

N-Channel Enhancement Mode Power MOSFET

Description

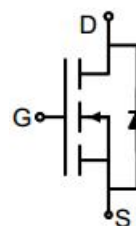
The GT105N10F uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

- V_{DS} 100V
- I_D (at $V_{GS} = 10V$) 48A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 10.5m Ω
- $R_{DS(ON)}$ (at $V_{GS} = 4.5V$) < 15m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



TO-220F

Ordering Information

Device	Package	Marking	Packaging
GT105N10F	TO-220F	GT105N10	50psc/Tube

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Continuous Drain Current	I_D	48	A
		30	
Pulsed Drain Current (note1)	I_{DM}	192	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	50	W
Single pulse avalanche energy (note2)	E_{AS}	73	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	50	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	R_{thJC}	2.5	$^\circ\text{C/W}$

Specifications T _J = 25°C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	100	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 100V, V _{GS} = 0V	--	--	1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.0	1.8	2.5	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 20A	--	8	10.5	mΩ
		V _{GS} = 4.5V, I _D = 20A	--	10	15	
Forward Transconductance	g _{FS}	V _{GS} = 5V, I _D = 20A	--	58	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 50V, f = 1.0MHz	--	1600	--	pF
Output Capacitance	C _{oss}		--	650	--	
Reverse Transfer Capacitance	C _{rss}		--	8	--	
Total Gate Charge	Q _g	V _{DD} = 50V, I _D = 20A, V _{GS} = 10V	--	33	--	nC
Gate-Source Charge	Q _{gs}		--	5	--	
Gate-Drain Charge	Q _{gd}		--	8	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 50V, I _D = 20A, R _G = 1.6Ω	--	13	--	ns
Turn-on Rise Time	t _r		--	10	--	
Turn-off Delay Time	t _{d(off)}		--	30	--	
Turn-off Fall Time	t _f		--	8	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	48	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 20A, V _{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Q _{rr}	I _F = 20A, V _{GS} = 0V di/dt=500A/us	--	95	--	nC
Reverse Recovery Time	T _{rr}		--	45	--	ns

Notes

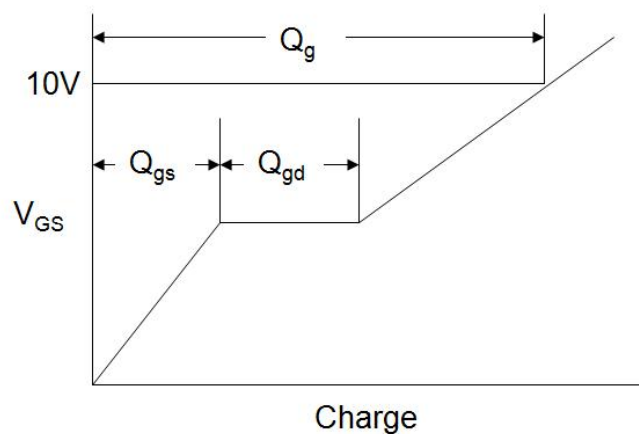
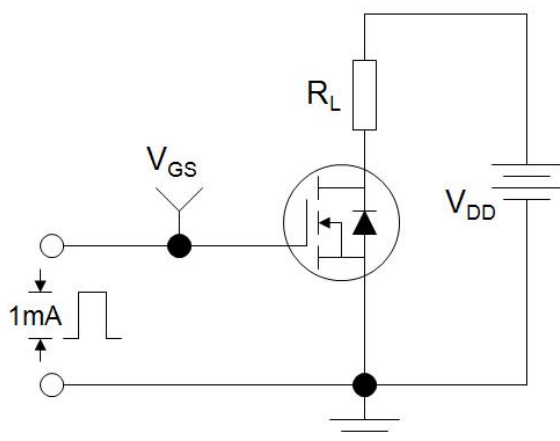
1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. EAS condition : $T_J=25^{\circ}\text{C}$, $V_{DD}=50V$, $V_{GS}=10V$, $L=0.5mH$, $R_g=25\Omega$

