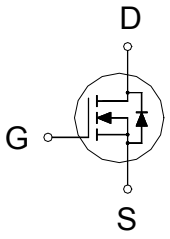
NIKO-SEM

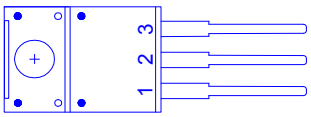
N-Channel Enhancement Mode Field Effect Transistor

P1070ATF:TO-220F
P1070ATFS:TO-220FS
Halogen-Free & Lead-Free

PRODUCT SUMMARY

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D
700V	0.85Ω	10A





1. GATE
2. DRAIN
3. SOURCE

100% UIS tested

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C Unless Otherwise Noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	LIMITS	UNITS
Drain-Source Voltage		V_{DS}	700	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current[2]	T_C = 25 °C	I_D	10	A
	T_C = 100 °C		6	
Pulsed Drain Current[1, 2]		I_{DM}	35	
Avalanche Current[3]		I_{AS}	5.4	A
Avalanche Energy[3]	L = 10mH	E_{AS}	148	mJ
Power Dissipation	T_C = 25 °C	P_D	33	W
	T_C = 100 °C		13	
Operating Junction & Storage Temperature Range		T_j, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	$R_{\theta JC}$		3.8	°C / W
Junction-to-Ambient	$R_{\theta JA}$		62.5	°C / W

[1]Pulse width limited by maximum junction temperature.
[2]Limited only by maximum temperature allowed
[3]V_{DD} = 60V , starting T_J = 25°C

ELECTRICAL CHARACTERISTICS (T_C = 25 °C, Unless Otherwise Noted)

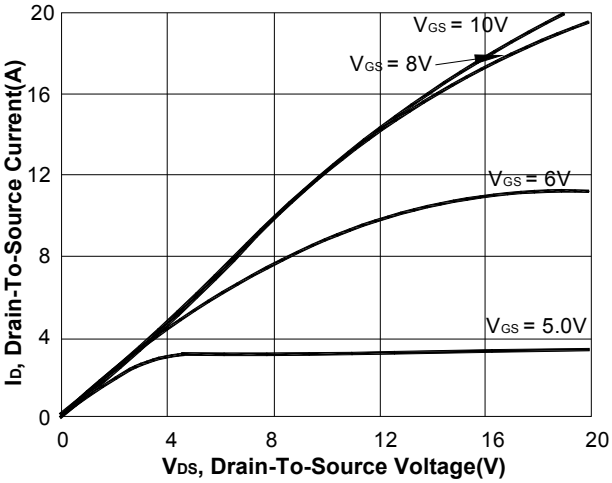
PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS			UNIT
			MIN	TYP	MAX	
STATIC						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	700			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.5	3.4	4.5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0V, V_{GS} = ±30V			±100	nA

Gate Voltage Drain Current	I_{DSS}	V_{DS} = 700V, V_{GS} = 0V , T_C = 25 °C			1	μA
		V_{DS} = 700V, V_{GS} = 0V , T_C = 100 °C			50	
Drain-Source On-State Resistance[1]	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 5A		0.7	0.85	Ω
Forward Transconductance[1]	g_{fs}	V_{DS} = 10V, I_D = 5A		7.5		S
DYNAMIC						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		2450		pF
Output Capacitance	C_{oss}			210		
Reverse Transfer Capacitance	C_{rss}			25		
Gate Resistance	Rg	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz		1.05		Ω
Total Gate Charge[2]	Q_g	V_{DD} = 560V, I_D = 5A, V_{GS} = 10V		42.6		nC
Gate-Source Charge[2]	Q_{gs}			11.7		
Gate-Drain Charge[2]	Q_{gd}			12.6		
Turn-On Delay Time[2]	$t_{d(on)}$	V_{DD} = 350V, I_D = 5A, R_G= 25Ω		23		nS
Rise Time[2]	t_r			20		
Turn-Off Delay Time[2]	$t_{d(off)}$			50		
Fall Time[2]	t_f			20		
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25 °C)						
Continuous Current[3]	I_S				10	A
Forward Voltage[1]	V_{SD}	I_F =10A, V_{GS} = 0V			1.4	V
Reverse Recovery Time	t_{rr}	I_F = 10A, dI_F/dt = 100A / μS		750		nS
Reverse Recovery Charge	Q_{rr}	V_{GS} = 0V		6		uC

