



芯基科技

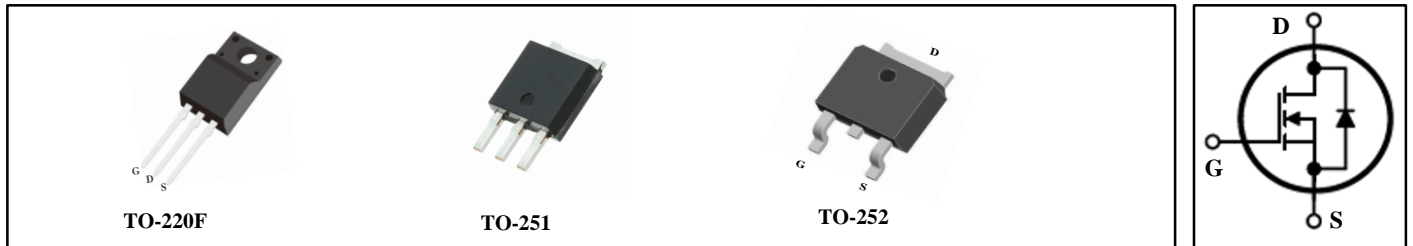
# MPVX2N65BK Series Power MOSFET

## FEATURES

- $BV_{DSS}$ : 650V,  $I_D=2A$
- $R_{DS(on)}$  : 4.8Ω(Max) @  $V_{GS}=10V$
- Very Low FOM ( $R_{DS(on)} * Q_g$ )
- Excellent stability and uniformity

## APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- AC to DC Converters



Ordering Information		
Type NO.	Marking	Package Code
MPVA2N65BK	MPVA2N65BK	TO-220F
MPVU2N65BK	MPVU2N65BK	TO-251
MPVD2N65BK	MPVD2N65BK	TO-252

Absolute Maximum Ratings $T_C = 25^\circ C$ , unless otherwise noted				
Parameter	Symbol	Value		Unit
		220F	251-252	
Drain-Source Voltage ( $V_{GS} = 0V$ )	$V_{DSS}$	650		V
Continuous Drain Current	$I_D$	2		A
Pulsed Drain Current (note1)	$I_{DM}$	6		A
Gate-Source Voltage	$V_{GSS}$	$\pm 30$		V
Single Pulse Avalanche Energy (note2)	$E_{AS}$	95		mJ
Avalanche Current (note1)	$I_{AR}$	2.3		A
Repetitive Avalanche Energy (note1)	$E_{AR}$	6.4		mJ
Power Dissipation ( $T_C = 25^\circ C$ )	$P_D$	20	25	W
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~+150		$^\circ C$

Thermal Resistance				
Parameter	Symbol	Value		Unit
		220F	251-252	
Thermal Resistance, Junction-to-Case	$R_{thJC}$	6.25	5	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	62.5	60	



