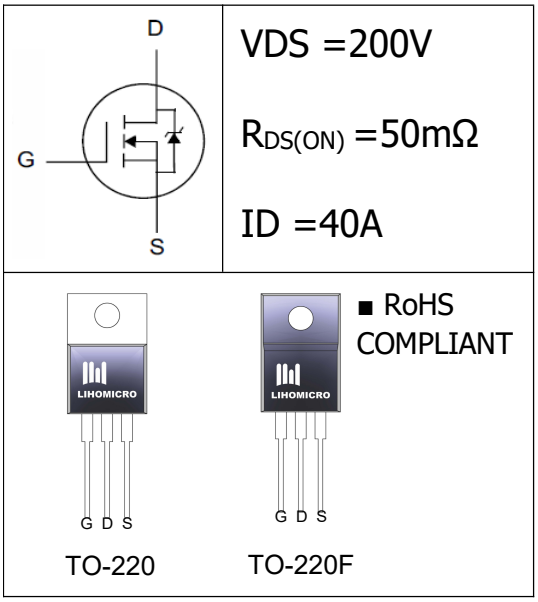
•General Description

The MOSFET LH40N20 has the low $R_{DS(on)}$,low gate charge,fast switching and excellent avalanche characteristics.This device offers extremely fast and robust body diode,and is suitable for telecom and power supplies.



•Features

■Low Thermal Resistance
■Fast Switching
■High Input Resistance

•Application

■LED/LCD/PDP TV and monitor Lighting
■Power Supplies

•Ordering Information:

Part number	LH40N20	LH40N20
Package	TO-220F	TO-220
Basic ordering unit (pcs)	1000	1000
Normal Package Material Ordering Code	LH40N20F-T0220F-TU	LH40N20T-T0220-TU
Halogen Free Ordering Code	LH40N20F-T0220F-TU -HF	LH40N20T-T0220-TU-HF

•Absolute Maximum Ratings（TC =25℃）

PARAMETER		SYMBOL	Value		UNIT
Drain-Source Breakdown Voltage[1]		BV_{DSS}	200		V
Gate-Source Voltage		V_{GS}	±20		V
Continuous Drain Current	TC = 25°C	I_D	40		A
	TC = 100°C		Figure 3		
Pulsed drain current (TC = 25°C, tp limited by Tjmax)[2]		I_{DM}	Figure 6		A
Single Pulse Avalanche Energy		E_{AS}	720		mJ
Power Dissipation(TC=25℃)		P_D	TO-220F: 50	TO-220: 125	W
Peak Diode Recovery dv/dt[3]		Dv/dt	5.0		V/ns
Junction Temperature		T_J	-55~+150		℃
Storage Temperature		T_{STG}	-55~+150		℃

●Electronic Characteristics

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V, I_D=250uA	200	--	--	V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=VGS,I_D=250uA	2.0	--	4.0	V
Drain-source On Resistance[4]	$R_{DS(ON)}$	V_{GS} =10V, I_D=20A	--	50	65	mΩ
Drain-Source Leakage Current	I_{DSS}	V_{DS}=200V,V_{GS}=0V,T_J=25℃	--	--	1	uA
		V_{DS}=160V,V_{GS}=0V,T_J=125℃	--	--	100	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20	--	--	±100	nA
Forward Transconductance[3]	gfs	V_{DS}=15V,I_D=20A	--	--	65	S
Input Capacitance	Ciss	V_{GS} = 0V, V_{DS} = 25V f = 1.0MHz	--	2800	3700	pF
Output Capacitance	Coss		--	305	400	
Reverse transfer Capacitance	Crss		--	110	150	
Turn -On Delay Time	Td(on)	V_{DD}=100V, ID=20A, V_{GS}=10V R_G=3.9Ω	--	20	--	ns
Rise Time	T_{rise}		--	30	--	ns
Turn -Off Delay Time	Td(off)		--	65	--	ns
Fall Time	T_{fall}		--	25	--	ns
Total Gate Charge	Qg	I_D =20A, V_{DS} = 100V V_{GS} = 0-10V	--	97	120	nC
Gate-to-Source Charge	Qgs		--	14	--	
Gate-to-Drain Charge	Qgd		--	39	---	
Continuous Diode Forward Current	I_S		--	--	40	A
Pulsed Diode Forward Current	I_{SM}		--	--	160	A
Diode Forward Voltage	V_{SD}	Tj=25°C, Is=40A V_{GS} =0V	--	--	1.5	V
Reverse Recovery Time	trr	If=Is di_F/dt=100A/μs	--	280	--	ns
Reverse Recovery Charge	Qrr		--	420	--	nC

●Thermal Characteristics

PARAMETER	SYMBOL	MAX		UNIT
		TO-220F	TO-220	
Thermal Resistance Junction-case	Rth_{JC}	2.5	1.0	℃/W
Thermal Resistance Junction-ambient	Rth_{JA}	62.5	62.5	℃/W

Notes:

1.TJ=+25℃ to +150℃

2.Repetitive rating; pulse width limited by maximum junction temperature.