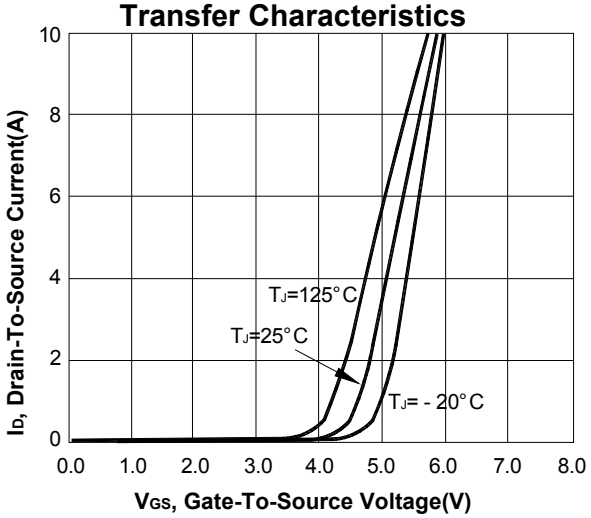
[1]Pulse test : Pulse Width ≤ 380 μsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.
[3]Pulse width limited by maximum junction temperature.

REMARK: THE PRODUCT MARKED WITH "P1070ATF(S)", DATE CODE or LOT #

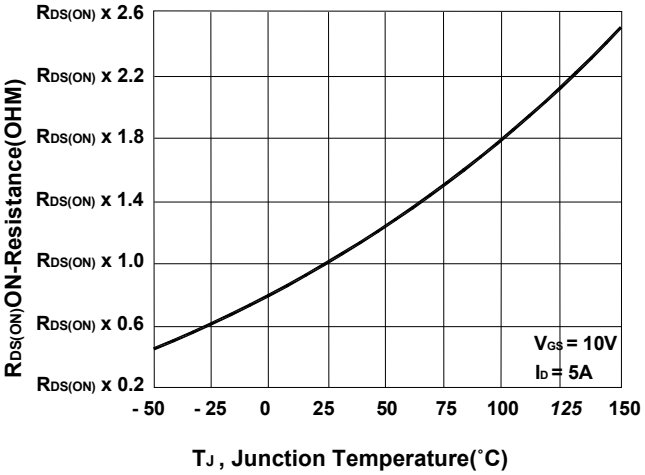
Output Characteristics



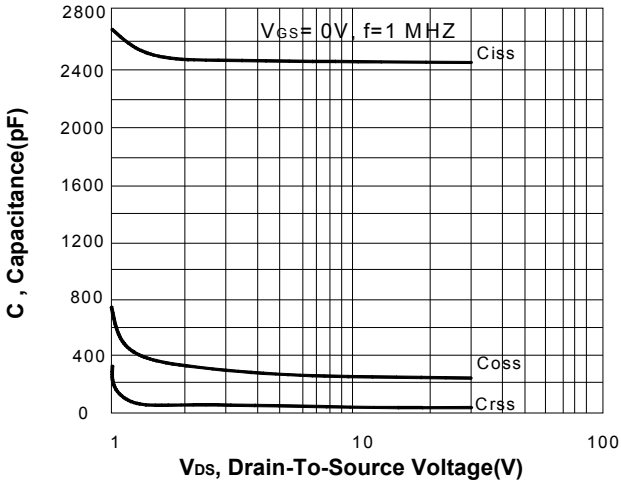
Transfer Characteristics



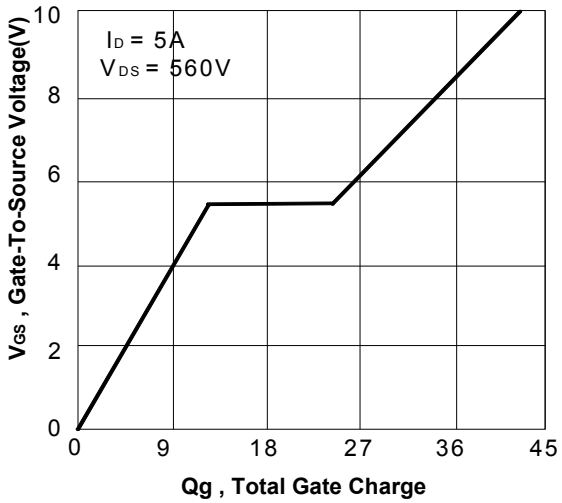