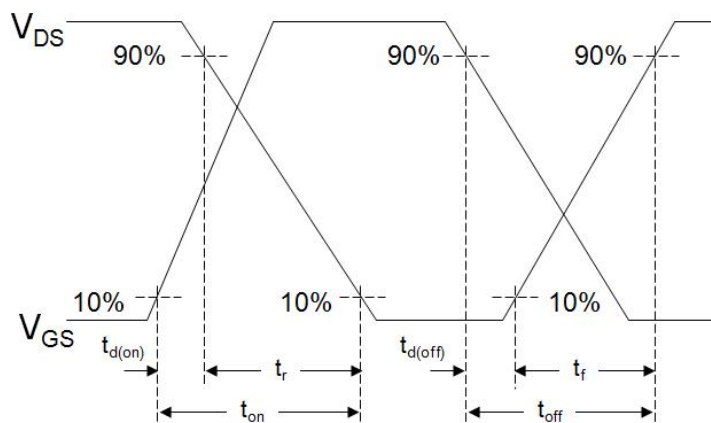
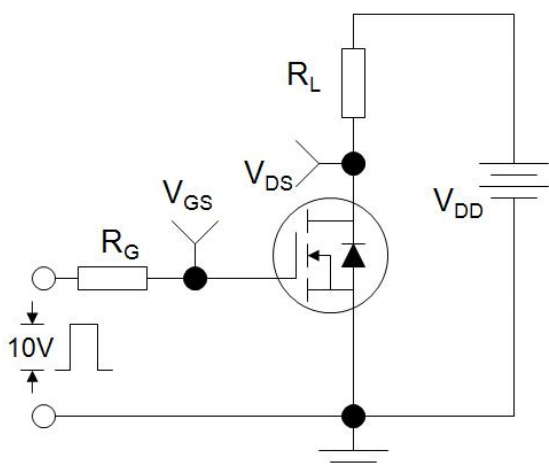
The table shows the minimum avalanche energy, which is 196mJ when the device is tested until failure

3. Identical low side and high side switch with identical R_G

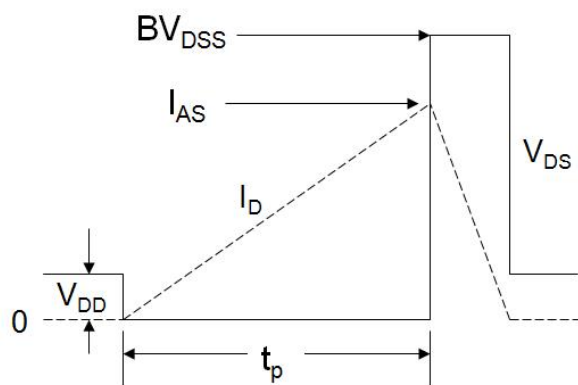
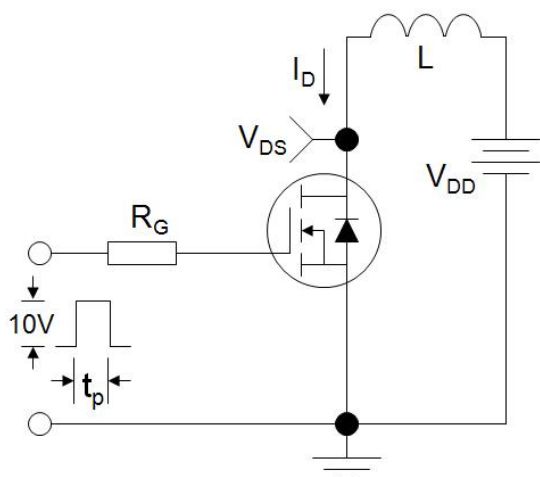
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



