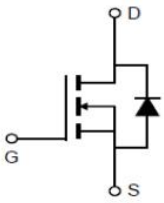
LH75N20

200V N-Channel MOSFET

•General Description

The N-Channel MOSFET LH75N20 has the low $R_{DS(on)}$,low gate charge,fast switching and excellent avalanche characteristics.This device is suitable for fast charge and lighting.



VDS =200V

RDS(ON)=21mΩ

ID =75A

■ RoHS COMPLIANT

TO-220

TO-263

•Features

- ■Extremely low on-resistance RDS(ON)
- ■Low Switching Charge
- ■Low Miller Capacitance

•Application

- ■BLDC Motor control and drive
- ■Power Supplies
- ■Battery Management
- ■UPS

•Ordering Information:

Part Number	LH75N20	LH75N20
Package	TO-220	TO-263
Basic Ordering Unit (pcs)	1000	800
Normal Package Material Ordering Code	LH75N20T-TO220-TU	LH75N20T63-TO263-TAP
Halogen Free Ordering Code	LH75N20T-TO220-TU-HF	LH75N20T63-TO263-TAP -HF

•Absolute Maximum Ratings（TC =25℃）

PARAMETER	SYMBOL	Value	UNIT
Drain-Source Breakdown Voltage	BV_{DSS}	200	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current,T_C = 25°C	I_D	75	A
Continuous Drain Current,T_C = 75°C	I_D	50	A
Pulsed drain current (TC = 25°C, tp limited by Tjmax)[1]	I_D pulse	300	A
Single Pulse Avalanche Energy[2]	E_{AS}	480	mJ
Power Dissipation(TC=25℃)	P_D	190	W
Operating Temperature	T_J	-55~+175	℃
Storage Temperature	T_{STG}	-55~+175	℃

●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}=V_{GS},I_D=250uA	2.0	3.0	4.0	V
Drain-source On Resistance	$R_{DS(ON)}$	V_{GS} =10V, I_D=30A	--	21	27	mΩ
		V_{GS} =6V, I_D=30A	--	23	28	
Drain-Source Leakage Current	I_{DSS}	V_{DS}=200V,V_{GS}=0V,T_J=25℃	--	--	1	uA
		V_{DS}=200V,V_{GS}=0V,T_J=125℃	--	--	100	
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20,V_{DS}=0V	--	--	±100	nA
Gate Resistance	Rg	f=1MHz,Open Drain	--	4.5	--	Ω
Forward Transconductance	Gfs	V_{DS}=5V,I_{DS}=30A	--	42	--	S
Input Capacitance	Ciss	V_{GS} = 0V, V_{DS} = 25V f = 1.0MHz	--	3180	--	pF
Output Capacitance	Coss		--	480	--	
Reverse transfer Capacitance	Crss		--	105	--	
Turn-on delay time	Td(on)	V_{DS}=100V V_{GS}=10V, I_D =30A R_G=3.6Ω	--	50	--	nS
Rise time	Tr		--	32	--	
Turn -Off Delay Time	Td(off)		--	73	--	
Fall time	Tf		--	28	--	
Total Gate Charge	Qg	I_D =30A, V_{DS} = 100V V_{GS} = 10V	--	76	---	nC
Gate-to-Source Charge	Qgs		--	19	--	
Gate-to-Drain Charge	Qgd		--	12	---	
Continuous Diode Forward Current	I_S	--	--	--	75	A
Diode Forward Voltage	V_{SD}	Tj=25°C, Is=30A V_{GS} =0V	--	--	1.2	V
Reverse Recovery Time	trr	If=Is di_F/dt=100A/μs	--	129	--	ns
Reverse Recovery Charge	Qrr		--	460	--	uC

●Thermal Characteristics

PARAMETER	SYMBOL	MAX	UNIT
Thermal Resistance Junction-case	Rth_{JC}	0.45	℃/W
Thermal Resistance Junction-ambient	Rth_{JA}	62.5	℃/W

Notes:

