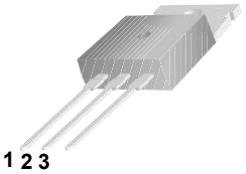
120N08

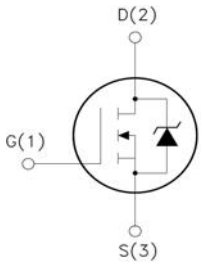
80V N-Channel MOSFET

Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg=74.4nC (Typ.).
- ☐ V_{DSS}=80V,I_D=120A
- ☐ R_{DS}(on) : 6 mΩ (typ.) @V_G=10V
- ☐ 100% Avalanche Tested

TO-220 RoHS COMPLIANT





1.Gate (G)
2.Drain (D)
3.Source (S)

Absolute（Tc= 25℃ unless otherwise specified）:

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	80	V
I_D	Continuous Drain Current	120	A
	Continuous Drain Current T_C = 100 ℃	85	A
I_{DM} [a1]	Pulsed Drain Current	480	A
V_{GS}	Gate-to-Source Voltage	±20	V
E_{AS} [a2]	Single Pulse Avalanche Energy	650.25	mJ
P_D	Power Dissipation	208	W
	Derating Factor above 25 ℃	1.6	W/℃
T_J， T_{stg}	Operating Junction and Storage Temperature Range	150，–55 to 150	℃
T_L	Maximum Temperature for Soldering	300	℃

Electrical Characteristics（Tc= 25℃ unless otherwise specified）:

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	80	--	--	V
I_{DSS}	Drain to Source Leakage Current	V_{DS} =80V, V_{GS}= 0V, T_a = 25℃	--	--	1	μA
		V_{DS} =68V, V_{GS}= 0V, T_a = 100℃	--	--	100	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS} =+20V	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS} =-20V	--	--	-100	nA

Electrical Characteristics（Tc= 25℃ unless otherwise specified）：

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=10V,I_D=60A	--	6.0	7.5	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	2.0	--	4.0	V
Pulse width tp≤300μs, δ ≤2%						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
C_{iss}	Input Capacitance	VGS=0V，VDS=25V f=1.0MHz	--	4572	--	pF
C_{oss}	Output Capacitance		--	494.4	--	
C_{rss}	Reverse Transfer Capacitance		--	253	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	VGS=10V，RG=6Ω VDD=40V，ID=60A	--	35.7	--	ns
tr	Rise Time		--	65.6	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	67.2	--	
t_f	Fall Time		--	21.87	--	
Q_g	Total Gate Charge	VGS=10V，VDD=64V ID=60A	--	74.4	--	nC
Q_{gs}	Gate to Source Charge		--	21.9	--	
Q_{gd}	Gate to Drain (“Miller”)Charge		--	22.4	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	120	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	480	A
V_{SD}	Diode Forward Voltage	I_S=60A,V_{GS}=0V	--	--	1.2	V
trr	Reverse Recovery Time	I_S=20A,T_j = 25℃ dI_F/dt=100A/us, V_{GS}=0V	--	72	--	ns
Qrr	Reverse Recovery Charge		--	126	--	nC
I_{RRM}	Reverse Recovery Current		--	3.5	--	A
Pulse width tp≤300μs, δ ≤2%						

Symbol	Parameter	Max.	Units
$R_{\theta JC}$	Junction-to-Case	0.6	℃/W
$R_{\theta JA}$	Junction-to-Ambient	48.92	℃/W

[a1]: Repetitive rating; pulse width limited by maximum junction temperature
[a2]: L=0.5mH, I_D=51A, Start T_J=25℃

