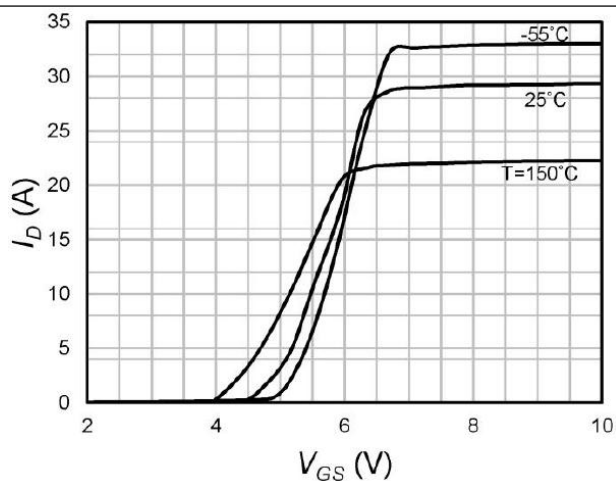


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

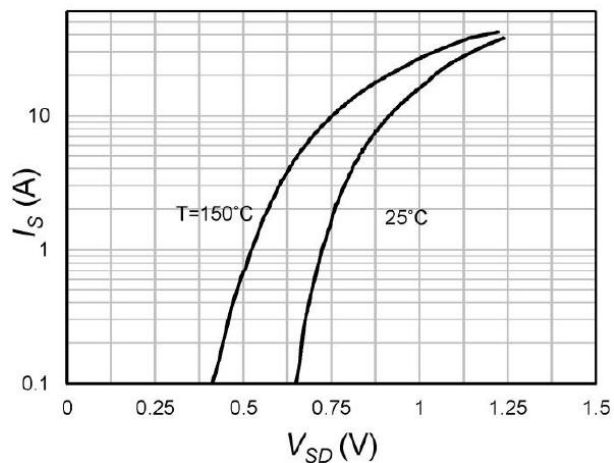


Fig.7 Gate Charge Characteristics

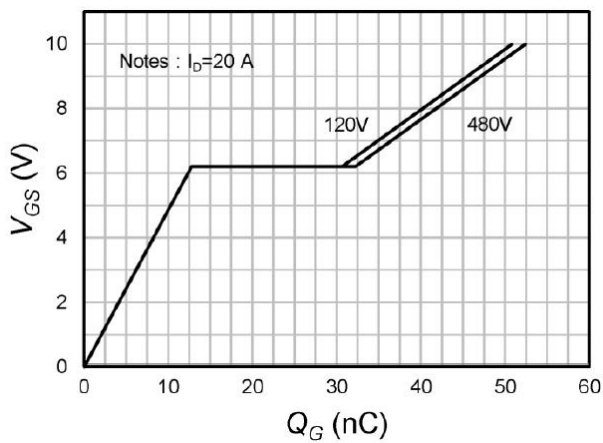


Fig.8 Capacitance Characteristics

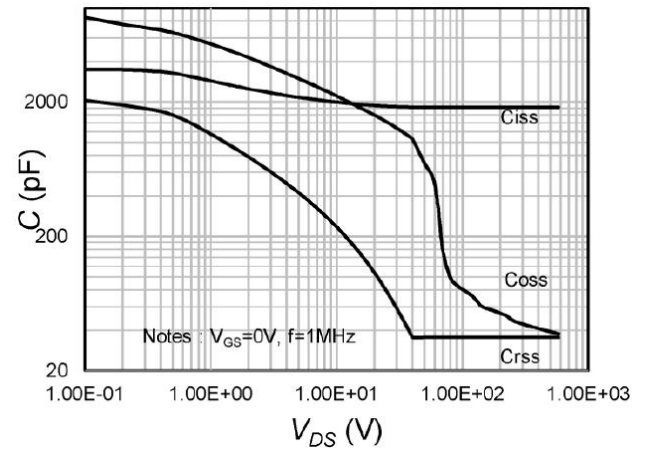


Fig.9 V_GS(th) Variation with Temperature (Normalized)