On-Resistance VS Temperature



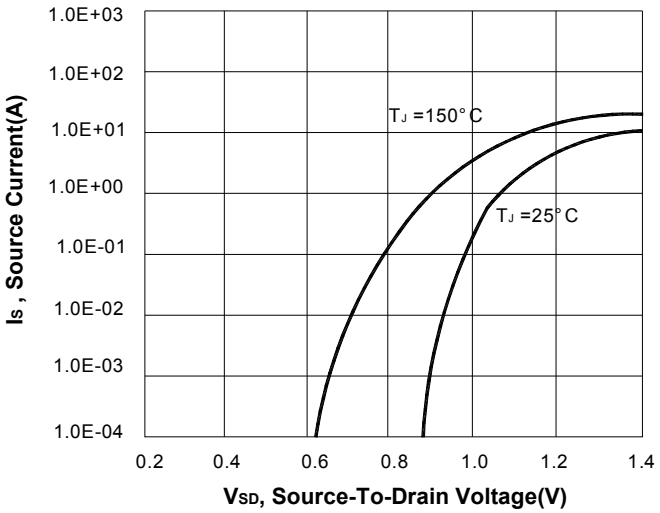
Capacitance Characteristic



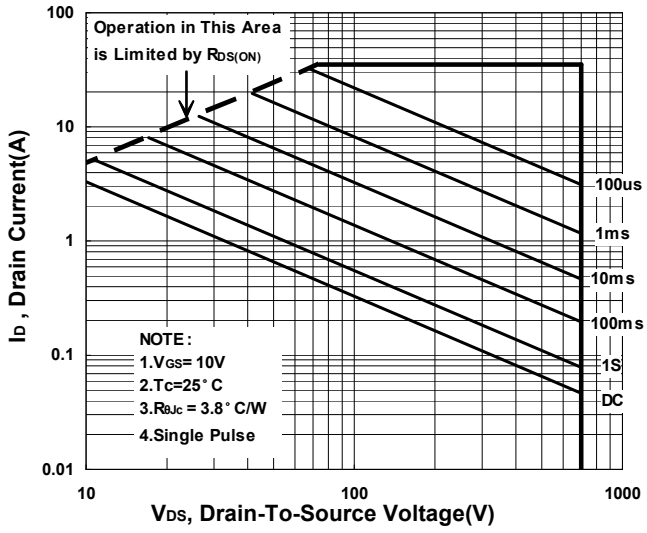
Gate charge Characteristics



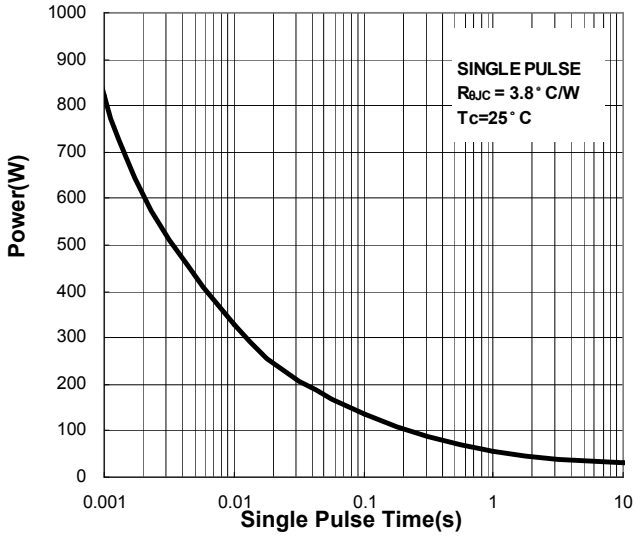
Source-Drain Diode Forward Voltage



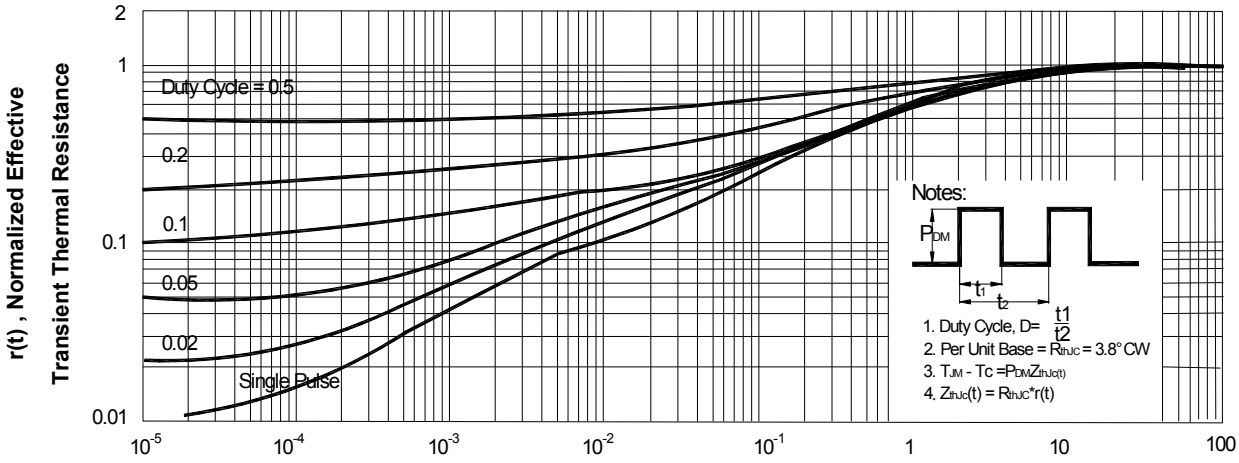
Safe Operating Area



Single Pulse Maximum Power Dissipation



Transient Thermal Response Curve



T1 , Square Wave Pulse Duration[sec]