Typical Performance Characteristics

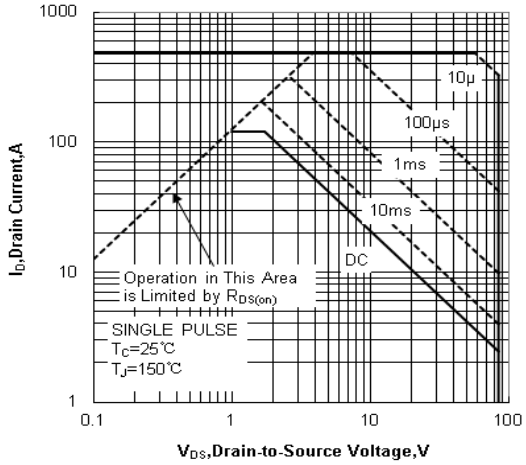


Figure 1 Maximum Forward Bias Safe Operating Area

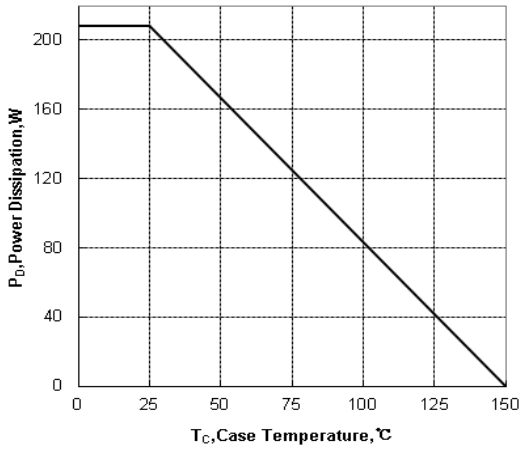


Figure 2 Maximum Power Dissipation vs Case Temperature

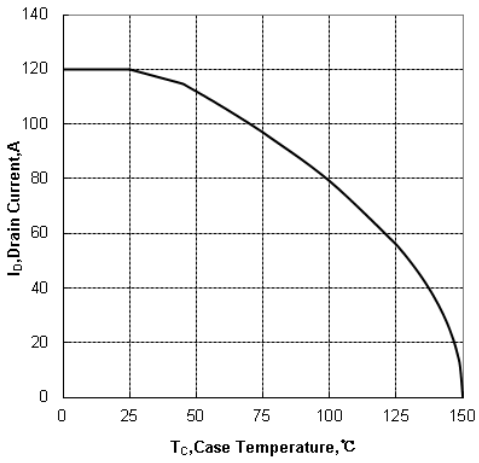


Figure 3 Maximum Continuous Drain Current vs Case Temperature

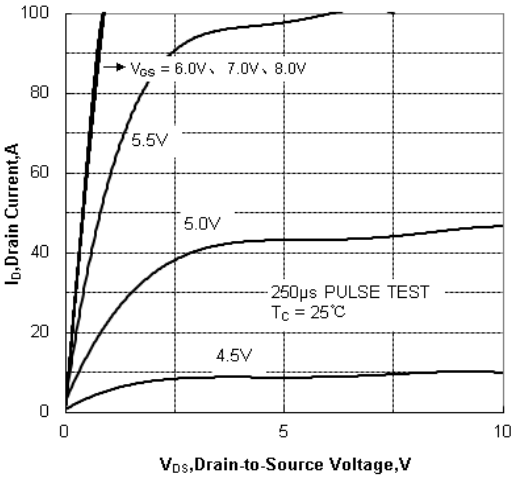


Figure 4 Typical Output Characteristics

