Description

Features

V_{DSS}	$R_{DS(ON)}$ @10V (typ)	I_D
55V	6.8mΩ	110A

- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- RoHS Compliant

Application

- UPS
- High efficiency switch mode power supplies

TO-220

Ordering Information

Part Number	Marking	Case	Packaging
G3205	G3205	TO-220	50pcs/Tube

Absolute Maximum Ratings T_C=25℃ unless otherwise specified

Symbol	Parameter		Max. TO-220	Units
V_{DSS}	Drain-Source Voltage		55	V
V_{GSS}	Gate-Source Voltage		± 20	V
I_D	Continuous Drain Current	T_C = 25℃	110 [note5]	A
		T_C = 100℃	80	A
I_{DM}	Pulsed Drain Current [note1]		390	A
I_{AR}	Avalanche Current [note1]		60	A
E_{AR}	Repetitive Avalanche Energy [note1]		20	mJ
dv/dt	Peak Diode Recovery Energy [note3]		5.0	V/ns
P_D	Power Dissipation	T_C = 25℃	200	W
	Linear Derating Factor	T_C > 25℃	1.3	W/℃
$R_{\theta JC}$	Thermal Resistance, Junction to Case		0.75	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +175	℃

*Drain current limited by maximum junction temperature

Electrical Characteristics $T_C=25℃$ unless otherwise specified

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250μA$	55	-	-	V
$\triangle V_{(BR)DSS}$ /$\triangle T_J$	Breakdown Voltage Temperature Coefficient	Reference to 25℃, $I_D = 250μA$	-	0.057	-	V/℃
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 55V$, $V_{GS} = 0V$	-	-	1	μA
		$V_{DS} = 44V$, $T_C = 125℃$	-	-	10	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS} = 0V$, $V_{GS} = ±20V$	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage [note4]	$V_{DS} = V_{GS}$, $I_D = 250μA$	2	-	4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10V$, $I_D = 60A$	-	6.8	8.0	mΩ
g_{FS}	Forward Transconductance	$V_{DS} = 20V$, $I_D = 60A$	45	-	-	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS} = 25V$, $V_{GS} = 0V$, f = 1.0MHz	-	3291	-	pF
C_{oss}	Output Capacitance		-	671.5	-	pF
C_{rss}	Reverse Transfer Capacitance		-	112.1	-	pF
Q_g	Total Gate Charge	$V_{DD} = 44V$, $I_D = 60A$, $V_{GS} = 10V$	-	112	-	nC
Q_{gs}	Gate-Source Charge		-	23.2	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	34.9	-	nC
E_{AS}	Single Pulse Avalanche Energy [note2]	$I_{AS} = 20A$, L = 5mH	-	1000 [note6]	267 [note7]	mJ
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 28V$, $I_D = 60A$, $R_G = 5Ω$, $V_{GS} = 10V$	-	19.5	-	ns
t_r	Turn-On Rise Time		-	50.7	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	55	-	ns
t_f	Turn-Off Fall Time		-	24.6	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	110	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	390	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS} = 0V$, $I_S = 60A$	-	-	1.3	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0V$, $I_F = 60A$, di/dt = 100A/μs	-	62.3	-	ns
Q_{rr}	Reverse Recovery Charge		-	137	-	nC

Notes:

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

2. L = 5mH, $I_{AS} = 20A$, $V_{DD} = 50V$, $R_G = 25Ω$, Starting $T_J = 25℃$

3. $I_{SD} ≤ 60A$, di/dt ≤ 200A/μs, $V_{DD} ≤ B_{VDSS}$, Starting $T_J = 25℃$

4. Pulse width ≤ 300μs; duty cycle ≤ 2%.

5. Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.