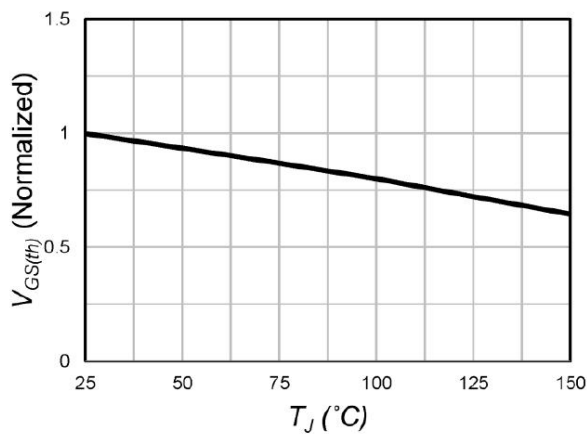


Fig.10 Maximum Drain Current vs. Case Temperature

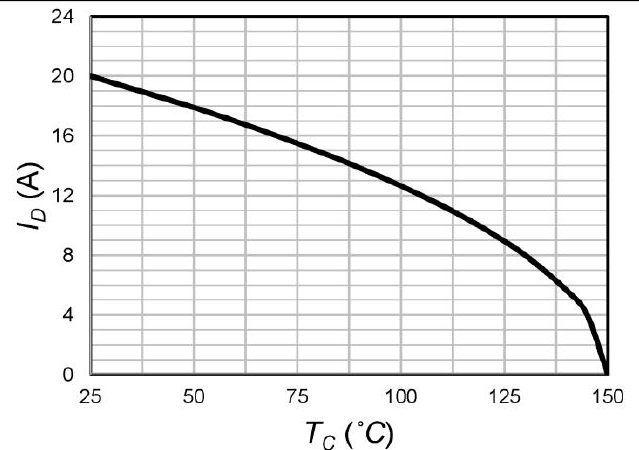


Fig.11 Single Pulse Maximum Power Dissipation

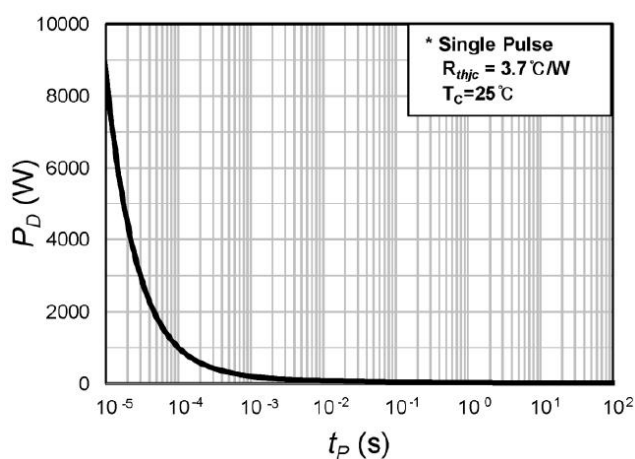


Fig.12 Output Capacitance Stored Energy

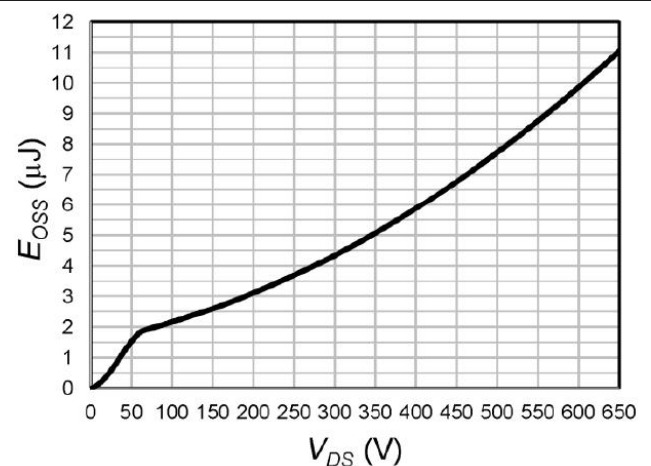


Fig.13 Transient Thermal Response Curve

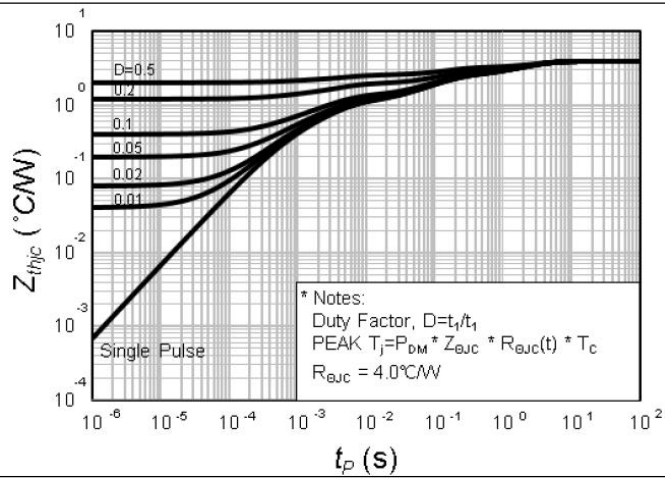