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

2. I_{AS} = 50A, V_{DD} = 25V, L=0.5mH,R_G = 50Ω,Starting T_J = 25°C

•Typical Characteristics

Fig1.Output Characteristics

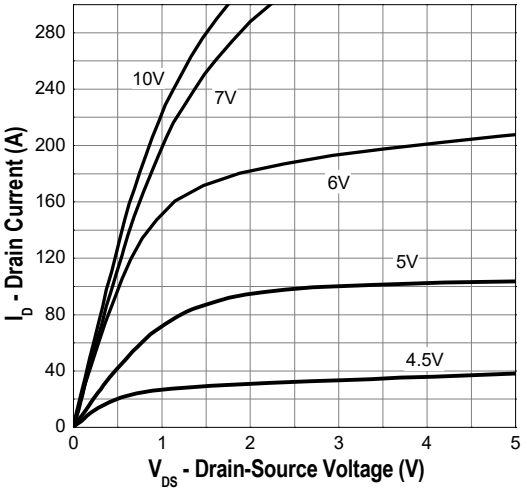


Fig2.Gate Threshold Voltage

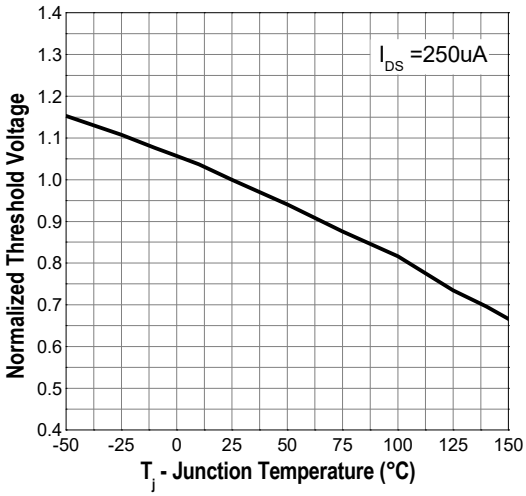


Fig3.Gate-Source On Resistance

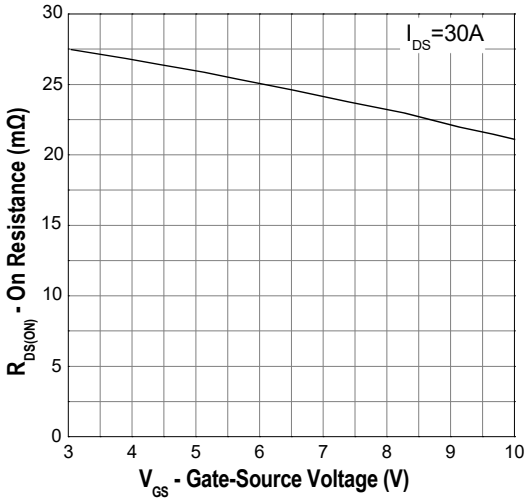


Fig4.Drain-Source On Resistance

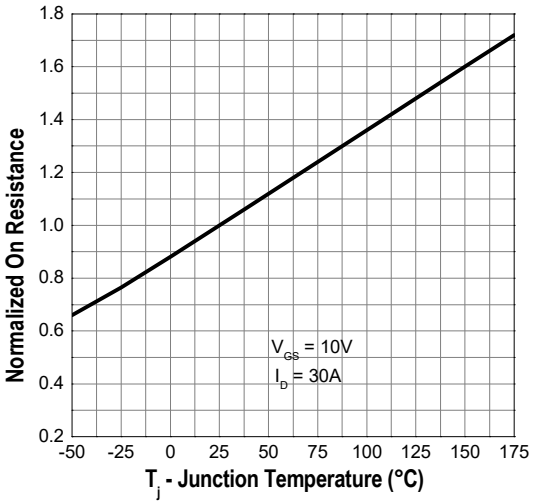


Fig5.Drain-Source On Resistance

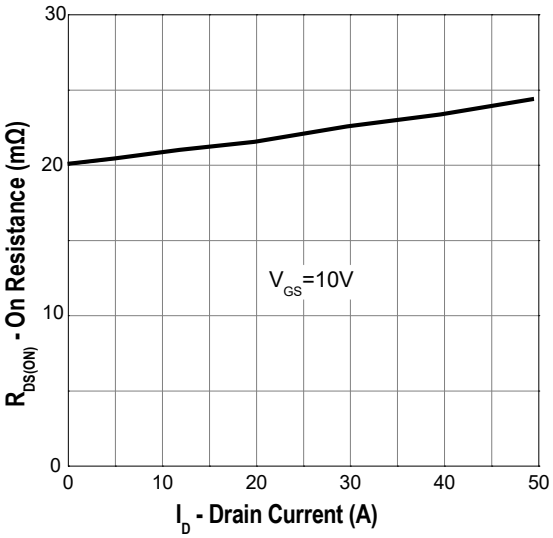
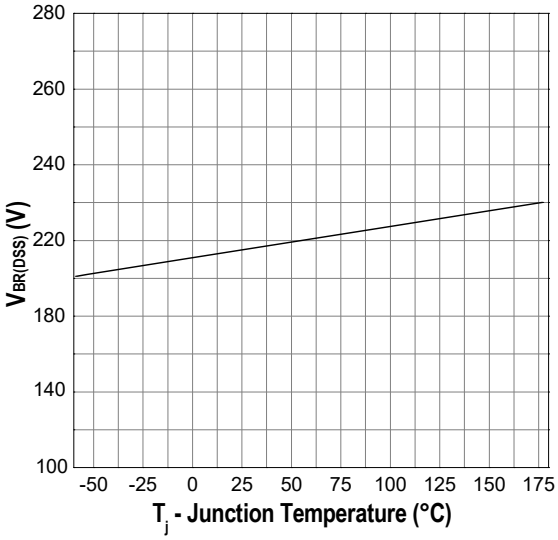


Fig6.Drain-source Breakdown Voltage



●Typical Characteristics(cont.)