3.ISD= 20A di/dt < 100 A/μs, VDD < BVDSS, TJ=+150℃.

4. Pulse width≤380μs; duty cycle≤2%.

●Typical Characteristics

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

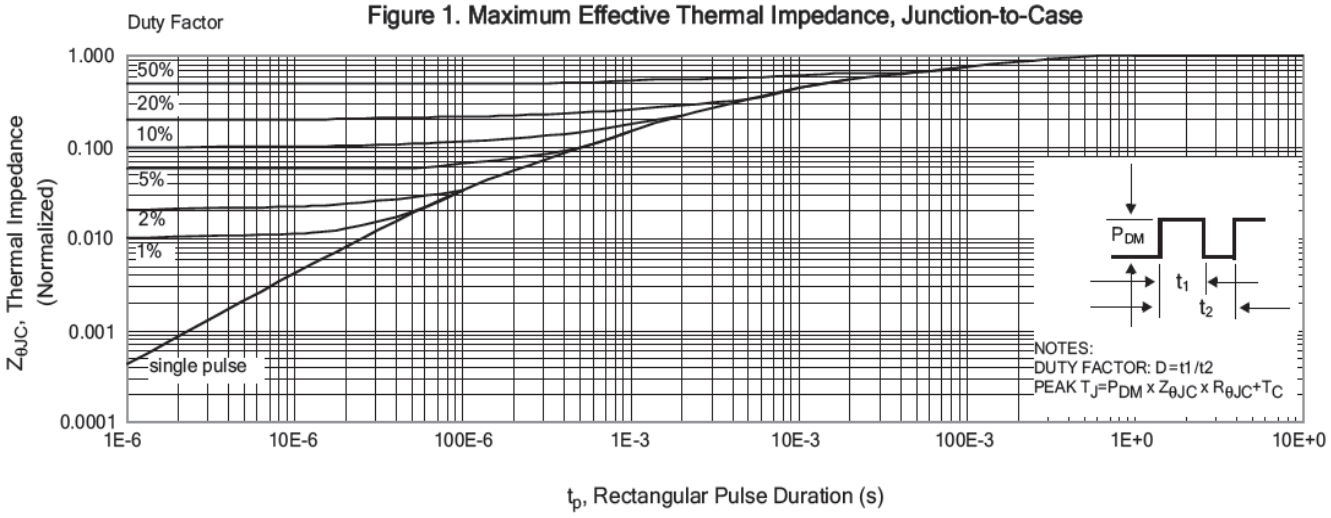


Figure 2. Maximum Power Dissipation vs Case Temperature

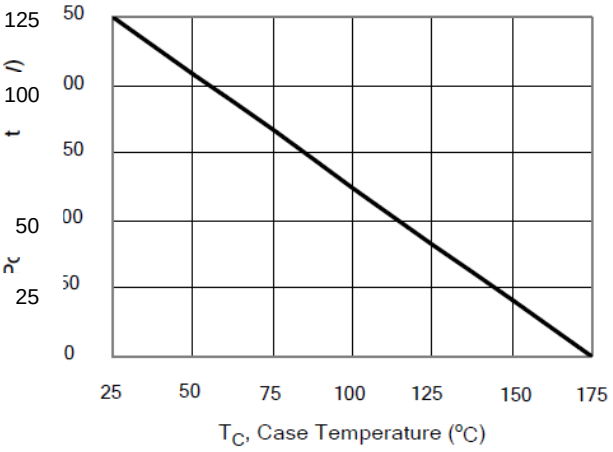


Figure3. Maximum Continuous Drain Current vs Case Temperature

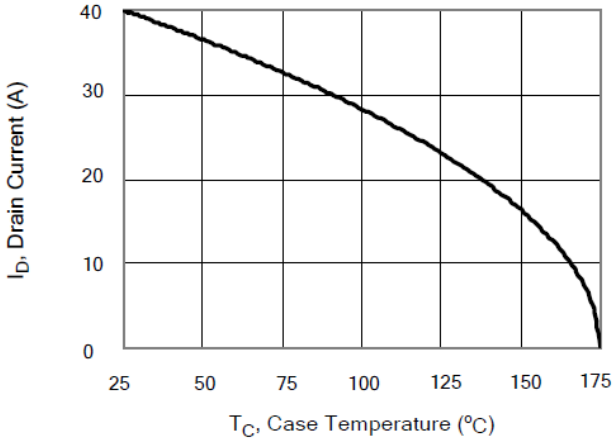


Figure 4. Typical Output Characteristics

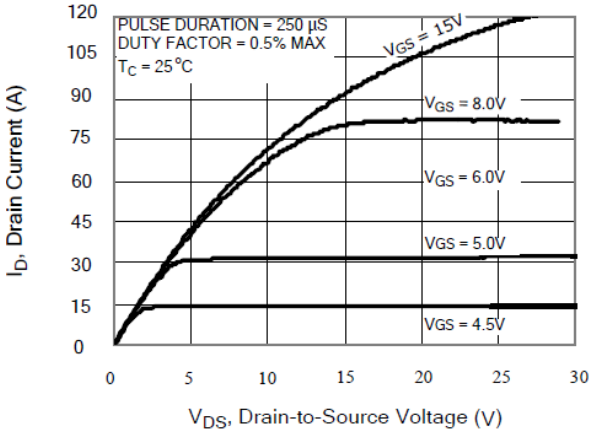
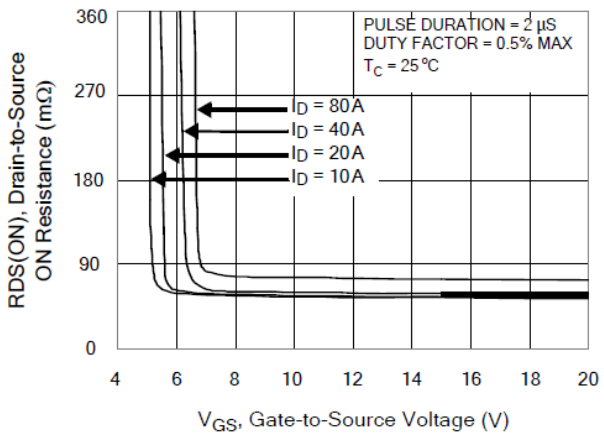


Figure 5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current



●Typical Characteristics(cont.)

