

SLB120N08G3/SLP120N08G3

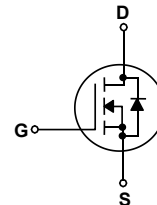
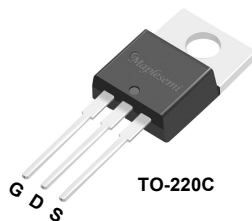
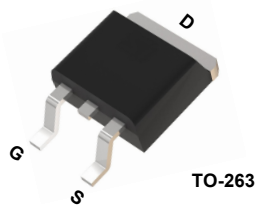
85V N -Channel MOSFET

General Description

This Power MOSFET is produced using Msemitek's advanced Shielding Gate MOSFET technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for low voltage applications such as DC/DC converters and high efficiency switching for power management in portable and battery operated products.

Features

- N-Channel:85V 120A
 $R_{DS(on)Typ} = 5.0m\Omega @ V_{GS} = 10V$
- Very Low On-resistance $R_{DS(ON)}$
- Low Crss
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	SLB120N08G3/SLP120N08G3	Units
V_{DSS}	Drain-Source Voltage	85	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$) - Continuous ($T_C = 100^\circ\text{C}$)	120	A
		100	A
I_{DM}	Drain Current - Pulsed (Note 1)	480	A
V_{GSS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	625	mJ
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	105	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.7	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to ambient	60	$^\circ\text{C}/\text{W}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

* Drain current limited by maximum junction temperature.

Package Marking

Part Number	Top Marking	Package	Packing Method	MOQ	QTY
SLB120N08G3	SLB120N08G3	TO-263	Tape	800	4000
SLP120N08G3	SLP120N08G3	TO-220C	Tube	1000	5000

Electrical Characteristics

 $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	85	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 85\text{ V}, V_{GS} = 0\text{ V}$	--	--	1	μA
		$V_{DS} = 85\text{ V}, T_C = 125^\circ\text{C}$	--	5	-	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	2.0	-	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 30\text{ A}$	--	5.0	6.2	m Ω
gfs	Transconductance	$V_{DS} = 5\text{ V}, I_D = 30\text{ A}$	-	80	-	S
R_G	Gate Resistance	$V_{GS} = 0\text{ V}, V_{DS} = 0\text{ V}$ $F = 1\text{ MHz}$	-	1.5	-	Ω

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	4030	-	pF
C_{oss}	Output Capacitance		--	545	-	pF
C_{rss}	Reverse Transfer Capacitance		--	35	-	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{GS} = 10\text{ V}, V_{DS} = 40\text{ V},$ $R_L = 3\ \Omega$ (Note 3)	--	20	--	ns
t_r	Turn-On Rise Time		--	38	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	45	--	ns
t_f	Turn-Off Fall Time		--	20	--	ns
Q_g	Total Gate Charge	$V_{DS} = 40\text{ V}, I_D = 25\text{ A},$ $V_{GS} = 10\text{ V}$ (Note 3)	--	65	--	nC
Q_{gs}	Gate-Source Charge		--	25	--	nC
Q_{gd}	Gate-Drain Charge		--	14	--	nC

Drain-Source Diode Characteristics and Maximum Ratings

I_S	Maximum Continuous Drain-Source Diode Forward Current	--	--	120	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current	--	--	480	A
V_{SD}	Drain to Source Diode Forward Voltage, $V_{GS} = 0\text{ V}, I_{SD} = 30\text{ A}, T_J = 25^\circ\text{C}$	--	-	1.4	V
T_{rr}	Reverse recovery time, $I_F = 20\text{ A}, DI_F/dt = 500\text{ A}/\mu\text{s}$			60	ns
Q_{rr}	Reverse recovery charge, $I_F = 20\text{ A}, DI_F/dt = 500\text{ A}/\mu\text{s}$			340	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: $T_J = 25^\circ\text{C}, V_{DD} = 15\text{ V}, V_G = 10\text{ V}, R_G = 25\ \Omega, L = 0.5\text{ mH}$
3. Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 0.5\%$