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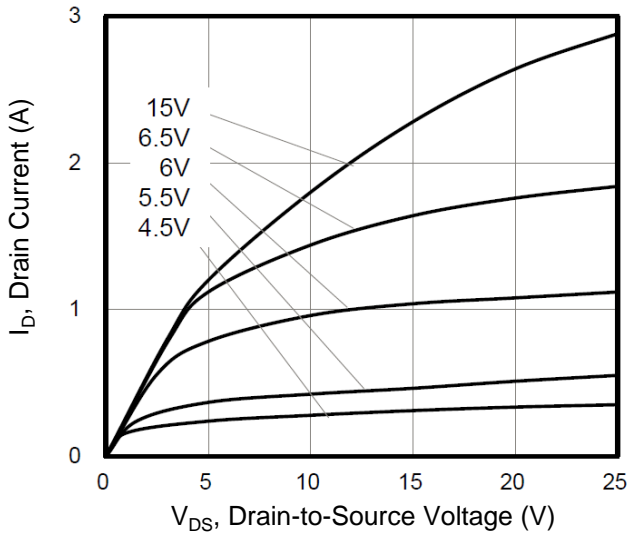
Specifications $T_J = 25^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	650	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 650V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	1	$\mu A$
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 30V$	--	--	$\pm 100$	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	--	4.0	V
Drain-Source On-Resistance (Note4)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 1.0A$	--	4.0	4.8	$\Omega$
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = 25V,$ $f = 1.0MHz$	--	359	--	pF
Output Capacitance	$C_{oss}$		--	46	--	
Reverse Transfer Capacitance	$C_{rss}$		--	10	--	
Total Gate Charge	$Q_g$	$V_{DD} = 400V, I_D = 2.0A,$ $V_{GS} = 10V$	--	6.3	--	nC
Gate-Source Charge	$Q_{gs}$		--	1.2	--	
Gate-Drain Charge	$Q_{gd}$		--	2.9	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 300V, I_D = 2.0A,$ $R_G = 25\Omega$	--	8	--	ns
Turn-on Rise Time	$t_r$		--	33	--	
Turn-off Delay Time	$t_{d(off)}$		--	23	--	
Turn-off Fall Time	$t_f$		--	59	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	2	A
Pulsed Diode Forward Current	$I_{SM}$		--	--	8	
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = 2.0A, V_{GS} = 0V$	--	--	1.4	V
Reverse Recovery Time	$t_{rr}$	$V_R = 400V, I_F = 2.0A,$ $di_F/dt = 100A/\mu s$	--	80	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	1.8	--	$\mu C$

### Notes

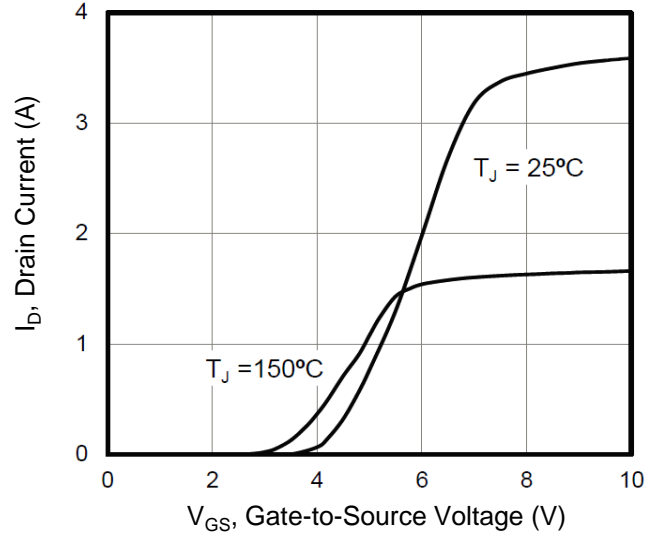
1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $I_{AS} = 2A, V_{DD} = 50V, R_G = 25\Omega, \text{Starting } T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse width  $\leq 300\mu s, \text{Duty Cycle } \leq 1\%$
4. Essentially independent of operating temperature

Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

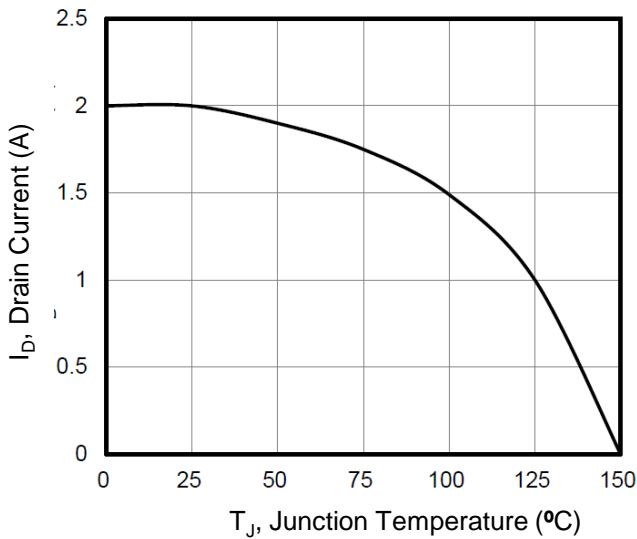
**Figure 1. Output Characteristics**



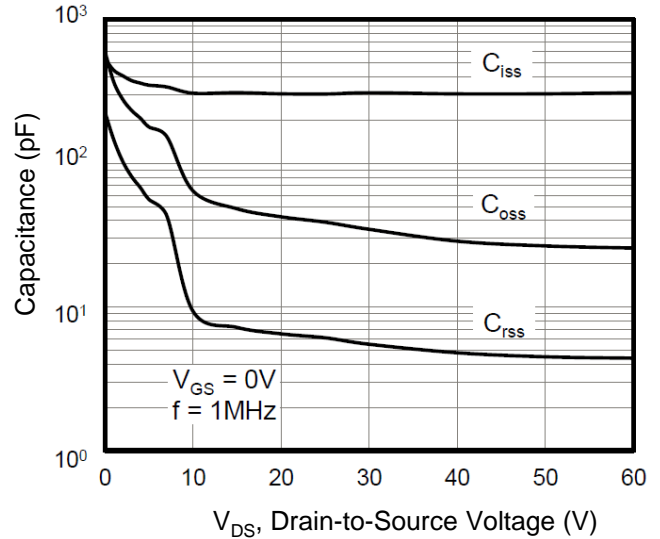
**Figure 2. Transfer Characteristics**



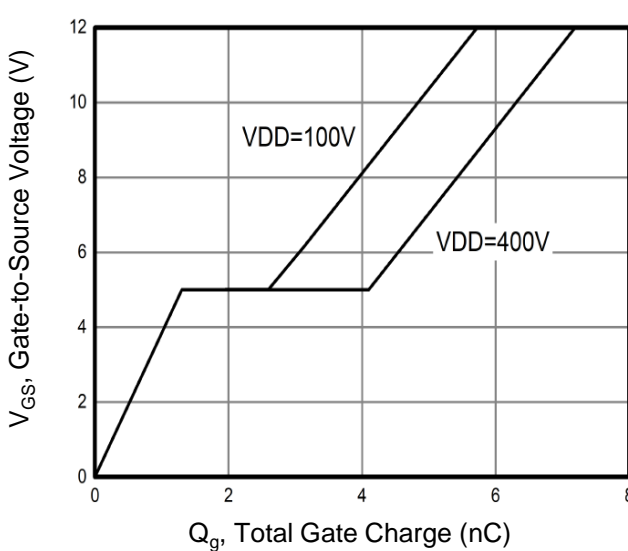
**Figure 3. Drain Current vs. Temperature**