Figure 1

Gate Charge Test Circuit

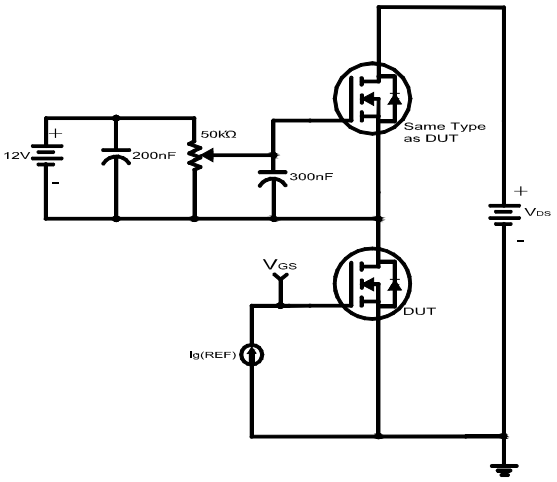


Figure 2

Gate Charge Waveforms

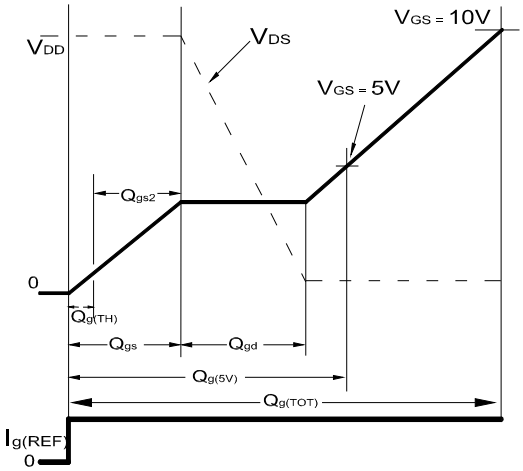


Figure 3

Switching Time Test Circuit

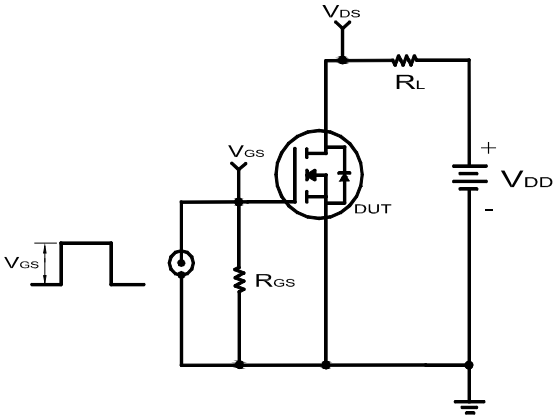


Figure 4

Switching Time Waveforms

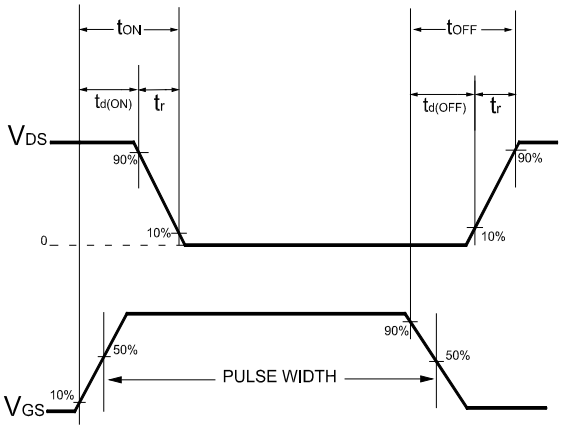