N- Channel Typical Characteristics

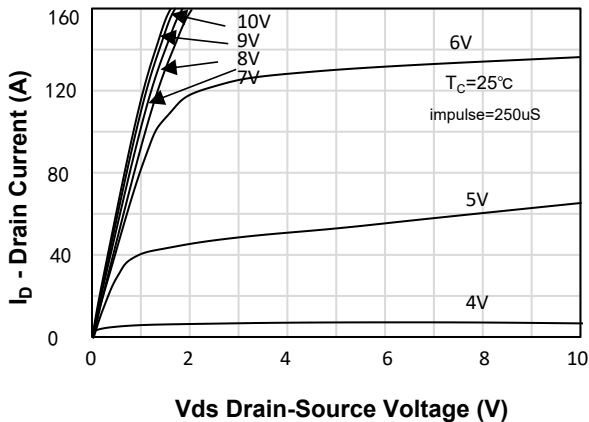


Figure 1. On-Region Characteristics

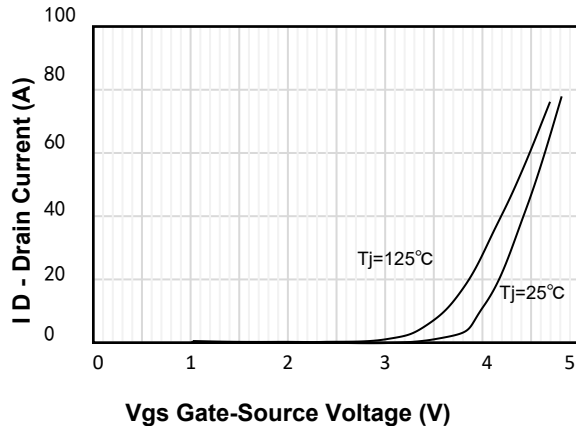


Figure 2. Transfer Characteristics

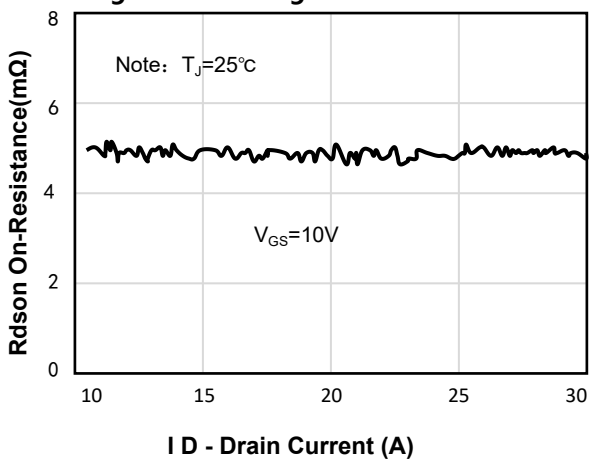


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

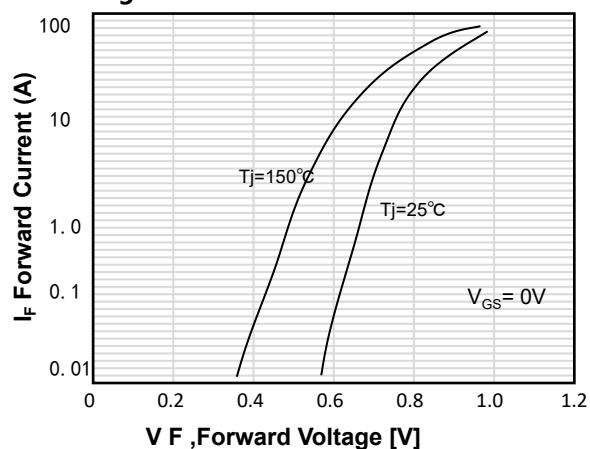


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

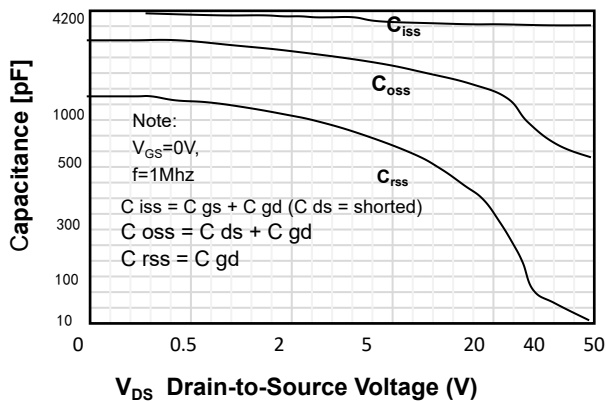