Figure 6. Maximum Peak Current Capability

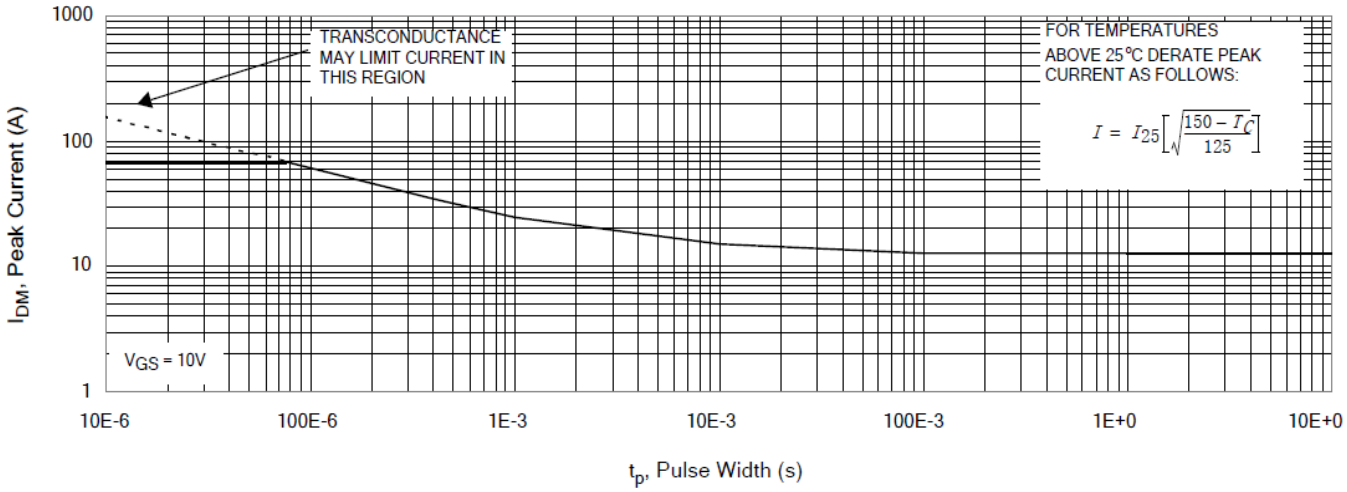


Figure 7. Typical Transfer Characteristics

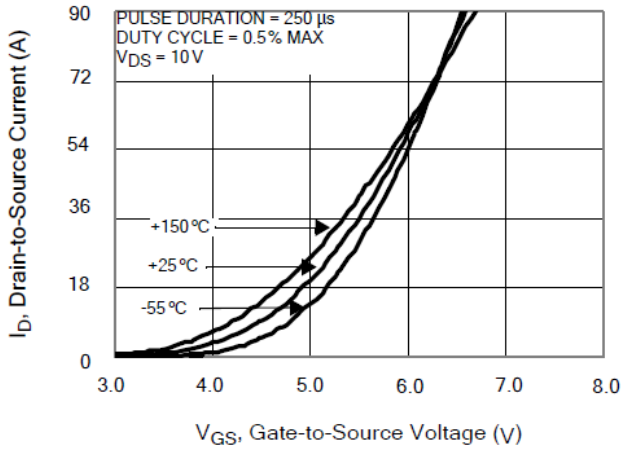


Figure 8. Unclamped Inductive Switching Capability

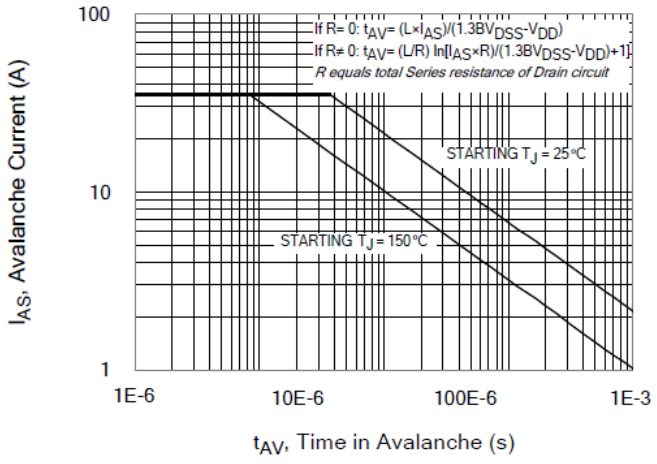