Figure 5

Unclamped Energy Test Circuit

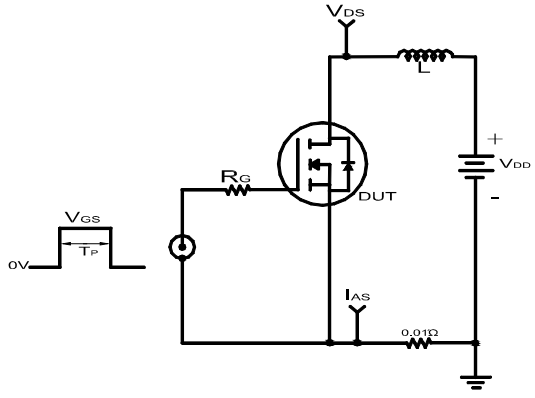


Figure 6

Unclamped Energy Waveforms

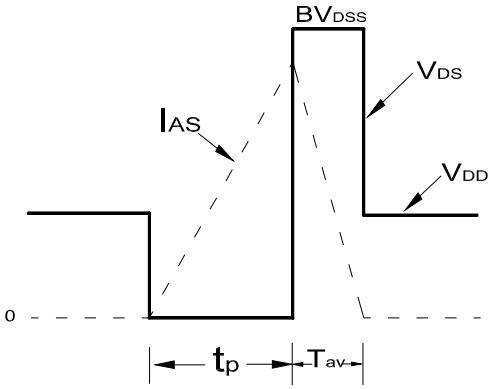


Figure 7

Diode Recovery Test Circuit

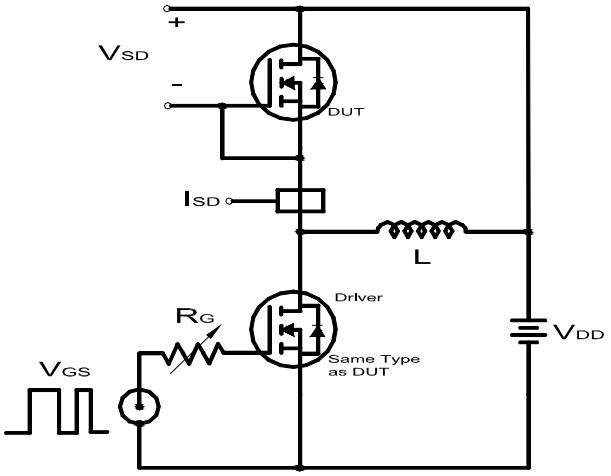
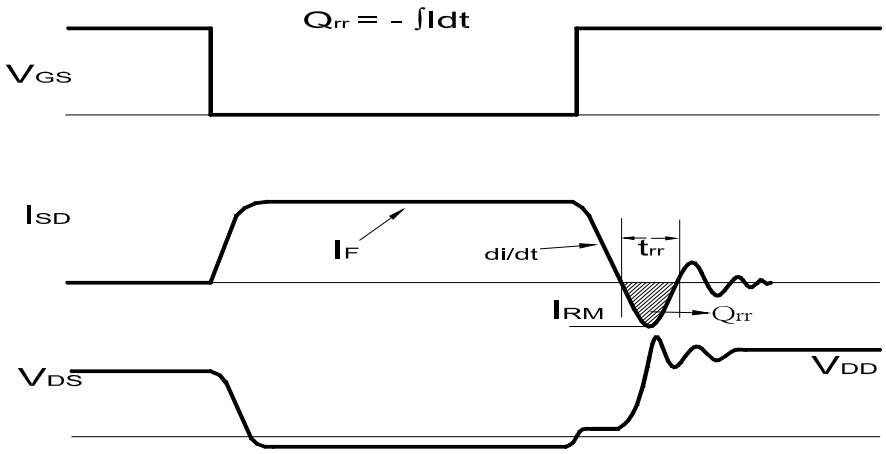