Figure 5. Capacitance Characteristics

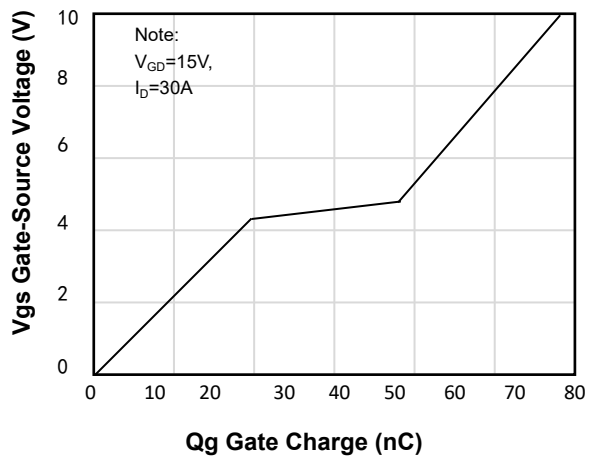


Figure 6. Gate Charge Characteristics

N- Channel Typical Characteristics (Continued)

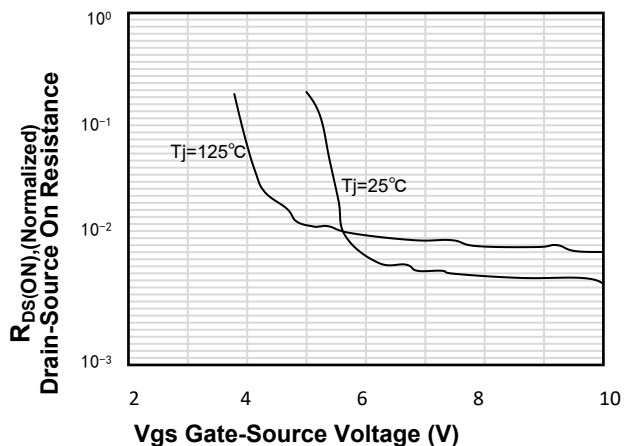


Figure 7. Breakdown Voltage Variation vs Temperature

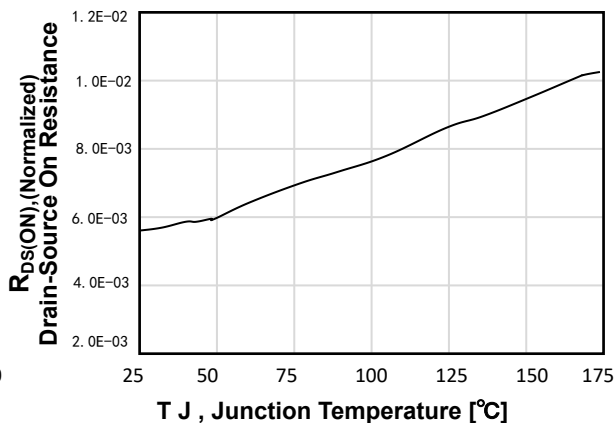


Figure 8. On-Resistance Variation vs Temperature

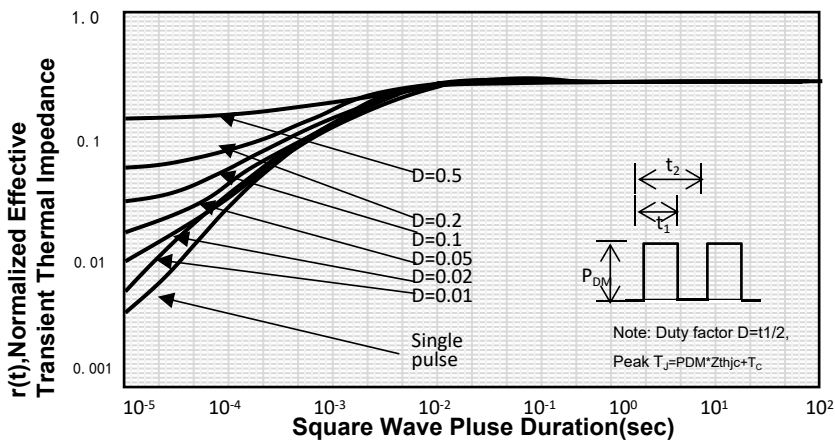


Figure 9.1 Transient Thermal Response Curve (R_{thJC})