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

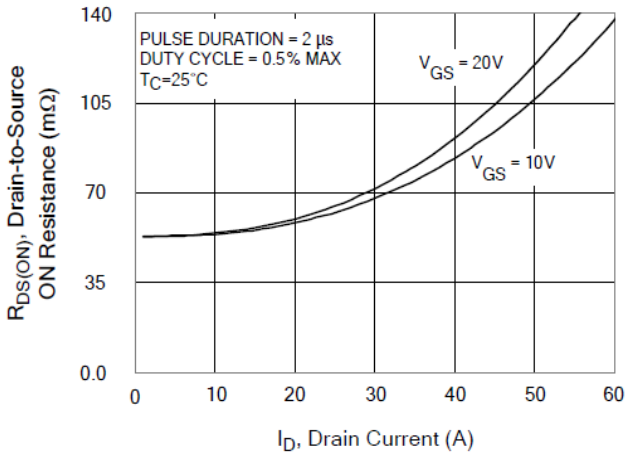
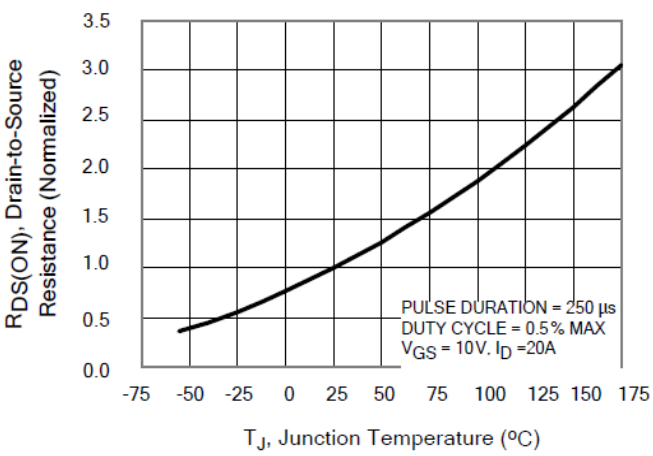


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature



●Typical Characteristics(cont.)