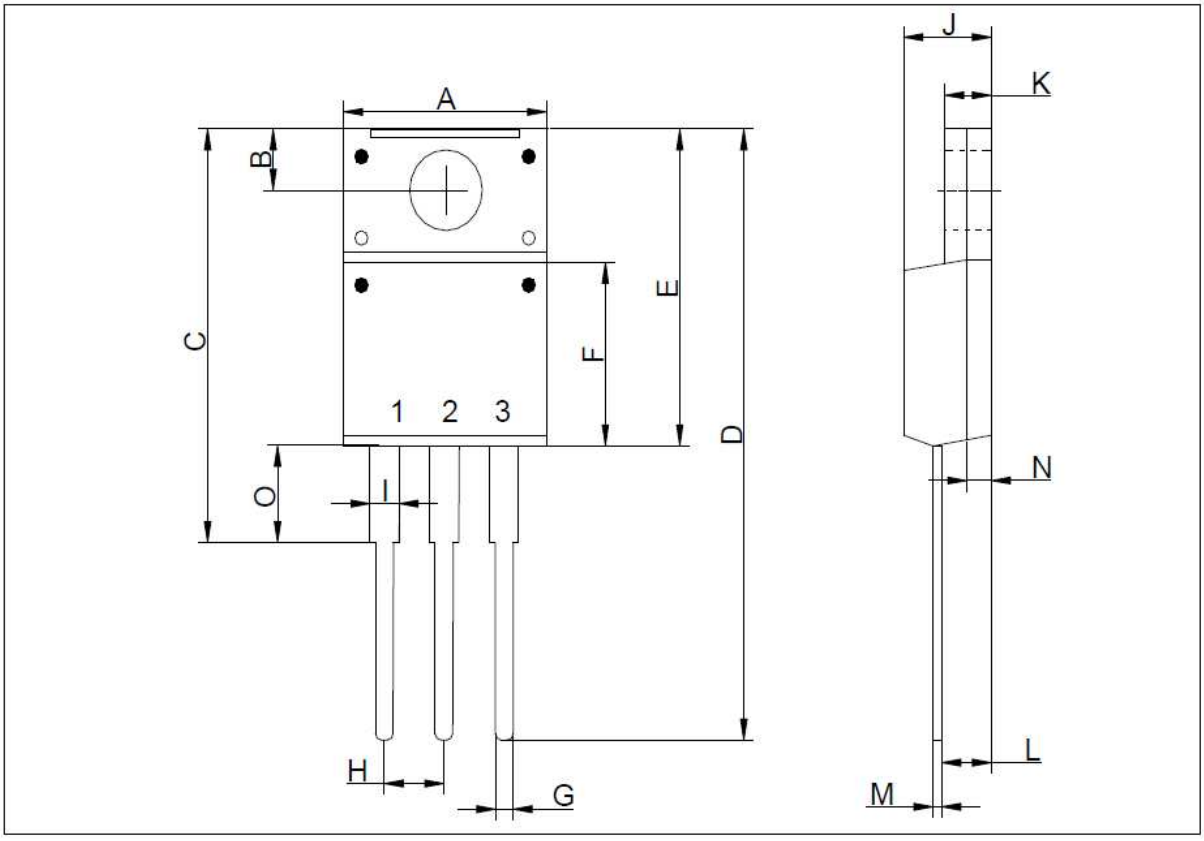
Figure 8

Diode Recovery Test Waveforms



TO-220F (3-Lead) MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	9.96	10.0	10.6	I	0.95	1.2	1.39
B	2.4	3.0	3.38	J	4.3	4.5	4.93
C	18.1	19.1	19.7	K	2.34		2.74
D	27.3	28.4	30	L	2.56		2.96
E	15.67		16.1	M	0.45		0.6
F	8.8	9.17	9.8	N		0.7	
G	0.5	0.75	0.91	O	2.8		3.4
H	2.3		2.74				



TO-220FS (3-Lead) MECHANICAL DATA

Dimension	mm			Dimension	mm		
	Min.	Typ.	Max.		Min.	Typ.	Max.
A	9.96		10.36	I	1.15		1.39
B	3.1		3.5	J	4.53		4.93
C	17.55		18.95	K	2.34		2.74
D	28.04		28.84	L	2.56		2.96
E	15.67		16.07	M	0.45		0.60
F		9.17		N		0.7	
G	0.71		0.91	O	2.23		2.63
H		2.54