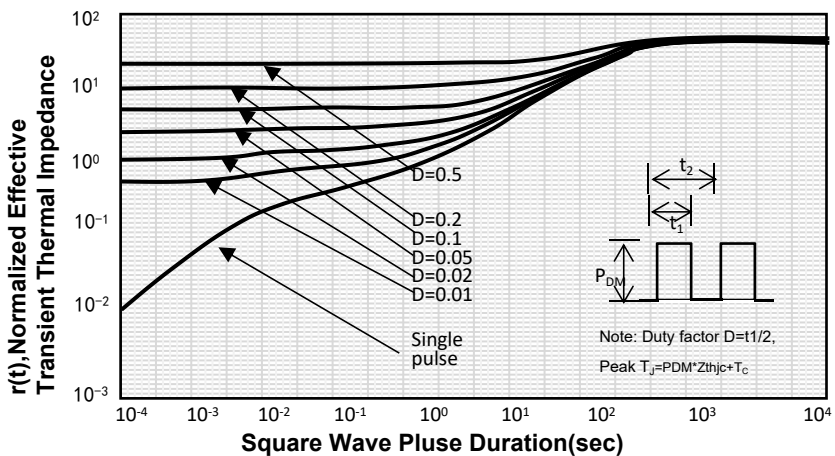
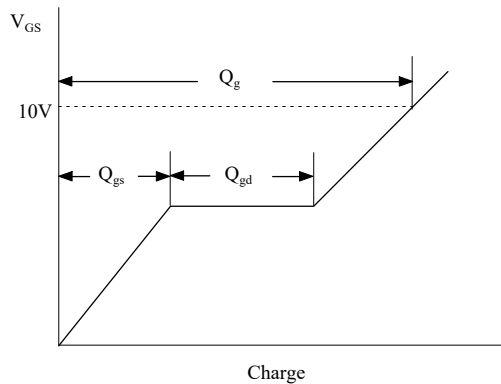
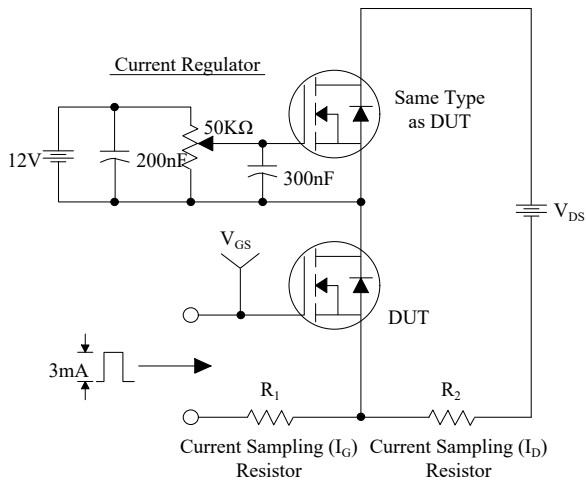
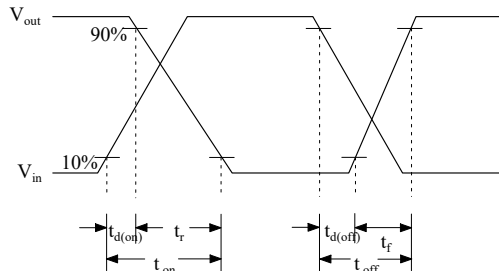
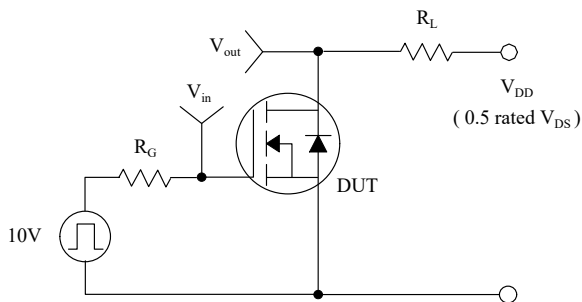