6. This is a typical value at device destruction and represents operation outside rated limits.

7. This is a calculated value limited to TJ = 175℃.

Typical Performance Characteristics

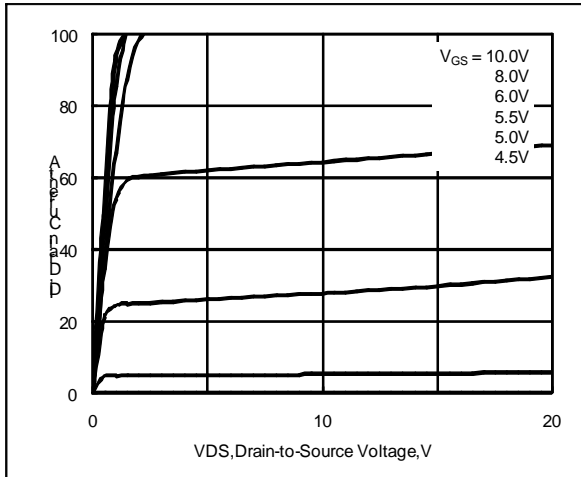**Figure 1. Output Characteristics**

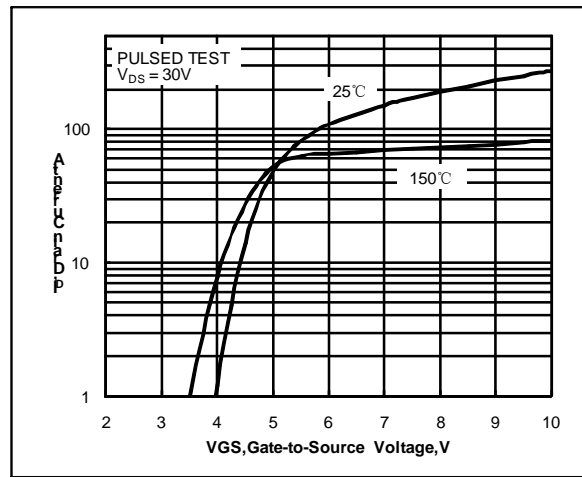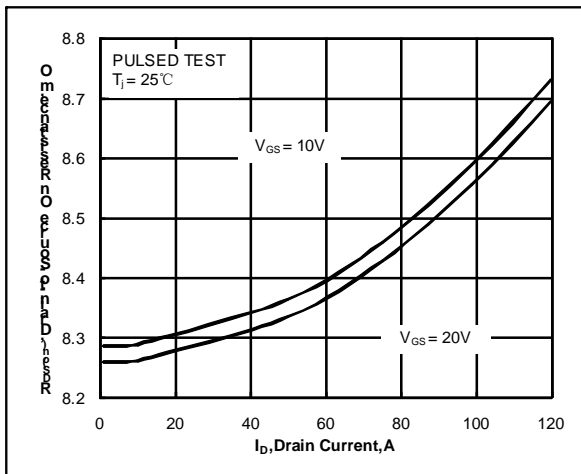**Figure 2. Transfer Characteristics**

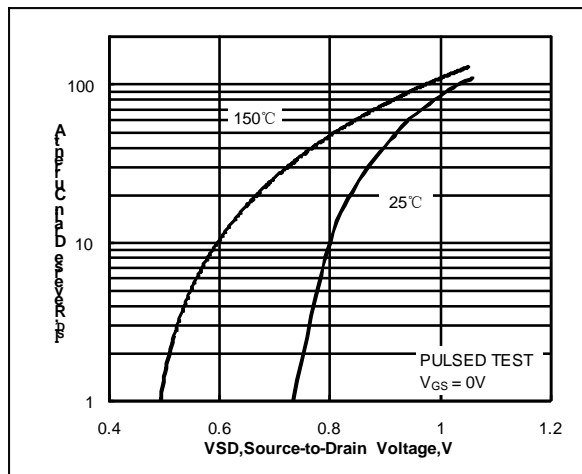**Figure 3. Drain-to-Source On Resistance vs.**