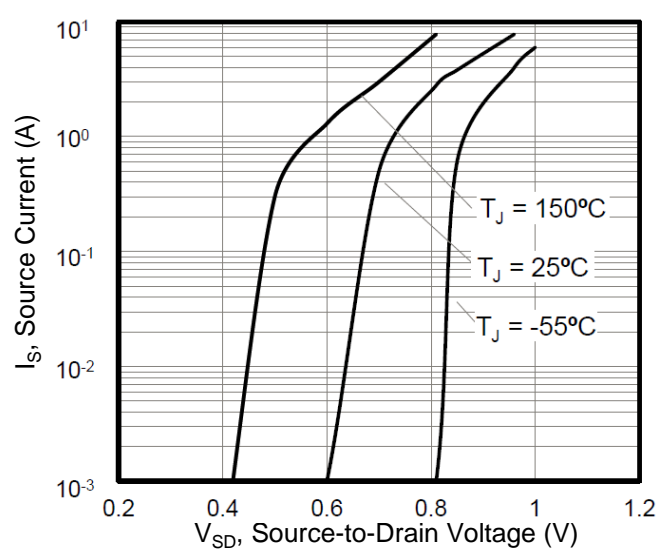
**Figure 4. Capacitance**



**Figure 5. Gate Charge**

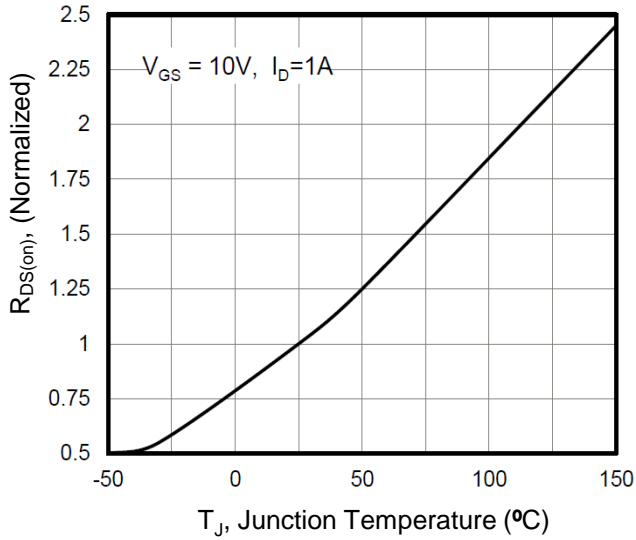


**Figure 6. Body Diode Forward Voltage**

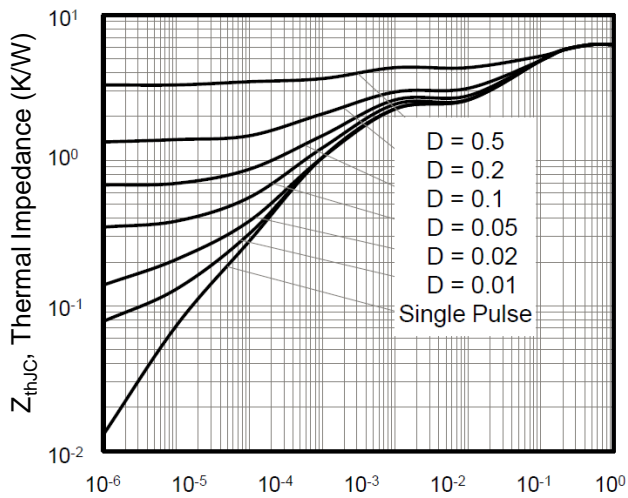


Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

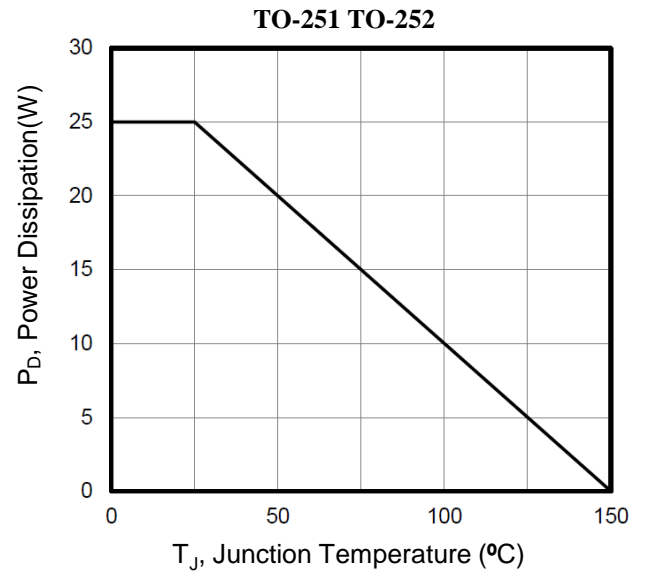
**Figure 7. On-Resistance vs. Temperature**