Fig7.Power Dissipation

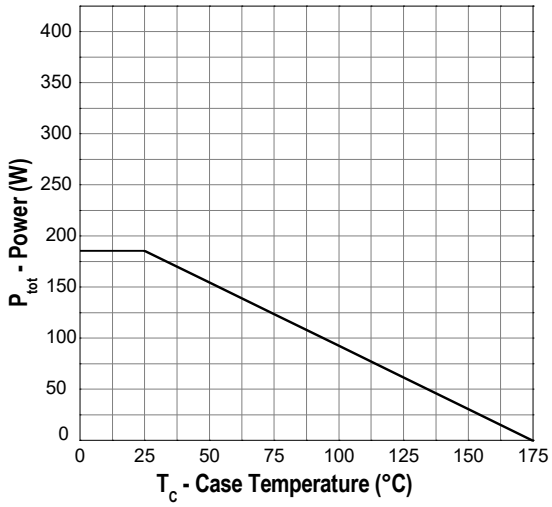


Fig8.Drain Current

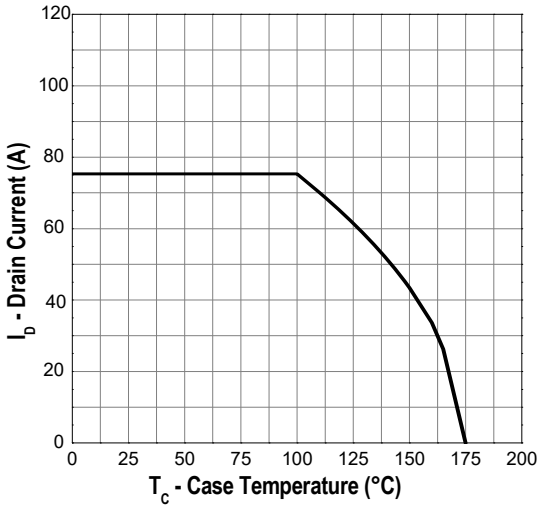


Fig9.Safe Operation Area

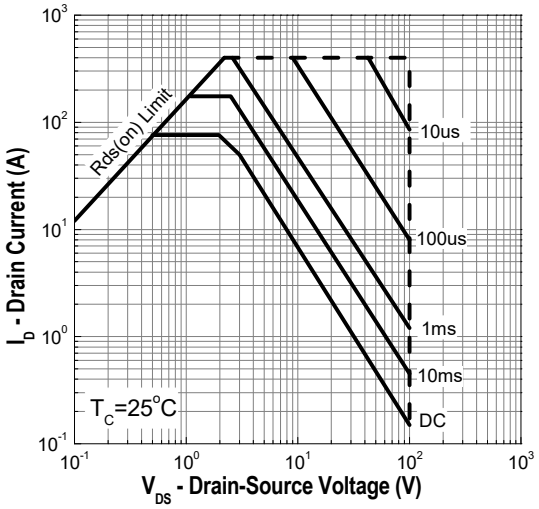