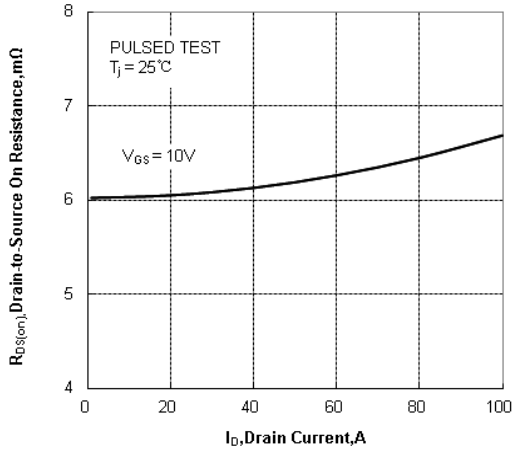


Figure 5 Drain-to-Source On Resistance vs Drain Current

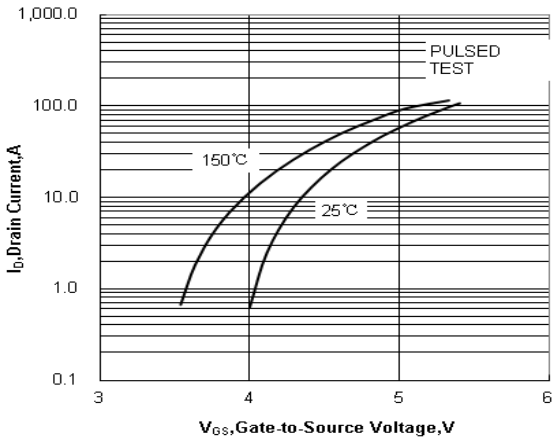


Figure 6 Typical Transfer Characteristics

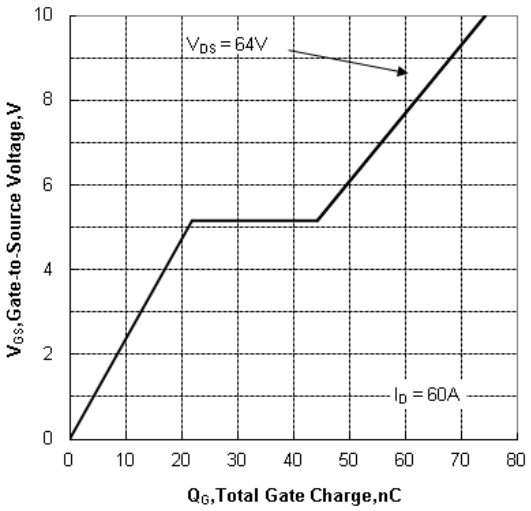


Figure 7 Typical Gate Charge vs Gate to Source Voltage

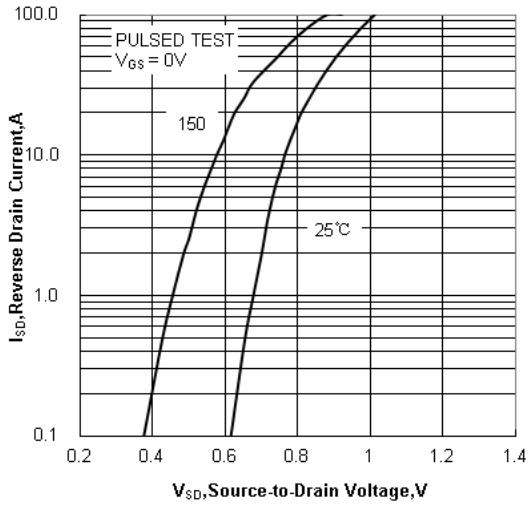


Figure 8 Typical Body Diode Transfer Characteristics

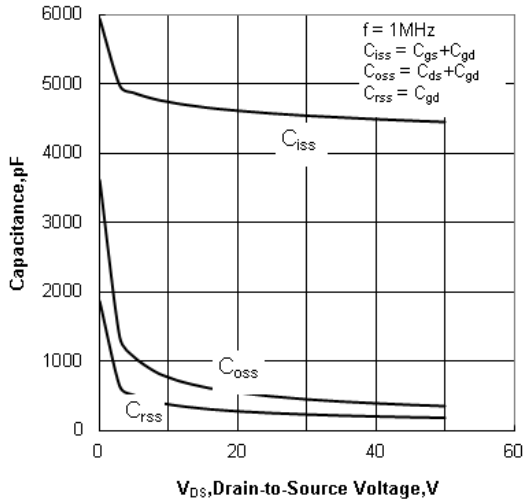