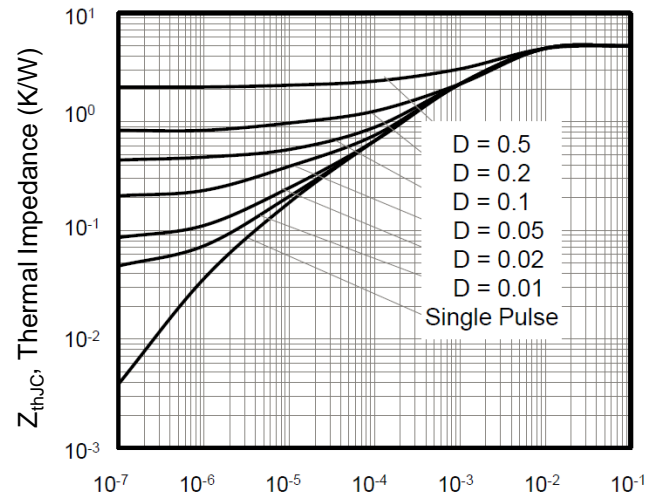
**Figure 9. Transient Thermal Impedance (TO-220F)**



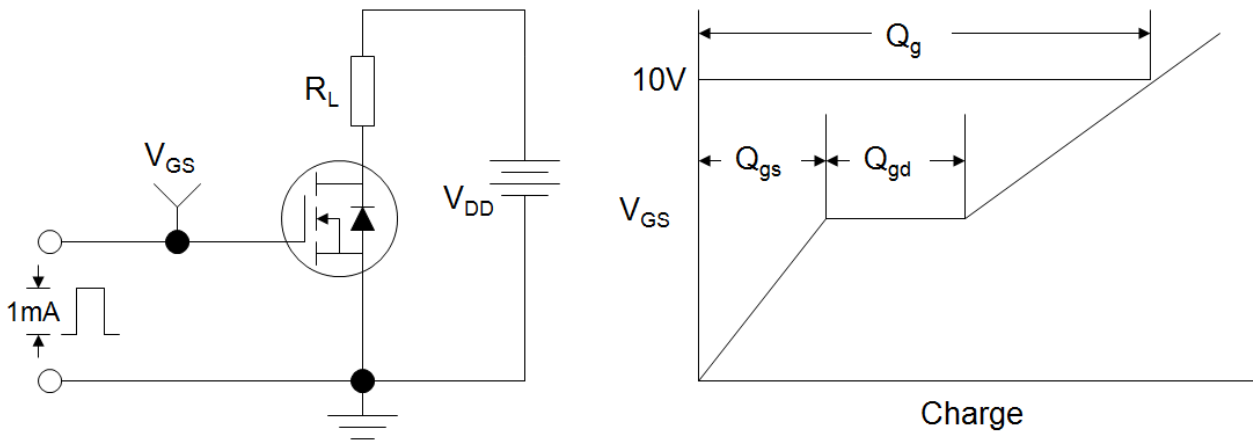
**Figure 8. Power Dissipation vs. Temperature**



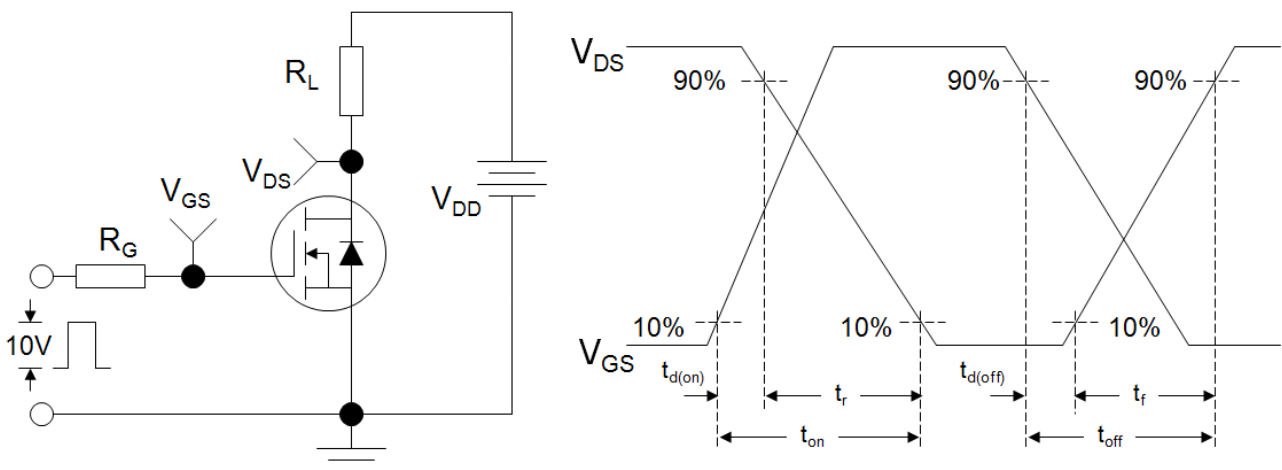
**Figure 10. Transient Thermal Impedance (TO-252 TO-251)**