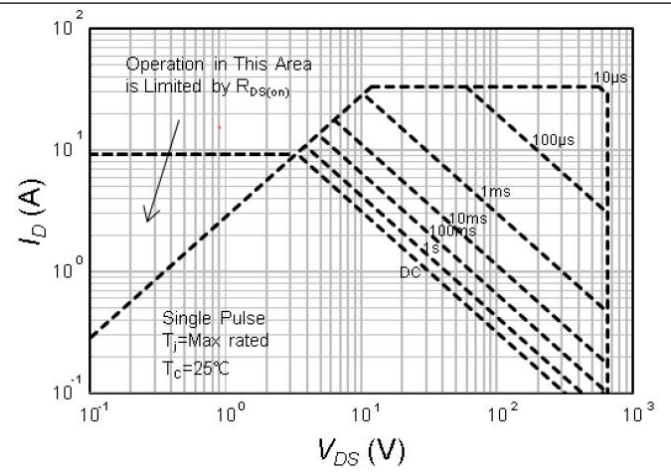
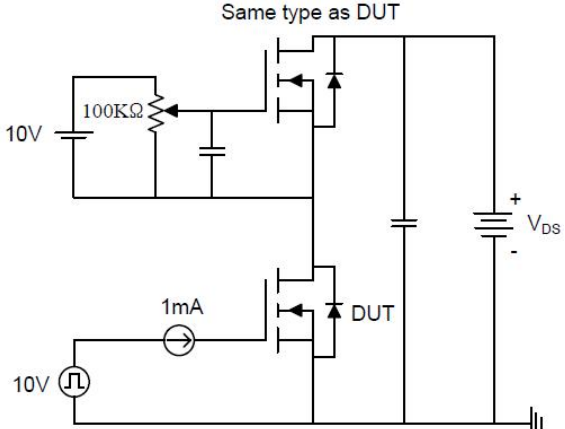
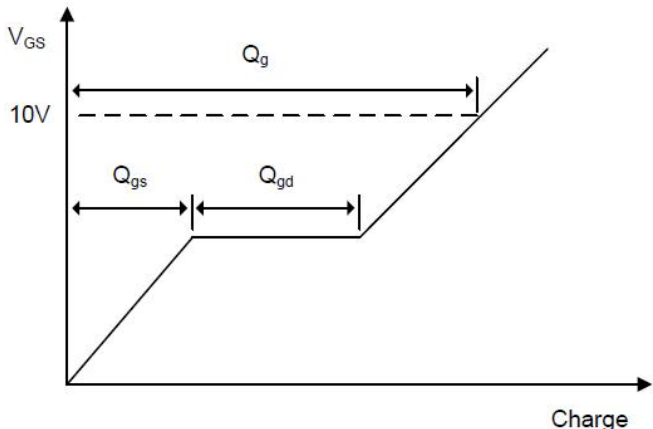
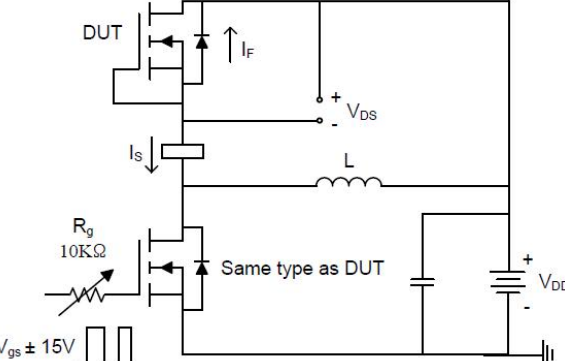
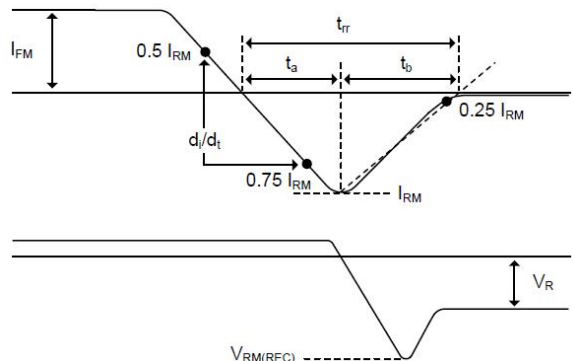
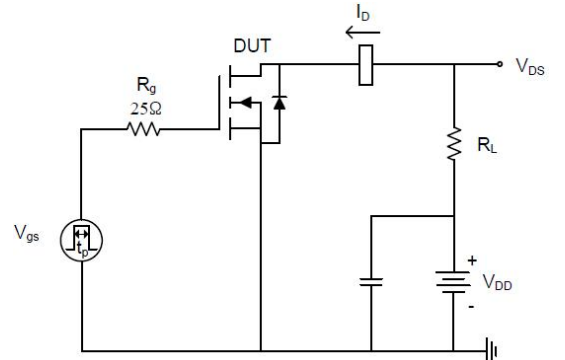
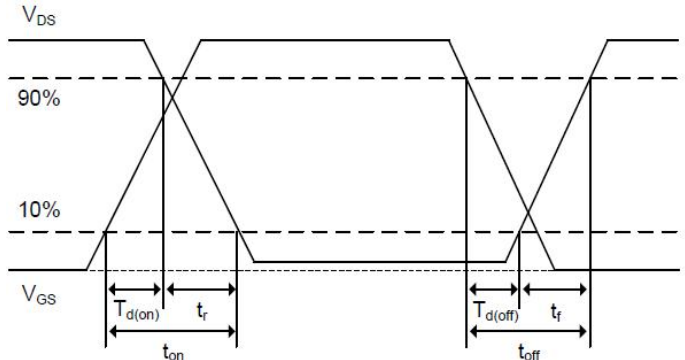
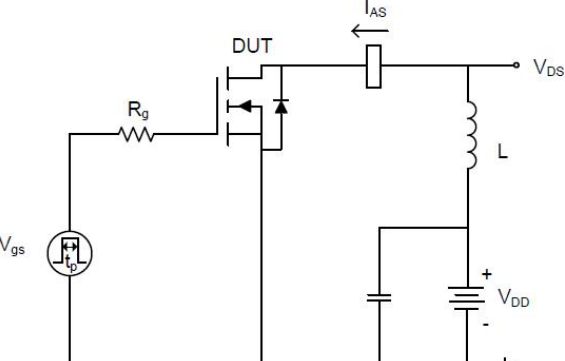
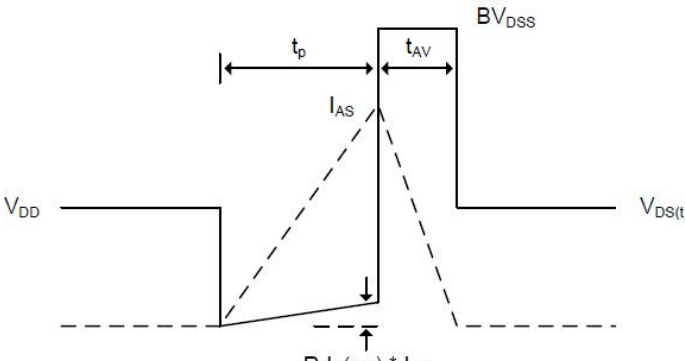