Figure 9 Typical Capacitance vs Drain to Source Voltage

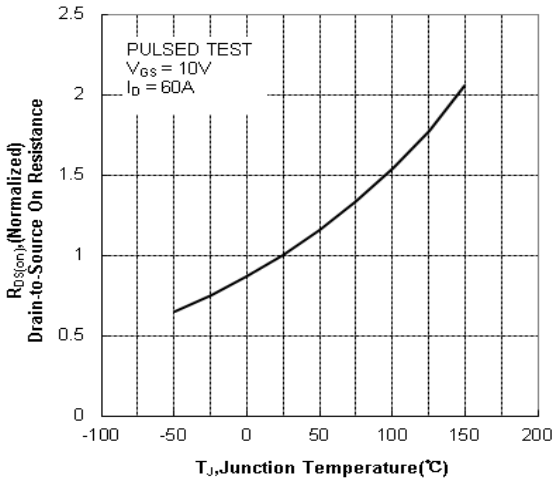


Figure 10 Typical Drian to Source on Resistance vs Junction Temperature

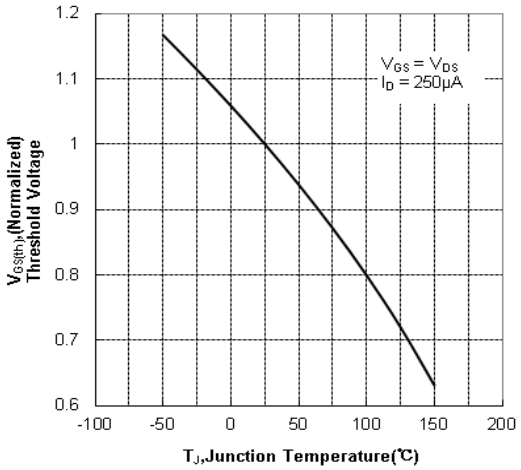


Figure 11 Typical Theshold Voltage vs Junction Temperature

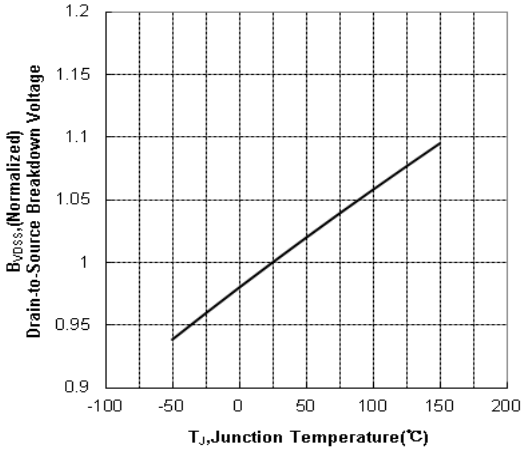


Figure 12 Typical Breakdown Voltage vs Junction Temperature

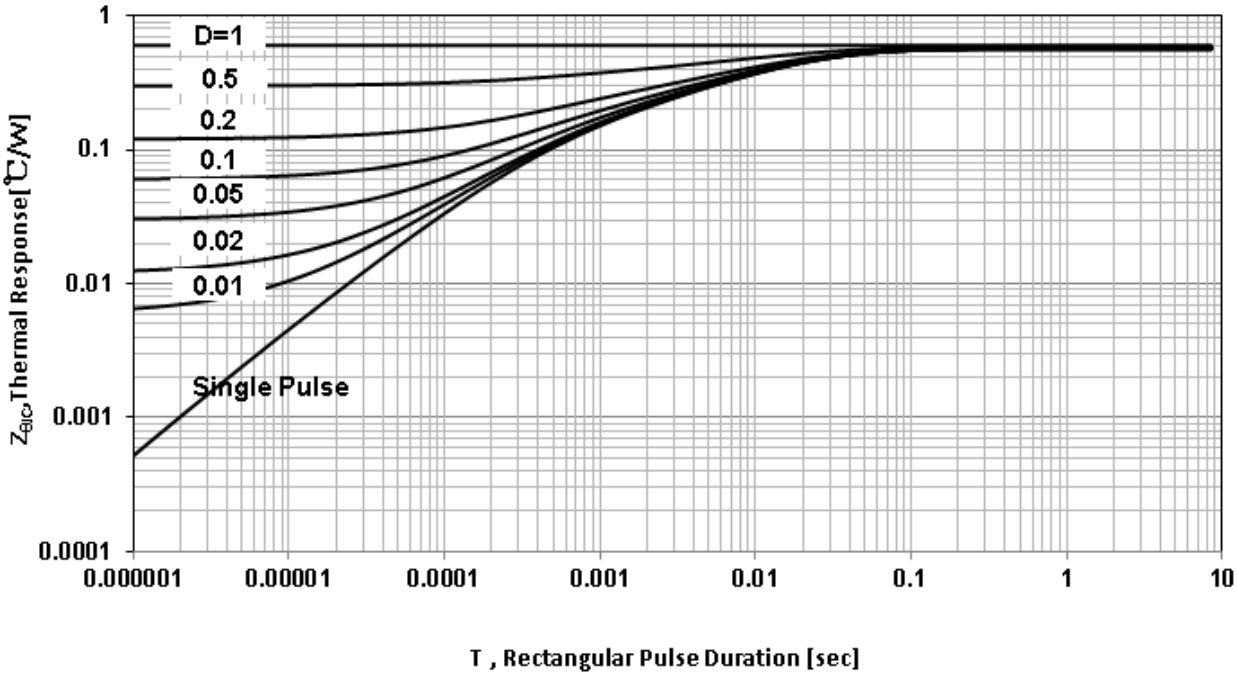