Fig10.Transient Thermal Impedance

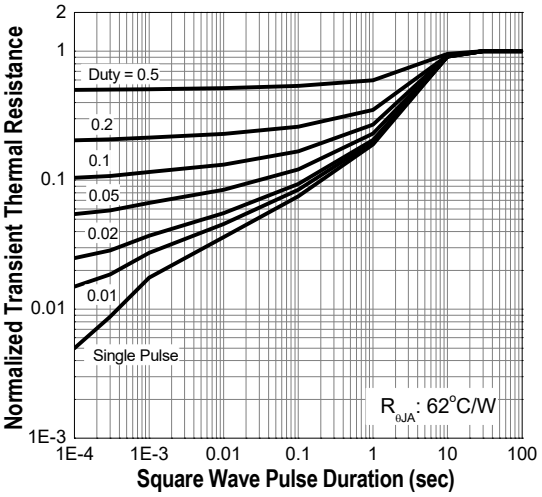


Fig11.Capacitance

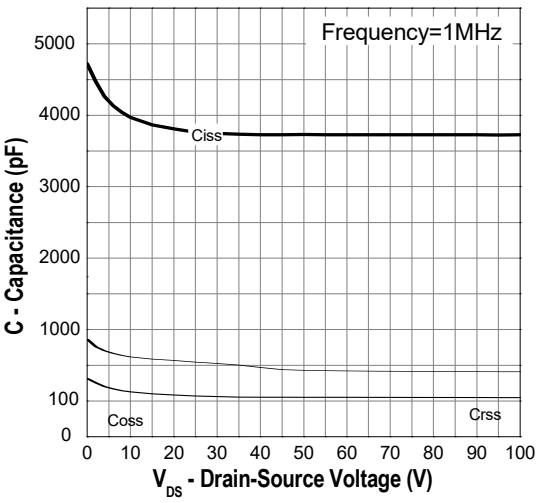
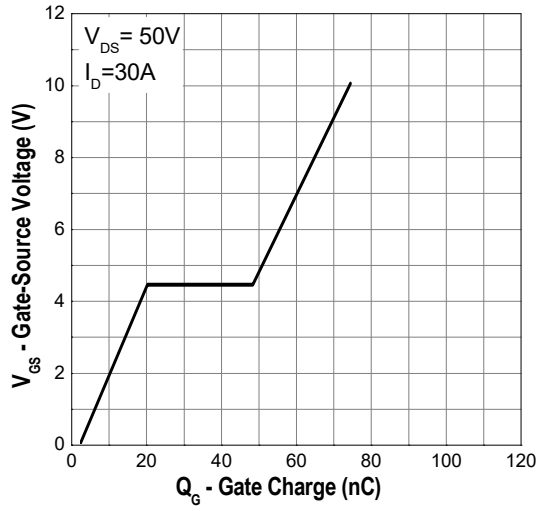
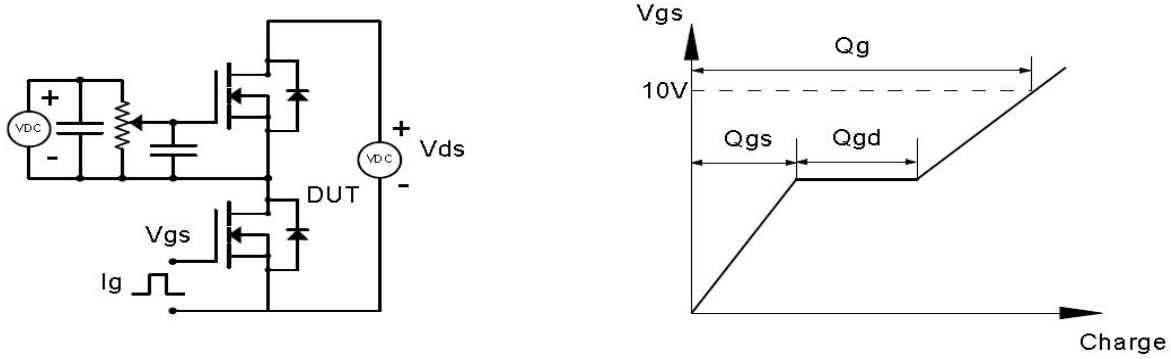