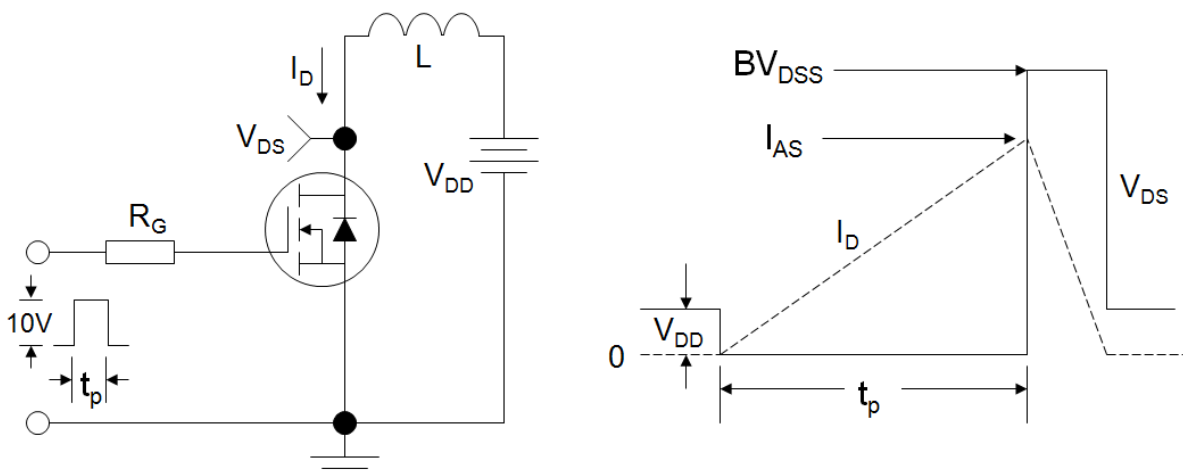
**Figure A: Gate Charge Test Circuit and Waveform**