Figure 13 Maximum Effective Transient Thermal Impedance, Junction-to-Case

Test Circuit & Waveform

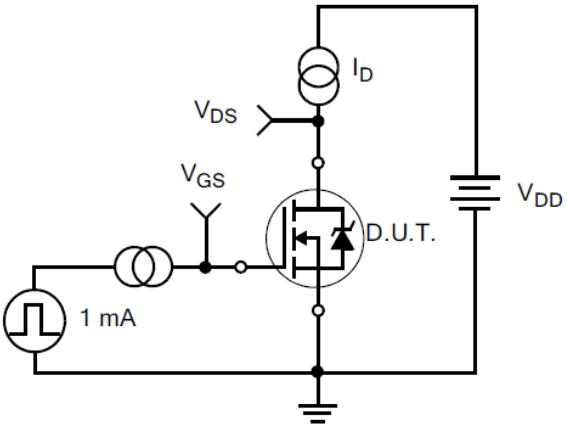


Figure 17. Gate Charge Test Circuit

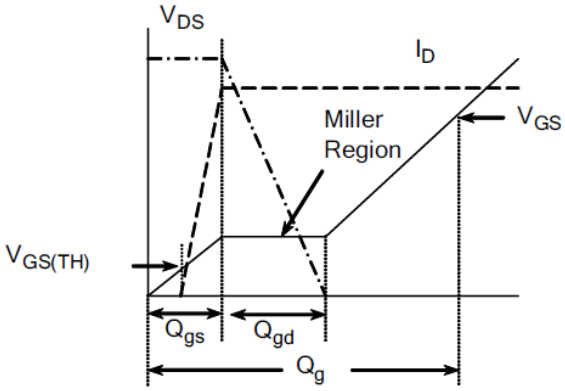


Figure 18. Gate Charge Waveform

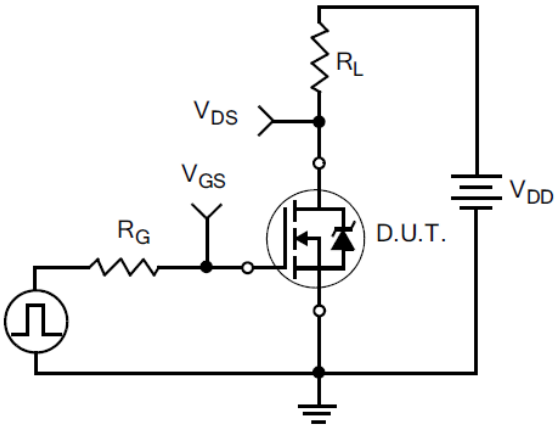


Figure 19. Resistive Switching Test Circuit

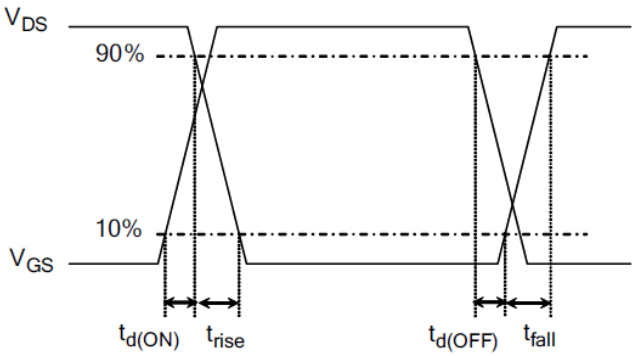


Figure 20. Resistive Switching Waveforms

Test Circuit & Waveform