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

Figure 1. Output Characteristics

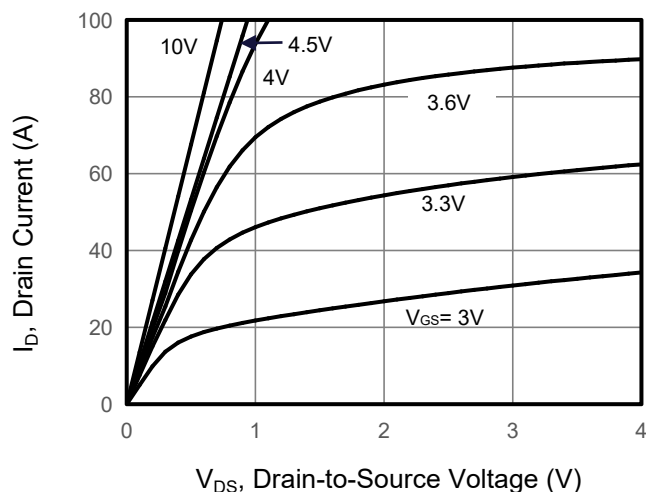


Figure 2. Transfer Characteristics

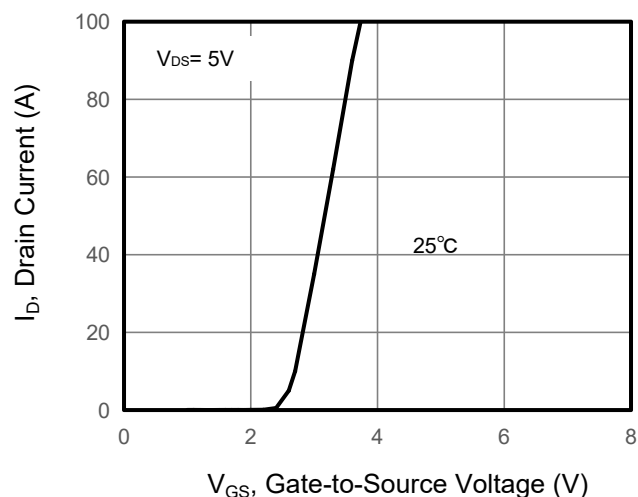


Figure 3. Drain Source On Resistance

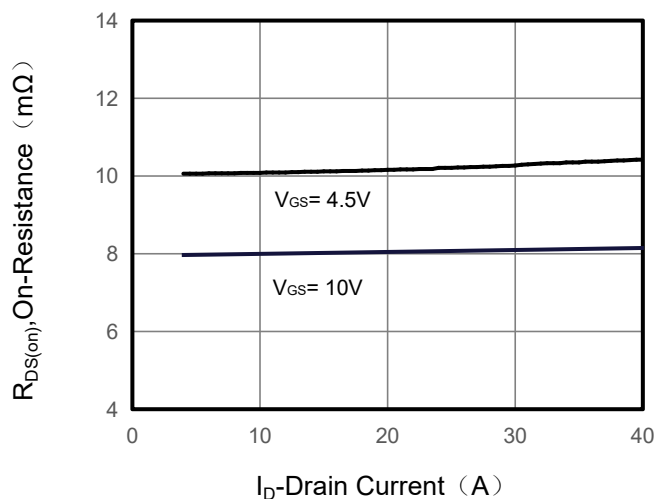


Figure 4. Gate Charge

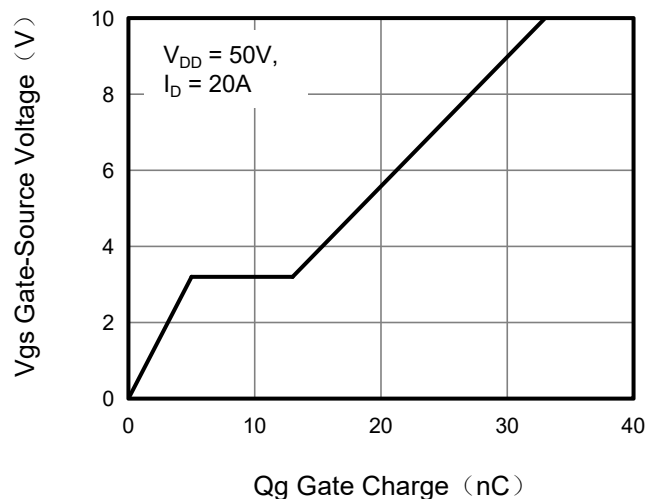


Figure 5. Capacitance

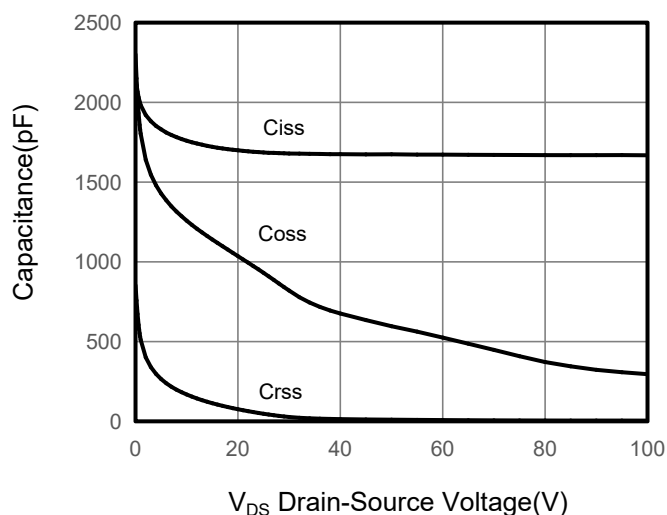
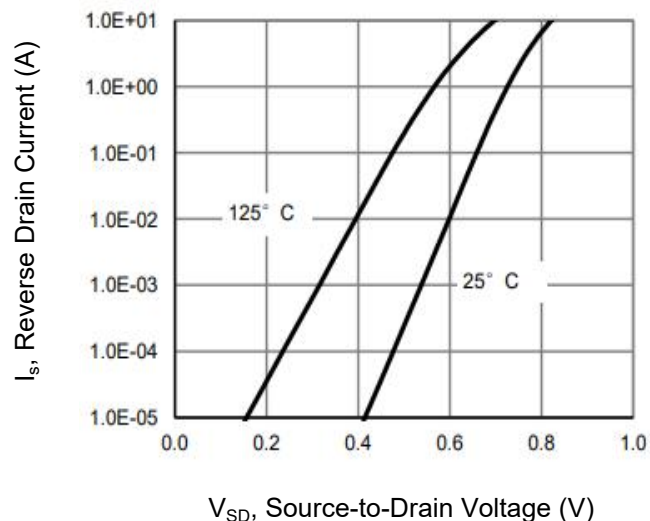