Figure 11. Typical Breakdown Voltage vs Junction Temperature

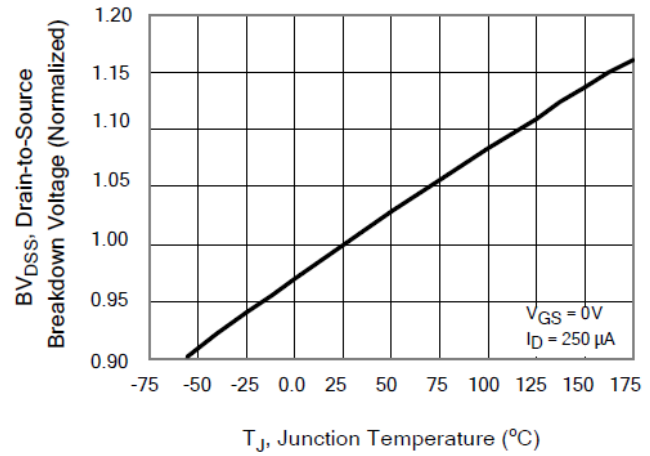


Figure 12. Typical Threshold Voltage vs Junction Temperature

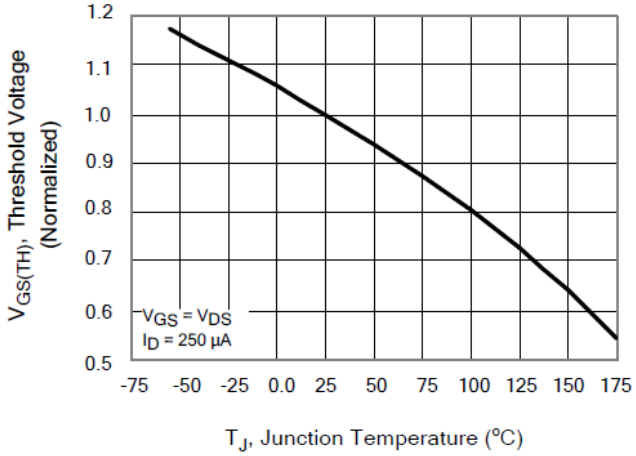


Figure 13. Maximum Forward Bias Safe Operating Area

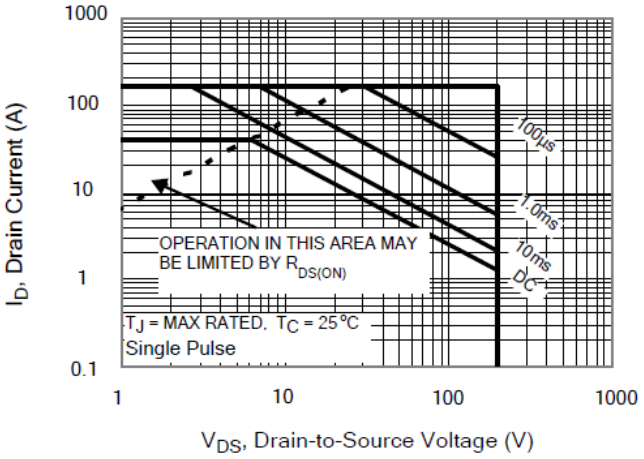


Figure 14. Typical Capacitance vs Drain-to-Source Voltage

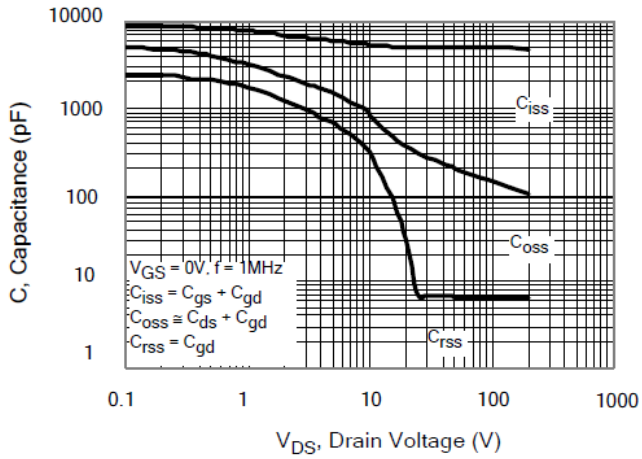


Figure 15 .Typical Gate Charge

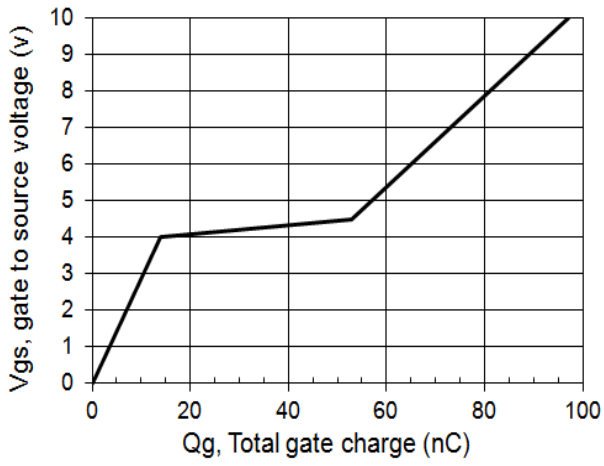
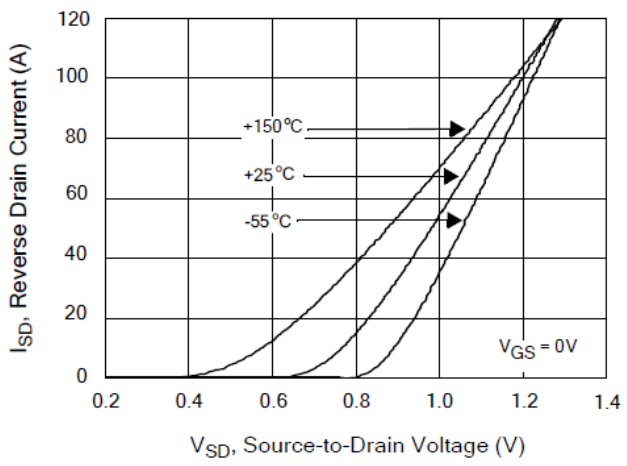