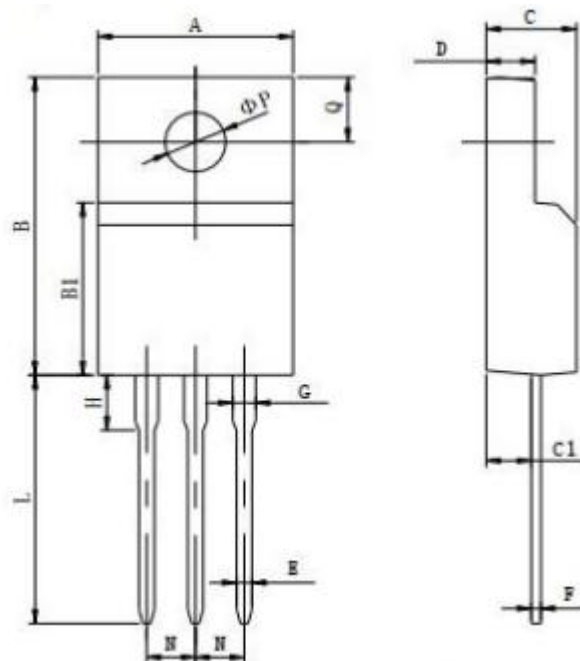
Fig.13 Transient Thermal Response Curve



Test Circuit

	
Fig15-1. Gate charge measurement circuit	Fig15-2. Gate charge waveform
	
Fig16-1. Diode reverse recovery test circuit	Fig16-2. Diode reverse recovery test waveform
	
Fig17-1. Switching time test circuit for resistive load	Fig17-2. Switching time waveform
	
Fig18-1. Unclamped inductive load test circuit	Fig18-2. Unclamped inductive waveform

Package Description



Items	Values(mm)	
	MIN	MAX
A	9.60	10.4
B	15.4	16.2
B1	8.90	9.50
C	4.30	4.90
C1	2.10	3.00
D	2.40	3.00
E	0.60	1.00
F	0.30	0.60
G	1.12	1.42
H	3.40	3.80
	1.60	2.90
L	12.0	14.0
N	2.34	2.74
Q	3.15	3.55
φp	2.90	3.30

TO-220F Package



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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. Shenzhen Minos reserves the right to make changes in this specification sheet and is subject to change without prior notice.

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