Figure 9.2. Transient Thermal Response Curve(R_{thJA})

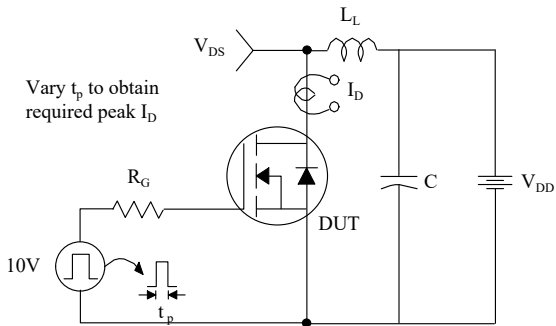
Gate Charge Test Circuit & Waveform



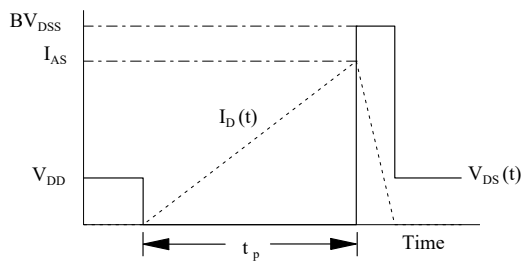
Resistive Switching Test Circuit & Waveforms



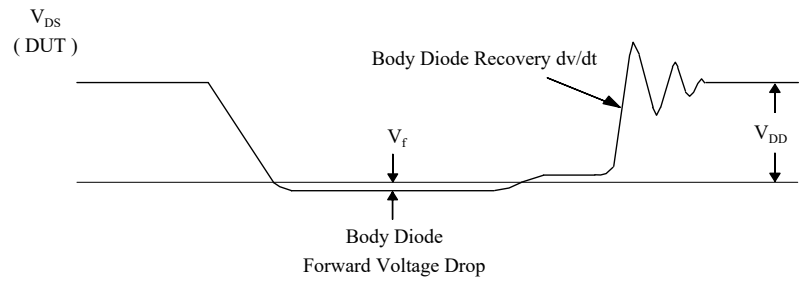
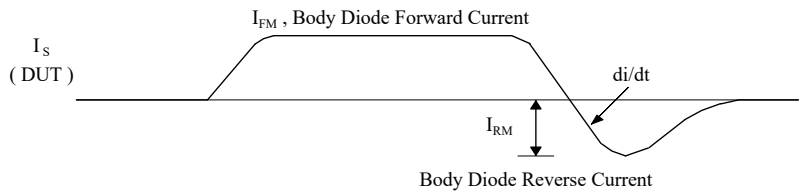
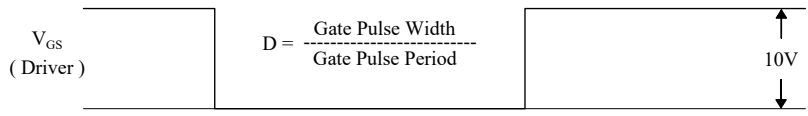
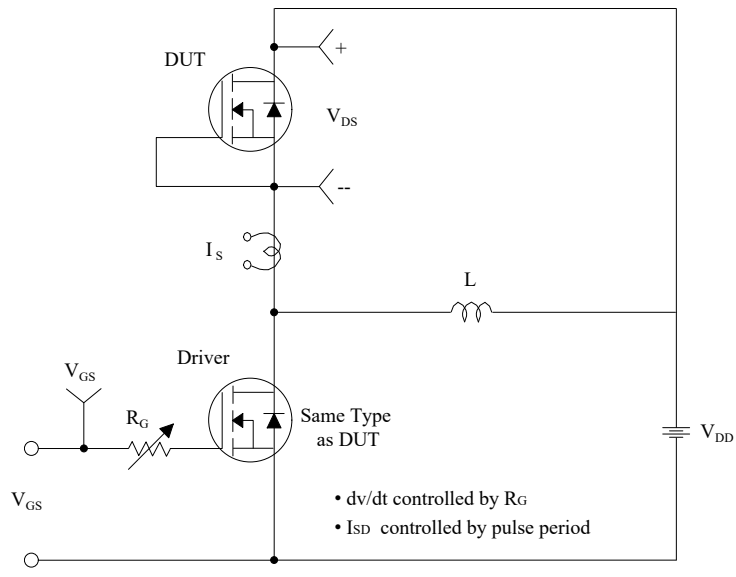
Unclamped Inductive Switching Test Circuit & Waveforms