**Figure B: Resistive Switching Test Circuit and Waveform**



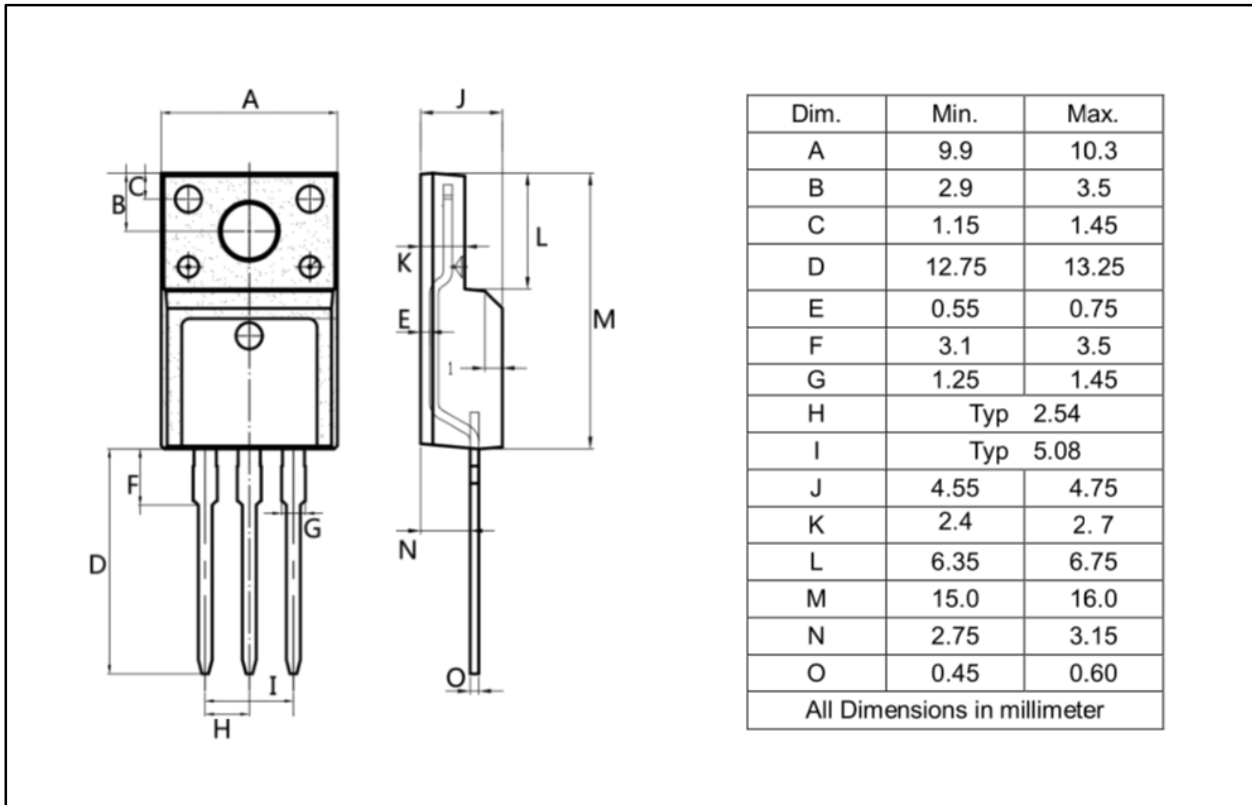
**Figure C: Unclamped Inductive Switching Test Circuit and Waveform**



## Outline Dimension

Unit: mm

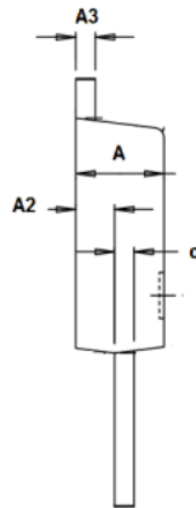
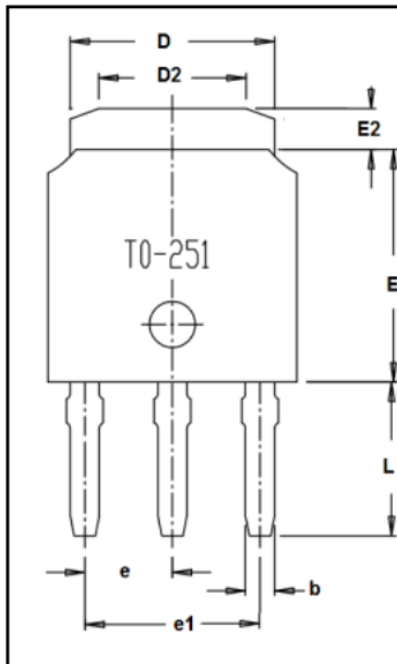
### TO-220F



## Outline Dimension

Unit: mm

### TO-251



Dim.	Min.	Max.
A	2.2	2.4
A2	0.95	1.15
A3	0.45	0.55
b	0.65	0.85
c	0.45	0.55
D	6.25	6.75
D2	5.2	5.6
E	5.8	6.3
E2	0.95	1.25
e	Typ2.3	
e1	Typ4.6	
L	3.7	4.3
L1	1.0	1.5
All Dimensions in millimeter		

## Outline Dimension

Unit: mm

### TO-252