Figure 16. Typical Body Diode Transfer Characteristics



Test Circuits and Waveforms

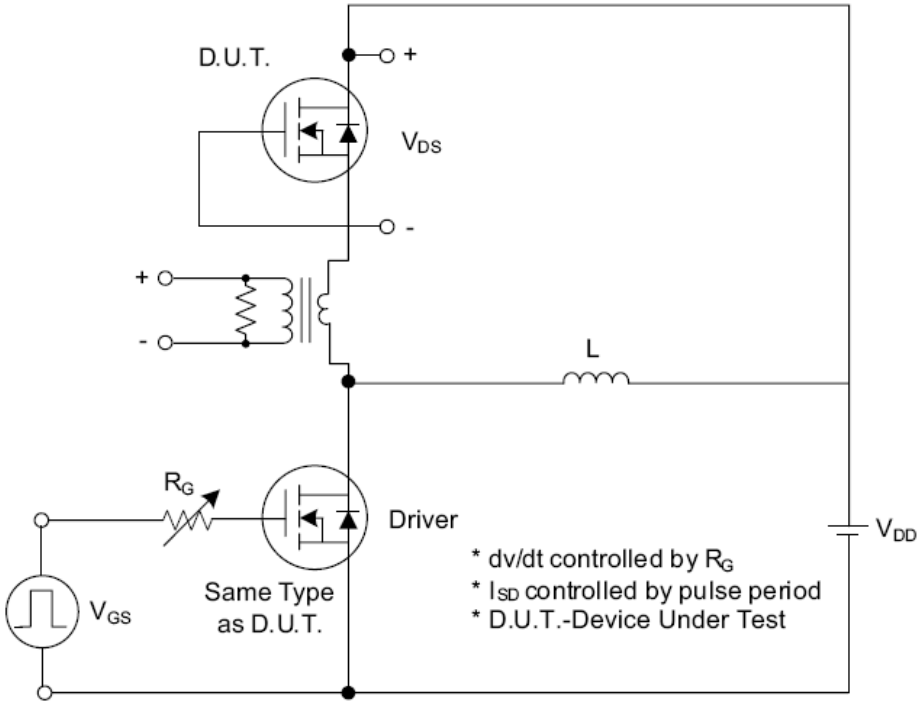


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

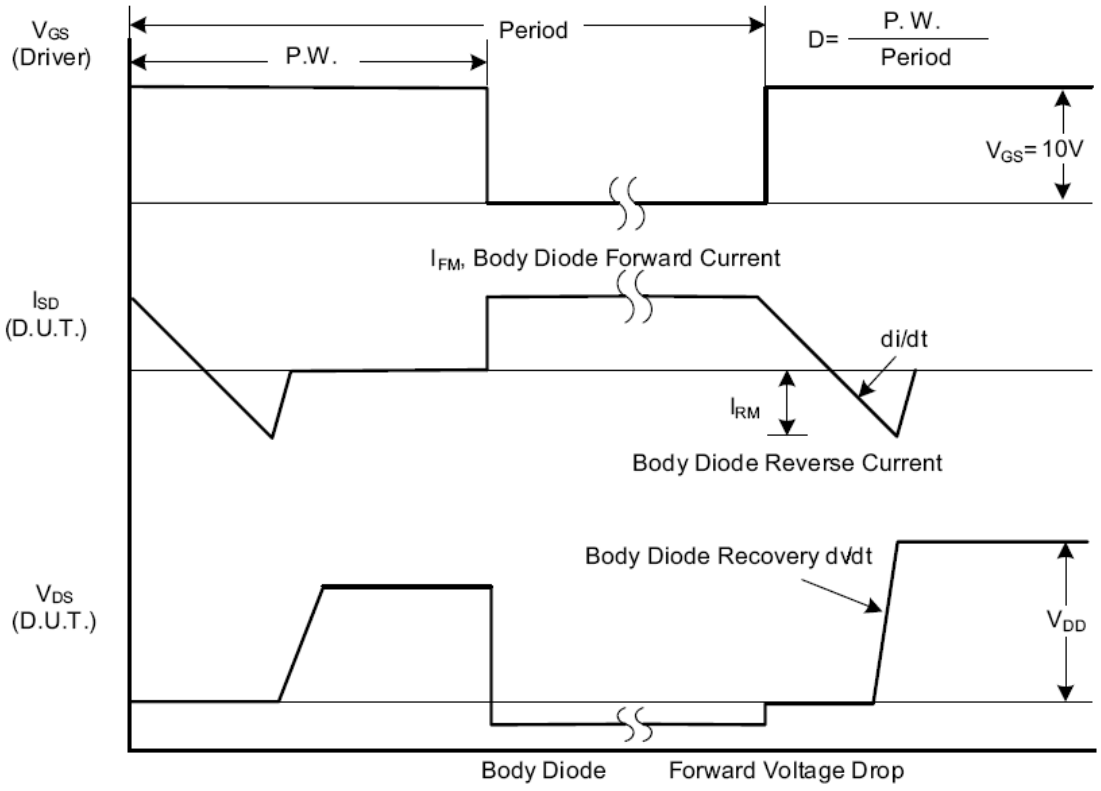


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

Test Circuits and Waveforms (Cont.)