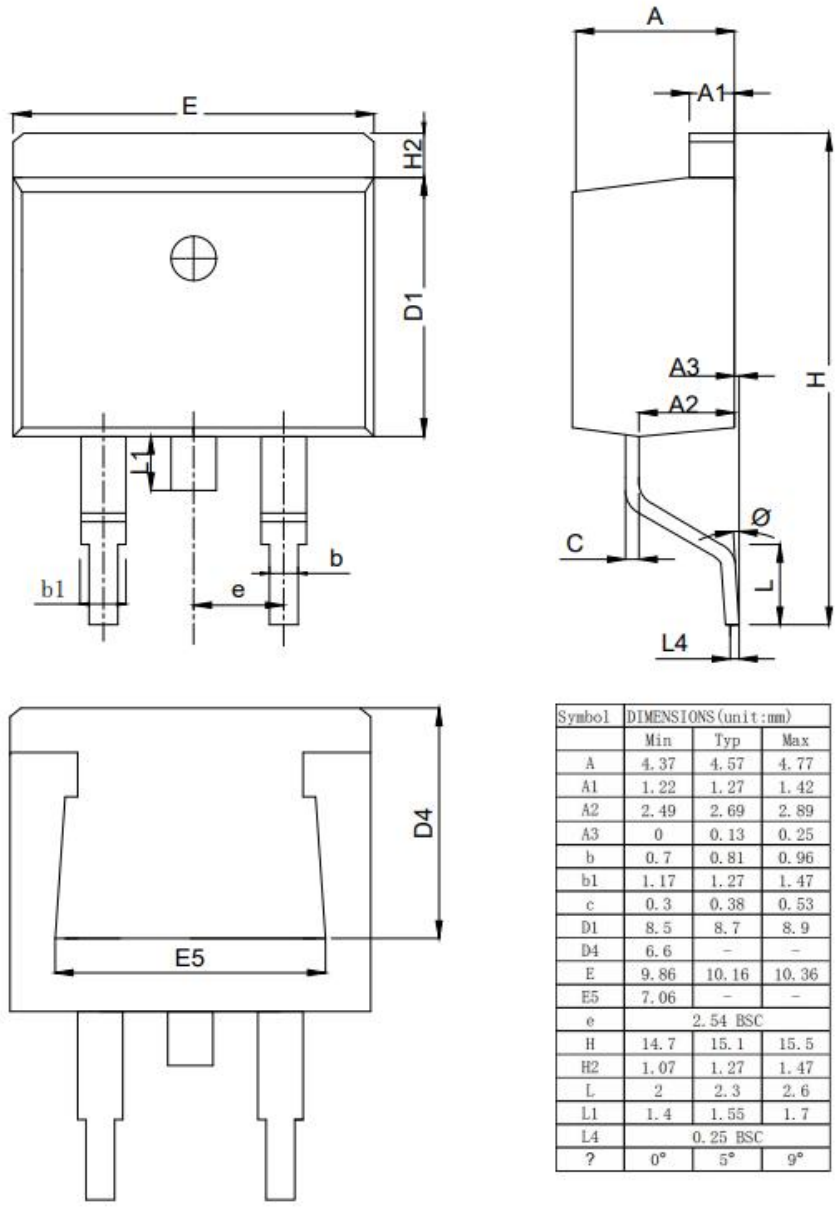
$$E_{AS} = \frac{1}{2} L_L I_{AS}^2$$



Peak Diode Recovery dv/dt Test Circuit & Waveforms



TO-263 OUTLINE

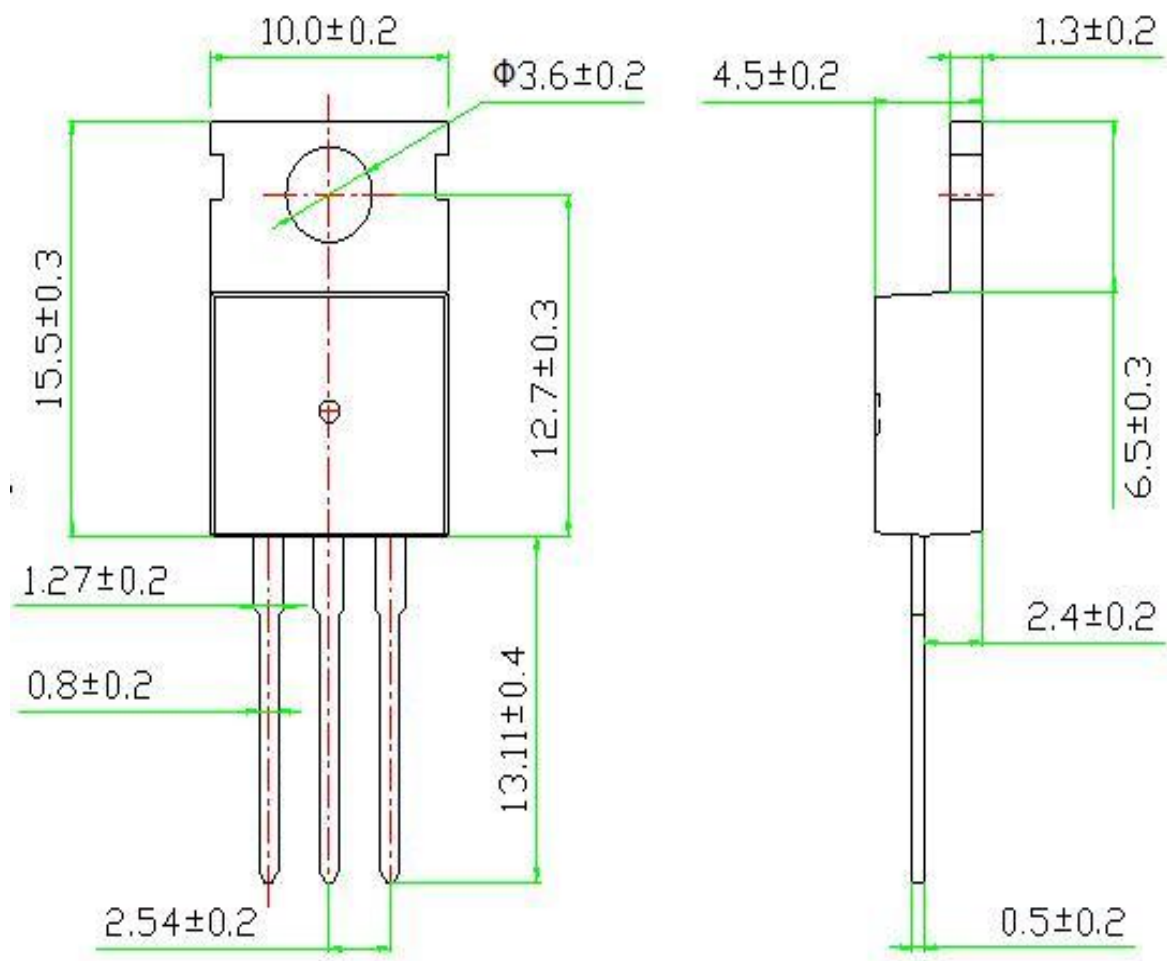


Symbol	DIMENSIONS (unit:mm)		
	Min	Typ	Max
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
A3	0	0.13	0.25
b	0.7	0.81	0.96
b1	1.17	1.27	1.47
c	0.3	0.38	0.53
D1	8.5	8.7	8.9
D4	6.6	-	-
E	9.86	10.16	10.36
E5	7.06	-	-
e	2.54 BSC		
H	14.7	15.1	15.5
H2	1.07	1.27	1.47
L	2	2.3	2.6
L1	1.4	1.55	1.7
L4	0.25 BSC		
?	0°	5°	9°

NOTE:

- 1.The plastic package is not marked as smooth surfaceRa=0.1;Subglossy surfaceRa=0.8
- 2.Undeclared tolerance ± 0.25 ,Unmarked filletRmax=0.25

TO-220C OUTLINE



NOTE:

- 1The plastic package is not marked as smooth surfaceRa=0.1;Subglossy surfaceRa=0.8
- 2.Undeclared tolerance ± 0.25 ,Unmarked filletRmax=0.25

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