Fig12.Gate Charge

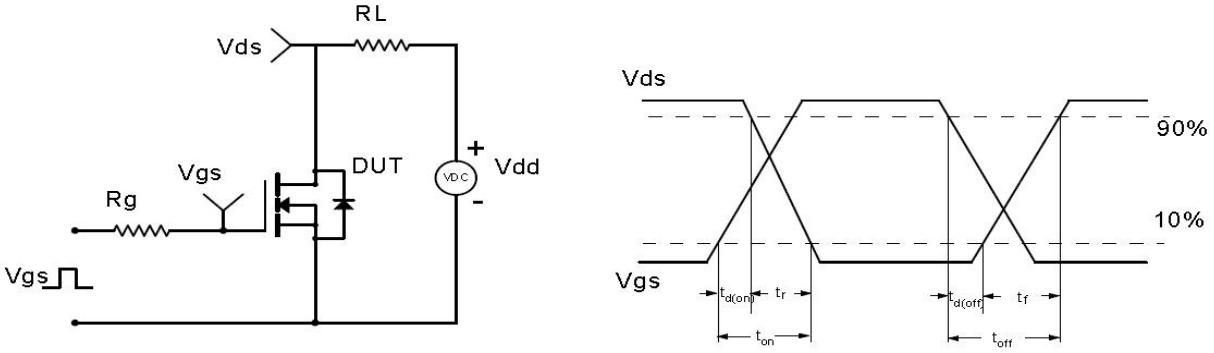


• Test Circuits & Waveforms

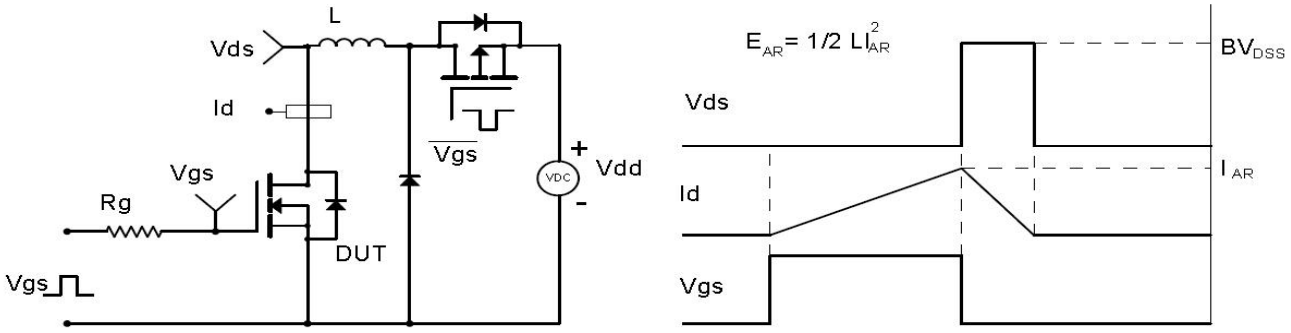
Gate Charge Test Circuit & Waveform



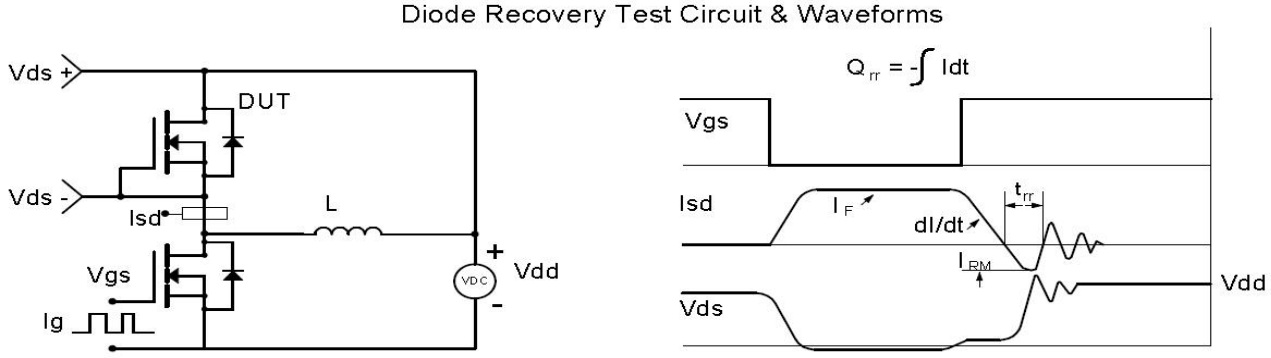
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