Drain Current and Gate Voltage

Figure 4. Body Diode Forward Voltage vs.
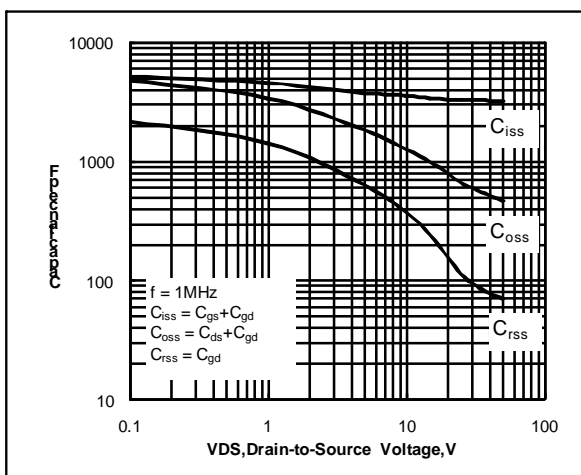
Source Current and Temperature

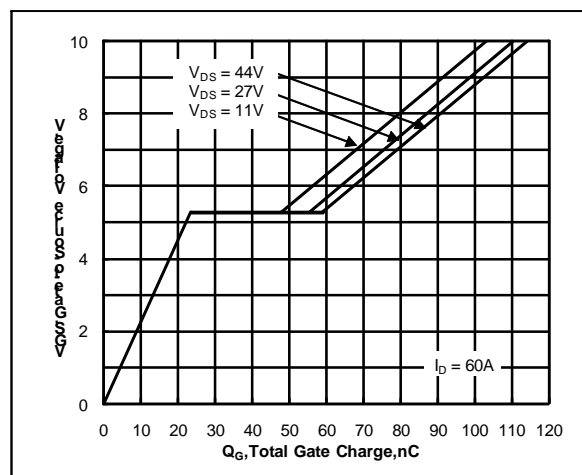**igure 5. Capacitance Characteristics**
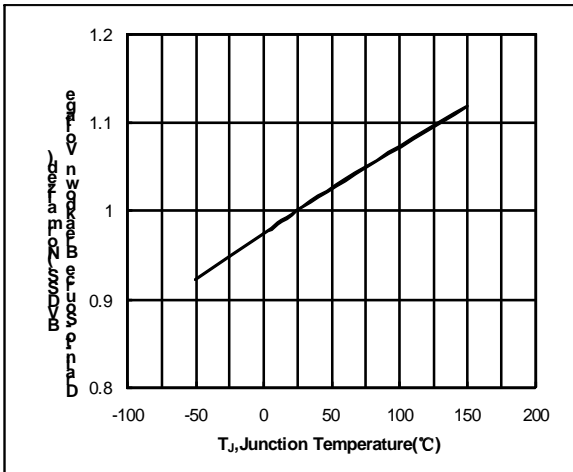
Figure 6. Gate Charge Characteristics

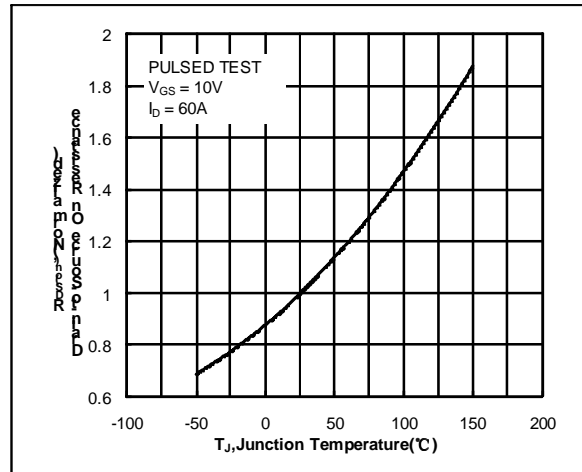**Figure 7. Normalized Breakdown Voltage vs. Junction Temperature**