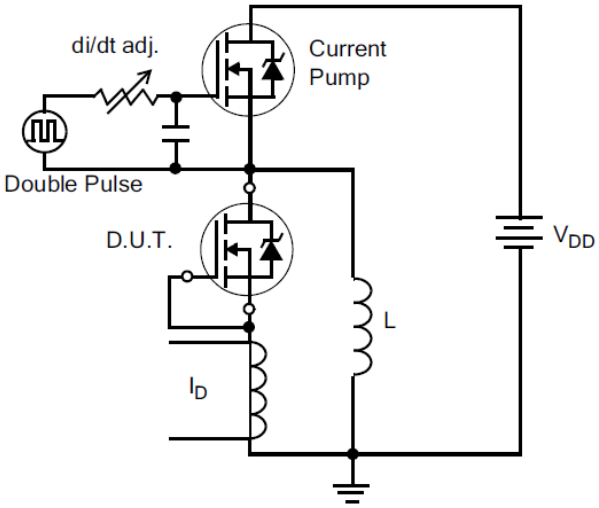


Figure 21. Diode Reverse Recovery Test Circuit

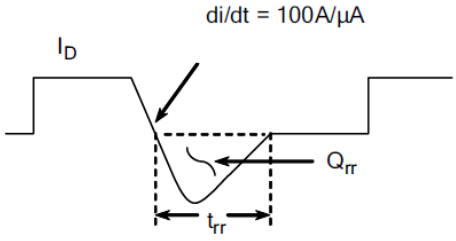


Figure 22. Diode Reverse Recovery Waveform

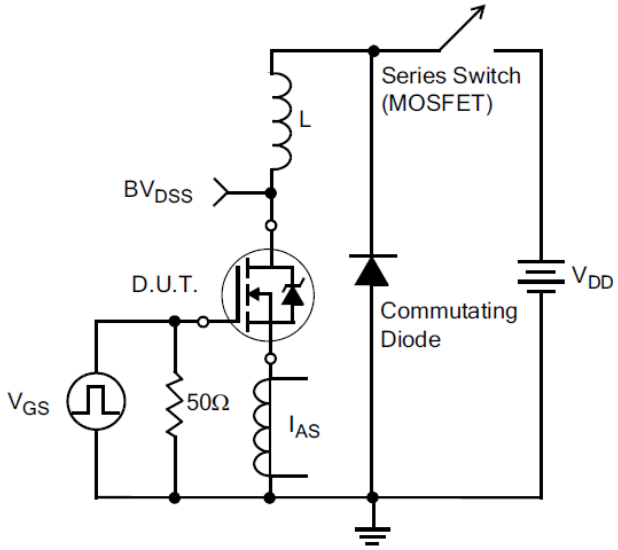
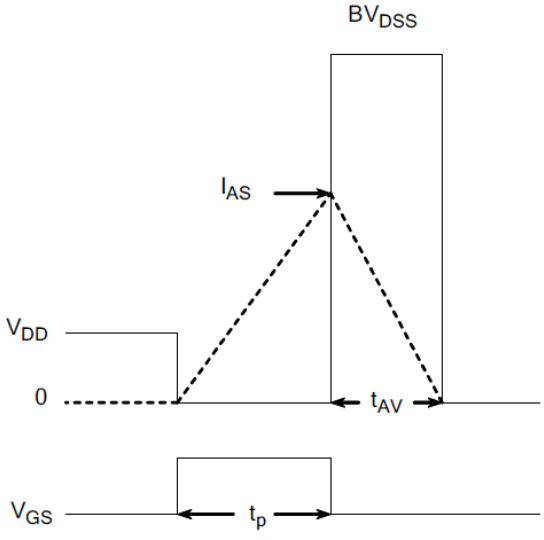


Figure 23. Unclamped Inductive Switching Test Circuit

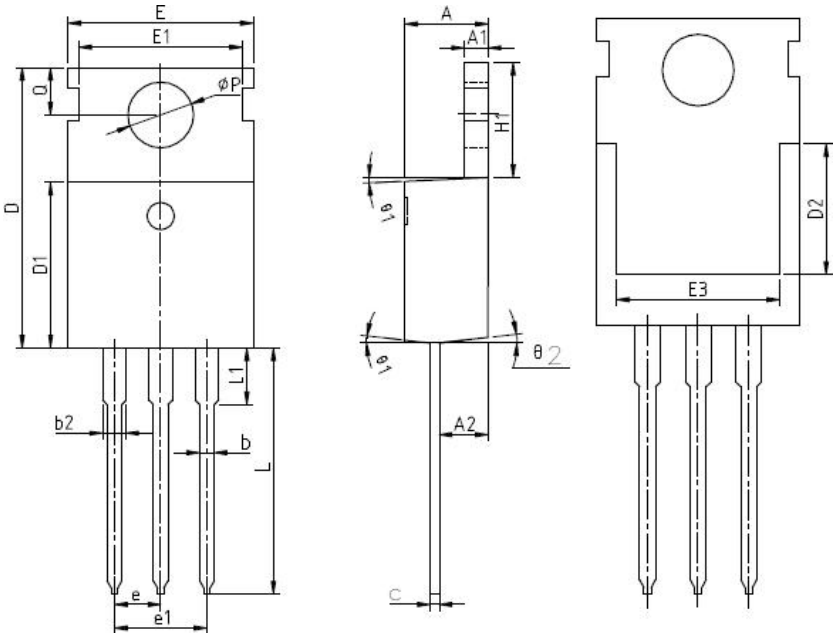


$$E_{AS} = \frac{I_{AS}^2 L}{2}$$

Figure 24. Unclamped Inductive Switching Waveforms

Package Dimension

Unit:mm



SYMBOL	MIN	NOM	MAX
A	4.27	4.57	4.87
A1	1.15	1.30	1.45
A2	2.10	2.40	2.70
b	0.70	0.80	1.00
b2	1.17	1.27	1.50
c	0.40	0.50	0.65
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.70	6.70	7.00
E	9.70	10.00	10.30
E1	-	8.70	-
E2	9.65	10.00	10.35
E3	7.00	8.00	8.40
e		2.54 BSC	
e1		5.08 BSC	
H1	6.00	6.50	6.85
L	12.75	13.50	13.90
L1	-	3.10	3.40
ΦP	3.45	3.60	3.75
Q	2.60	2.80	3.00
θ1	4°	7°	10°
θ2	0°	3°	6°