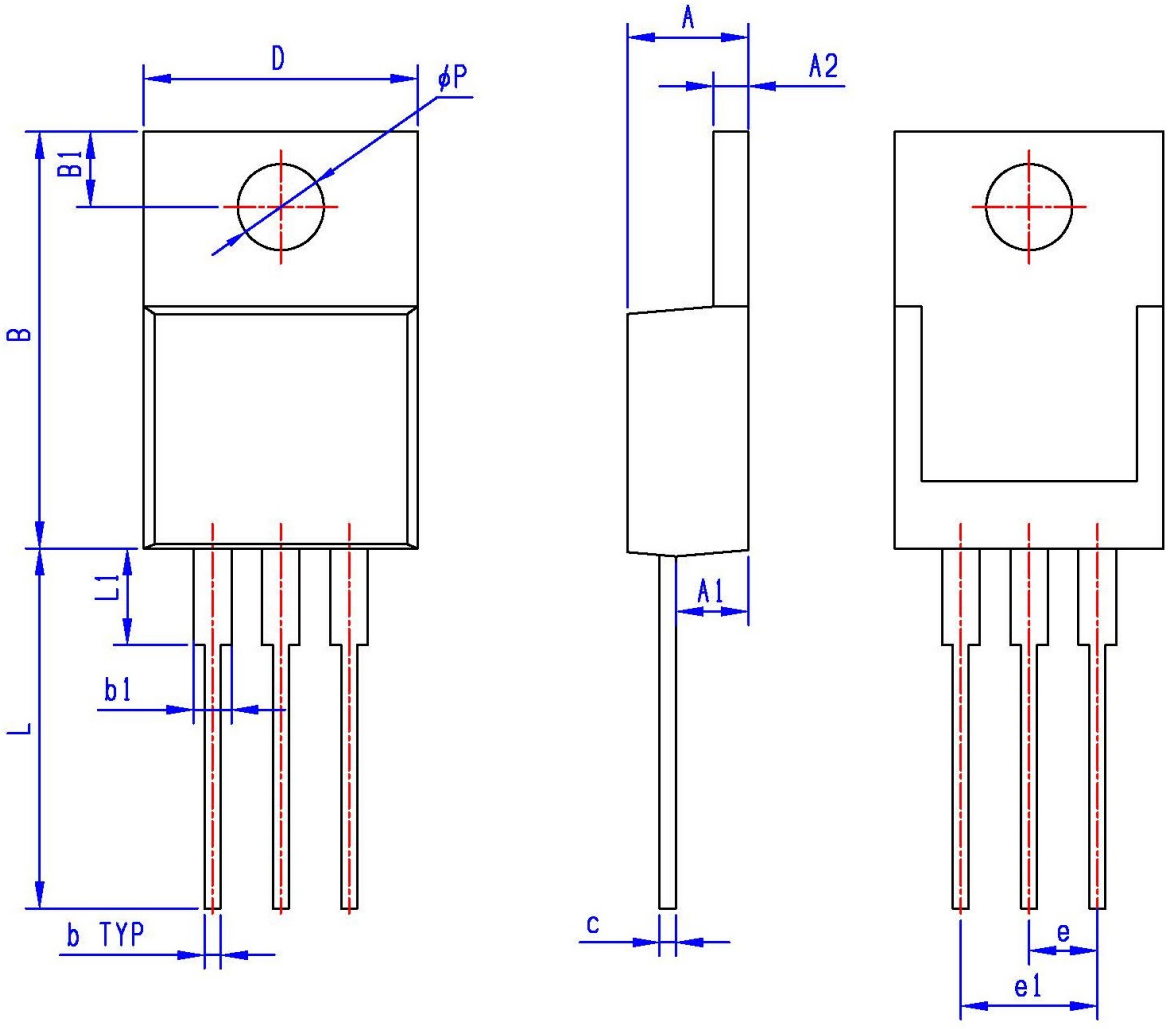
Diode Recovery Test Circuit & Waveforms



●Dimensions (TO-220)