Figure 8. Normalized On Resistance vs. Junction Temperature
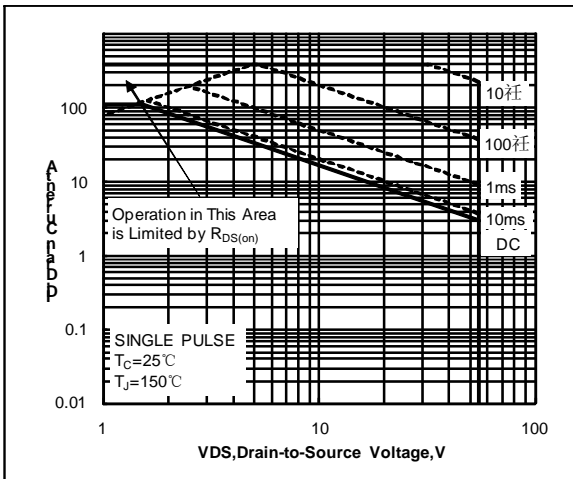
Figure 9. Maximum Safe Operating Area for OP3205B
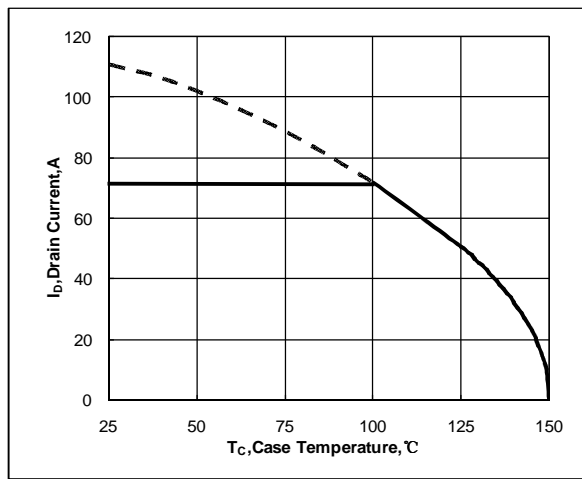
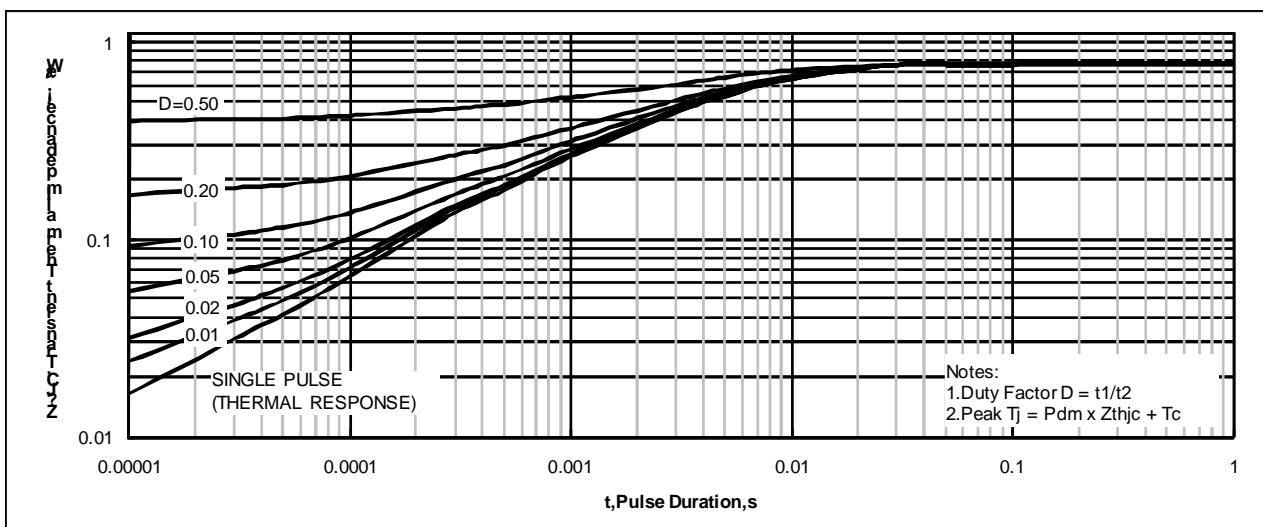**Figure 10. Maximum Continuous Drain Current vs. Case Temperature**