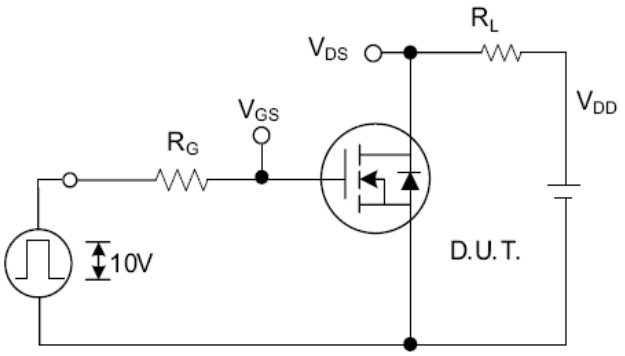


Fig. 2.1 Switching Test Circuit

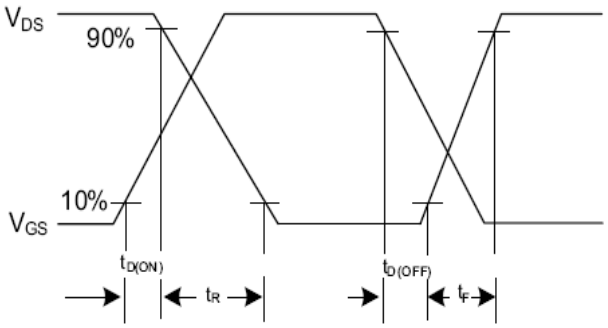


Fig. 2.2 Switching Waveforms

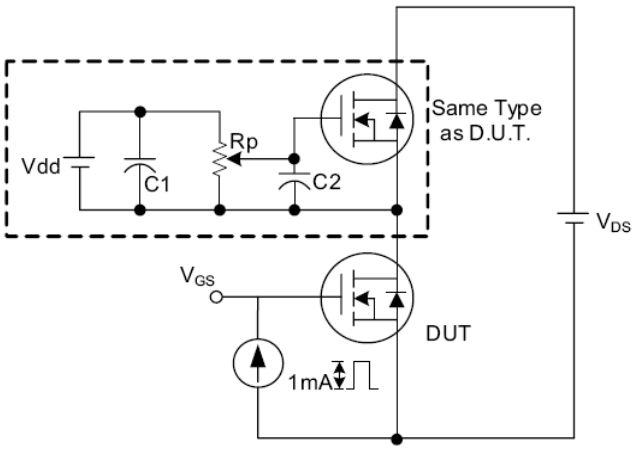


Fig. 3 . 1 Gate Charge Test Circuit

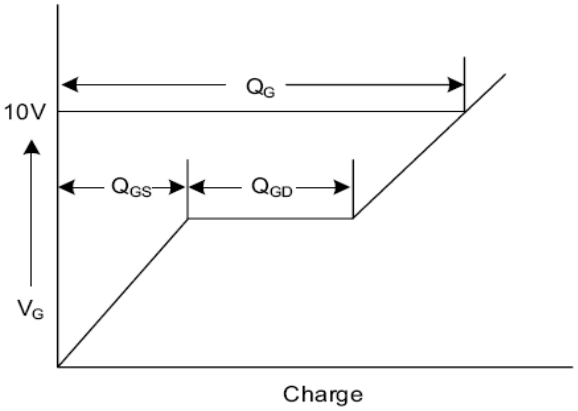


Fig. 3 . 2 Gate Charge Waveform

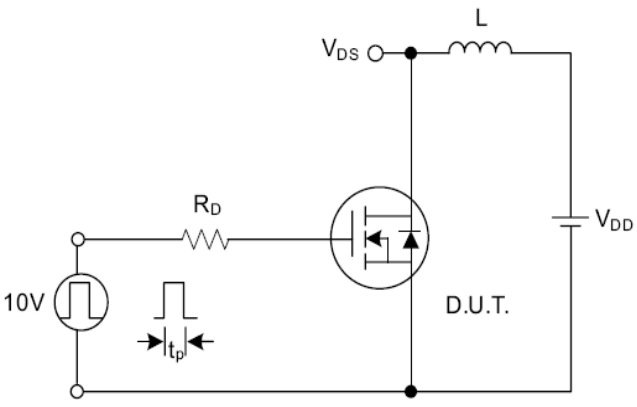


Fig. 4.1 Unclamped Inductive Switching Test Circuit

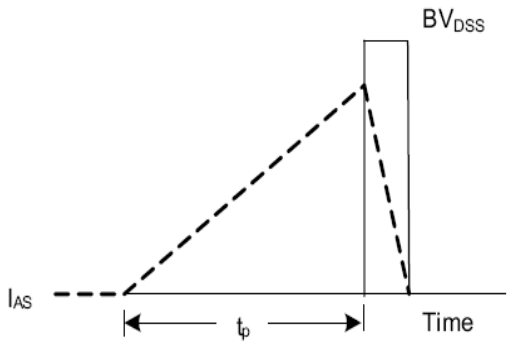
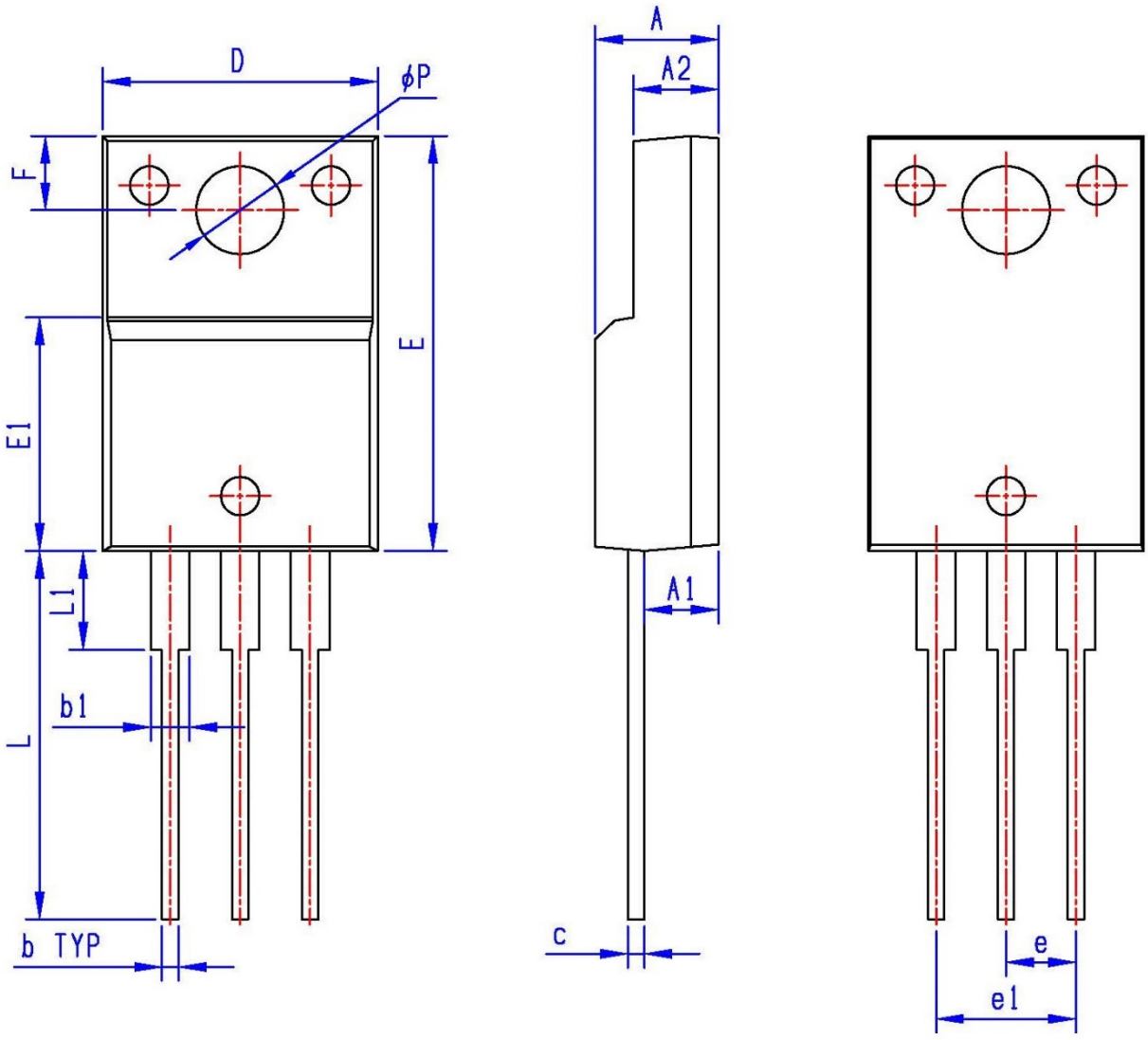


Fig. 4.2 Unclamped Inductive Switching Waveforms

●Dimensions（TO-220F)

UNIT:mm

SYMBOL	min	max	SYMBOL	min	max
A	4.20	4.80	E1	8.30	8.70
A1	2.50	2.90	e	2.40	2.70
A2	2.90	3.30	e1	4.95	5.25
b	0.40	0.80	F	2.50	2.90
b1	1.10	1.50	L	13.00	14.00
c	0.50	0.70	L1	3.00	4.00
D	9.80	10.60	⌀P	2.90	3.50
E	14.60	15.60			



●Dimensions（TO-220)

UNIT:mm

SYMBOL	min	max	SYMBOL	min	max
A	4.25	4.85	B1	2.60	3.00
A1	2.30	3.00	e	2.40	2.70
A2	1.20	1.40	e1	4.95	5.25
b	0.60	0.90	L	12.60	14.40
b1	1.10	1.70	L1	2.40	4.00
c	0.40	0.70	⌀P	3.50	3.90
D	9.80	10.60			
B	15.20	16.20