Unit：mm

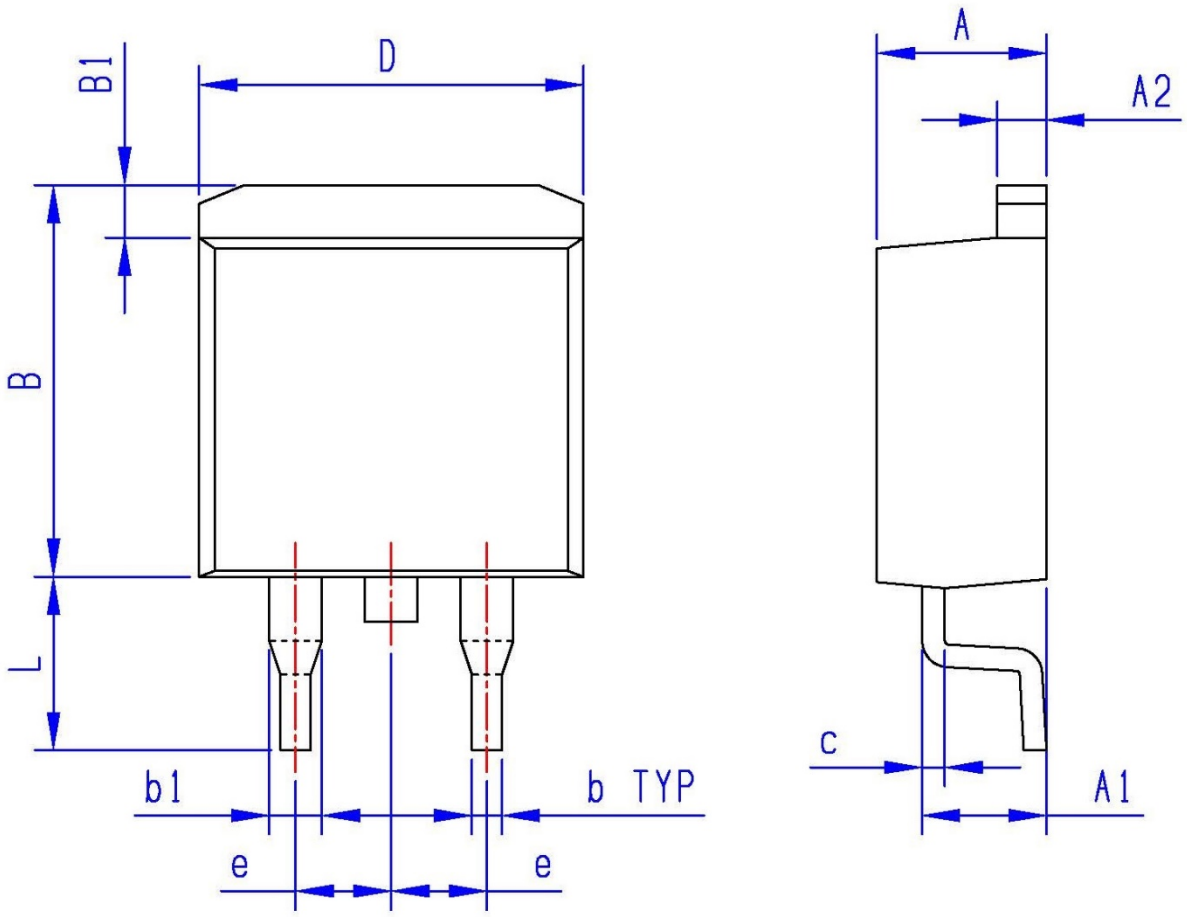
SYMBOL	min	max	SYMBOL	min	max
A	4.25	4.85	B1	2.60	3.00
A1	2.30	3.00	e	2.40	2.70
A2	1.20	1.40	e1	4.95	5.25
b	0.60	0.90	L	12.60	14.40
b1	1.10	1.70	L1	2.40	4.00
c	0.40	0.70	⌀P	3.50	3.90
D	9.80	10.60			
B	15.20	16.20			



- **Dimensions（TO-263）**

Unit：mm

SYMBOL	min	max	SYMBOL	min	max
A	4.25	4.85	B1	1,20	1.80
A1	2.30	3.00	e	2.40	2.70
A2	1.20	1.40	L	4.80	5.60
b	0.60	0.90			
b1	1.10	1.70			
c	0.40	0.70			
D	9.80	10.60			
B	10.40	11.40			