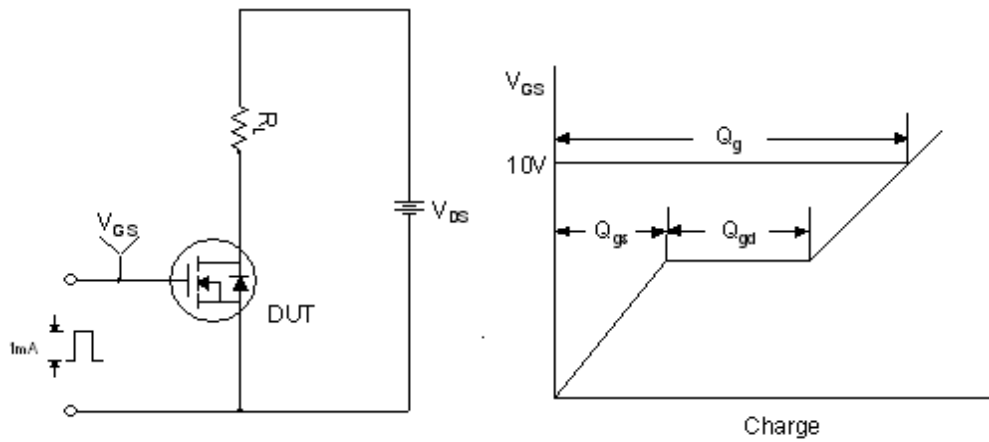**Figure 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case for OP3205B**

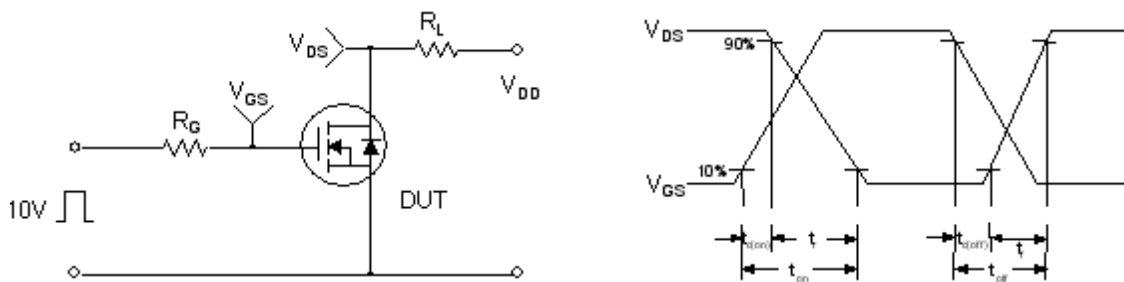**Figure 12. Gate Charge Test Circuit & Waveform**
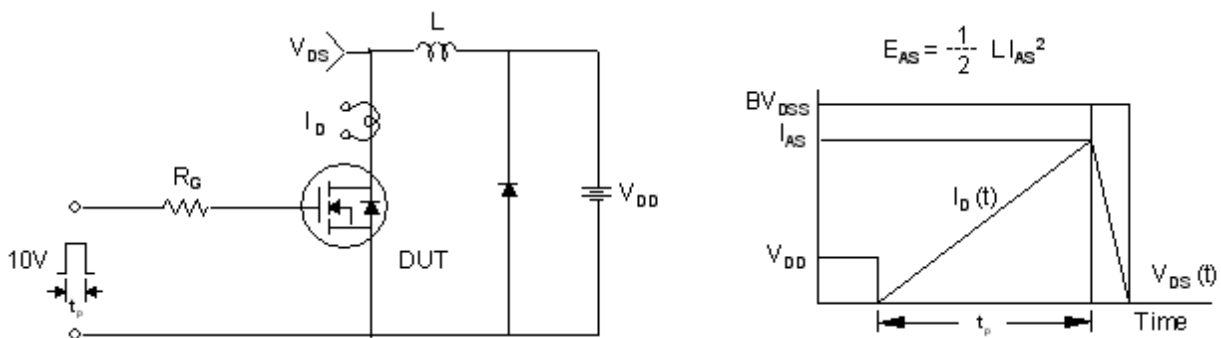