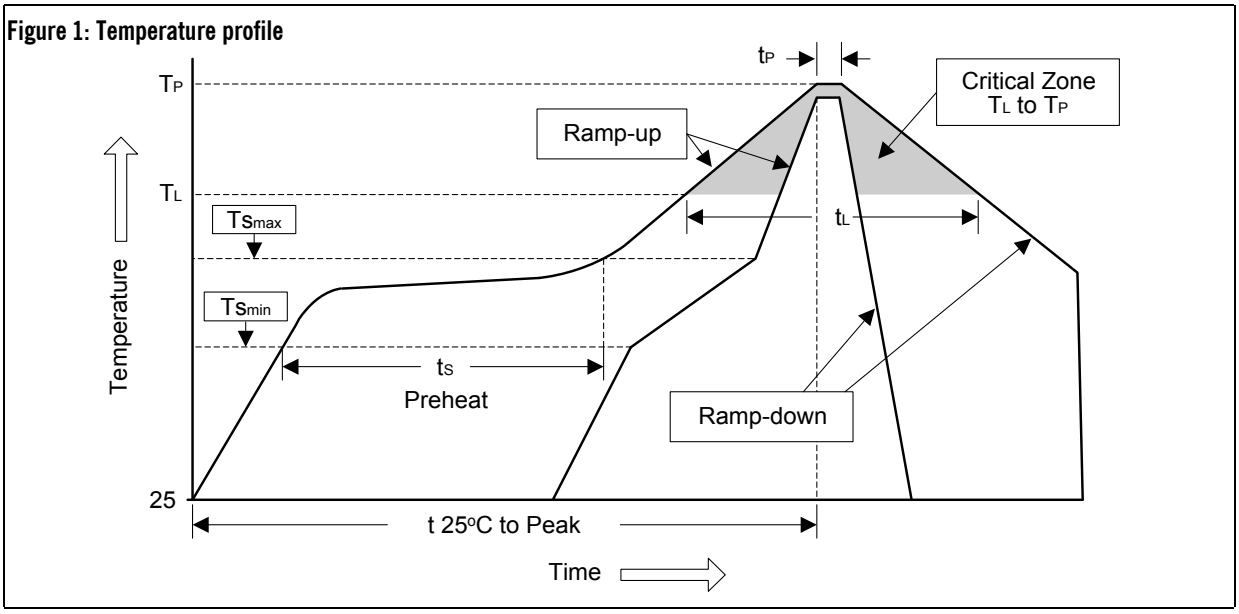
• Soldering Methods for Lihomicro's Products

1. Storage environment: Temperature=10°C to 35°C Humidity=65%±15%

2. Molder Plastic: UL Flammability Classification Rating 94V-0

3. Reflow soldering of surface-mount devices

Figure 1: Temperature profile



• Classification Reflow Profiles

Average ramp-up rate (T_L to T_P)	＜3°C/sec	＜3°C/sec
Preheat - Temperature Min (Ts_{min}) - Temperature Max (Ts_{max}) - Time (min to max) (ts)	 100°C 150°C 60 to 120 sec	 150°C 200°C 60 to 180 sec
Tsmax to T_L - Ramp-up Rate	 ＜3°C/sec	 ＜3°C/sec
Time maintained above: - Temperature (T_L) - Time (t_L)	 183°C 60 to 150 sec	 217°C 60 to 150 sec
Peak Temperature (T_P)	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature (t_P)	10 to 30 sec	20 to 40 sec
Ramp-down Rate	＜6°C/sec	＜6°C/sec
Time 25°C to Peak Temperature	＜6 minutes	＜8 minutes

Flow (wave) soldering (solder dipping)

Products	Peak Temperature	Dipping Time
Pb devices.	245°C ±5°C	5sec ±1sec
Pb-Free devices.	260°C +0/-5°C	5sec ±1sec

• Reliability Test Program

Testitem	Method	Description
Solderabity	JESD-22,B102	5sec , 245°C
Holt	JESD-22,A108	1000Hrs,Bias@125°C
PCT	JESD-22,A102	168Hrs,100%RH,2atm,121°C
TCT	JESD-22,A104	500Cycles, -65°C ~150°C