Figure 13. Resistive Switching Test Circuit & Waveforms

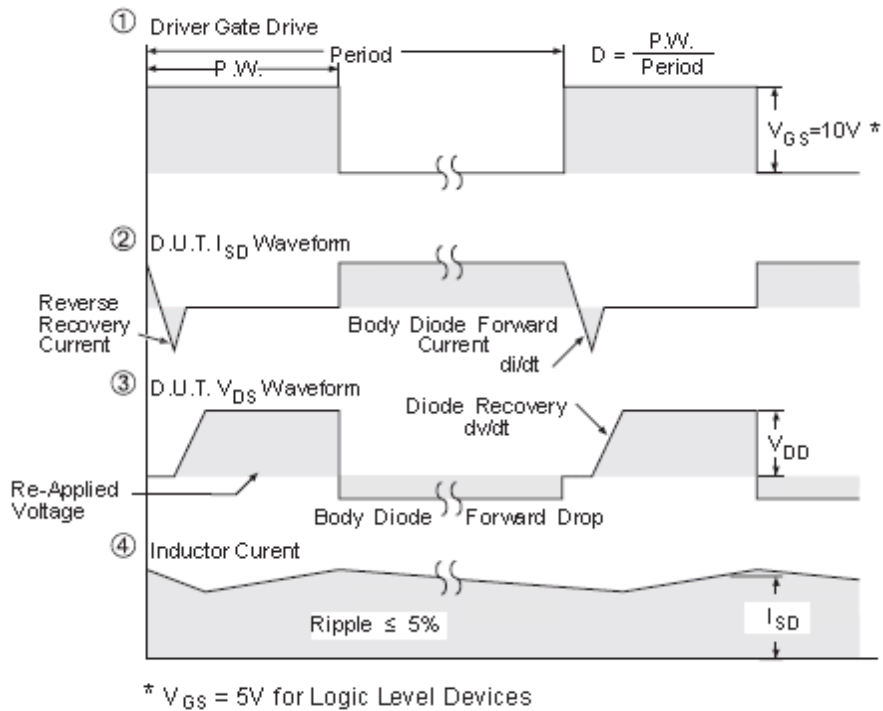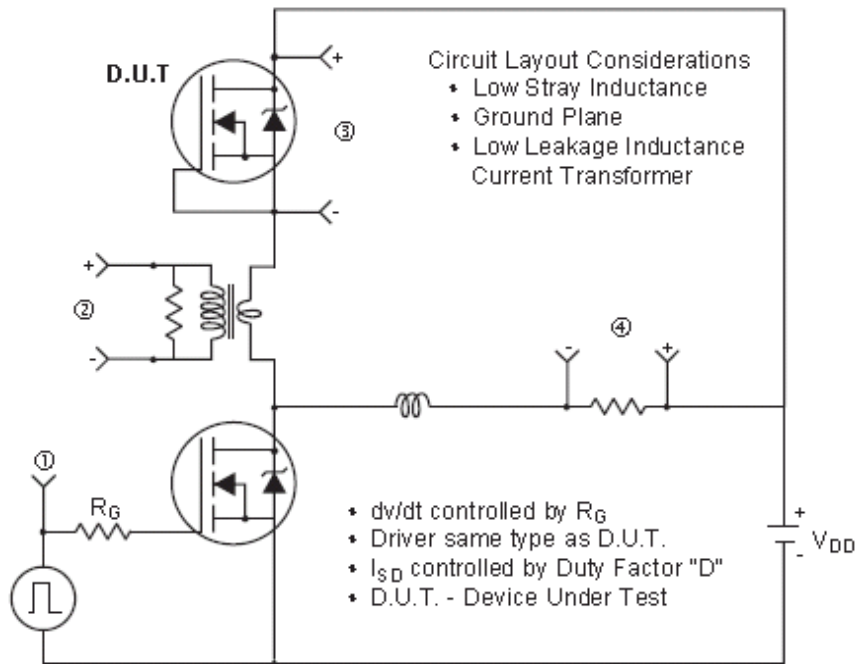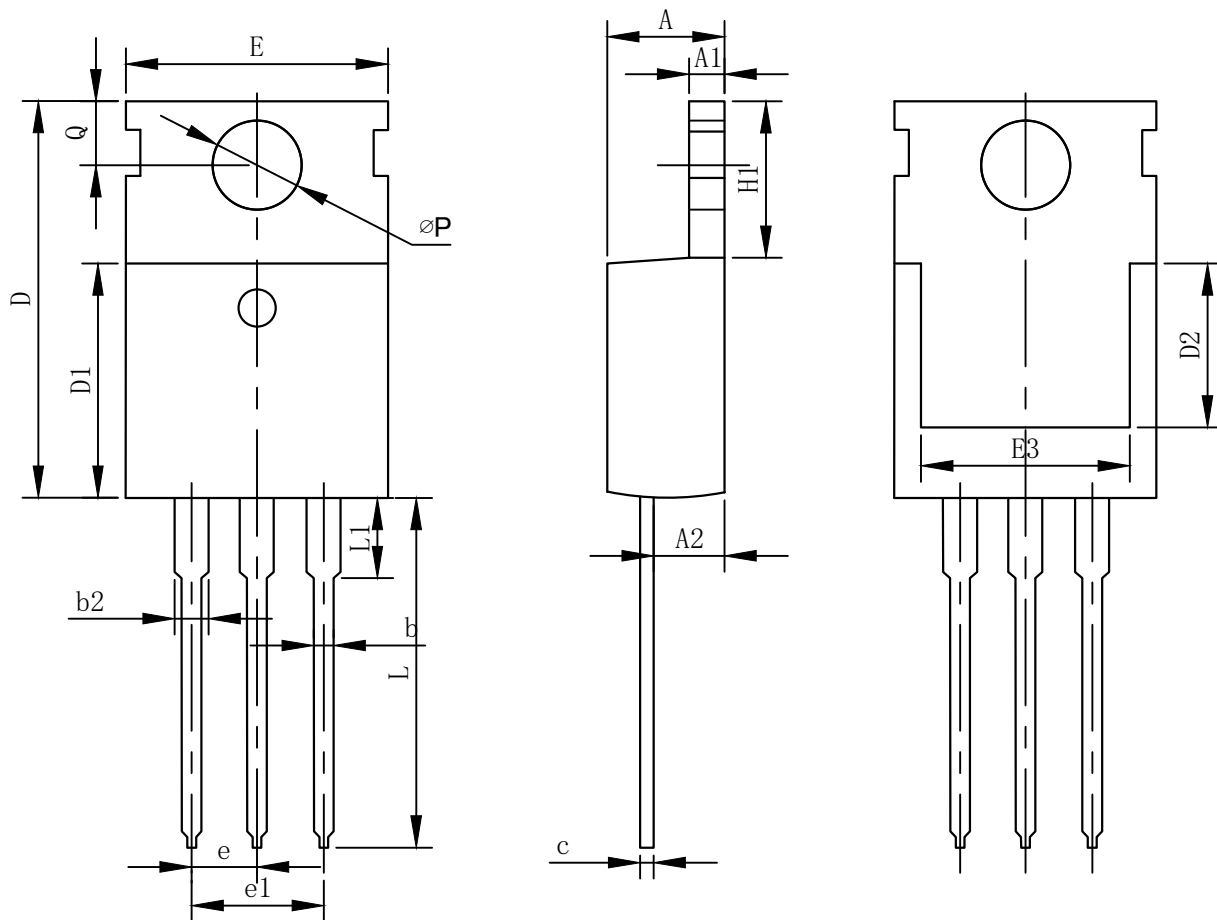**Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms**

Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms (For N-channel)

TO-220 Package information

COMMONDIMENSIONS

SYMBO	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.70
A1	1.25	1.30	1.40
A2	2.20	2.40	2.60
b	0.70	0.80	0.95
b2	1.70	1.27	1.47
c	0.45	0.50	0.60
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.50	–	–
E	9.70	10.00	10.30
E3	7.00	–	–
e	2.54BSC		
e1	5.08BSC		
H1	6.25	6.50	6.85
L	12.75	13.50	13.80
L1	–	3.10	3.40
ϕP	3.40	3.60	3.80
Q	2.60	2.80	3.00

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