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

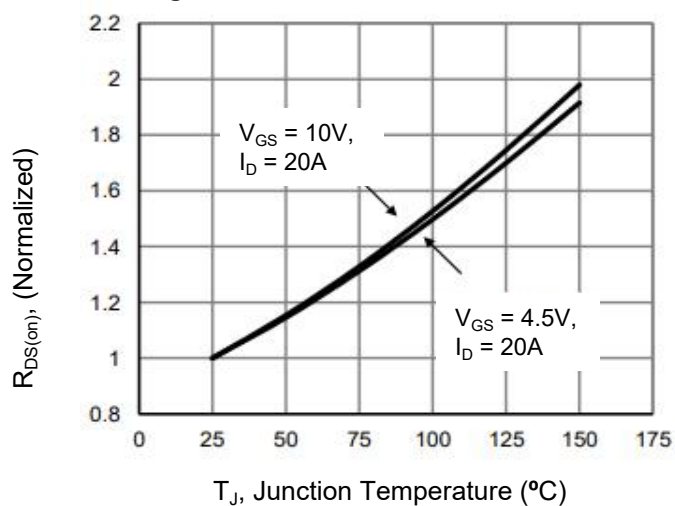


Figure 8. Safe Operation Area

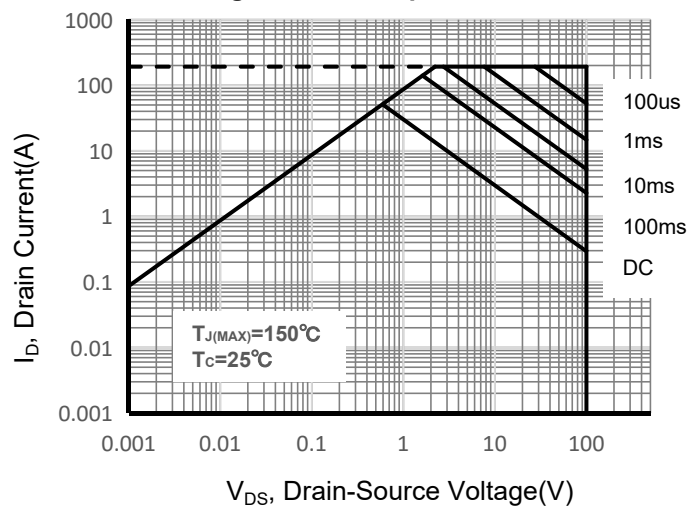


Figure 9. Maximum Continuous Drain Current vs Case Temperature

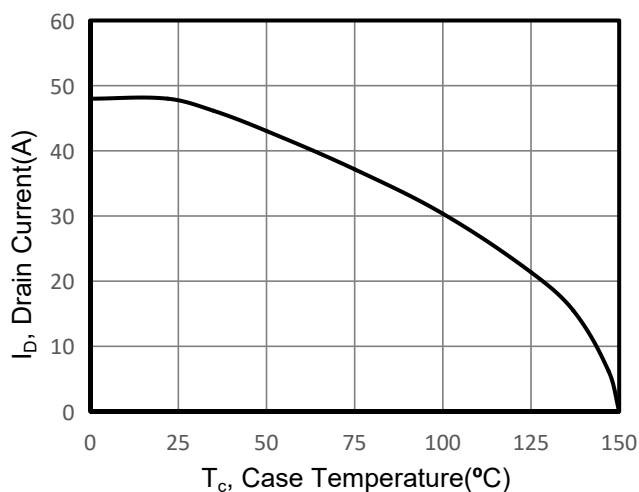
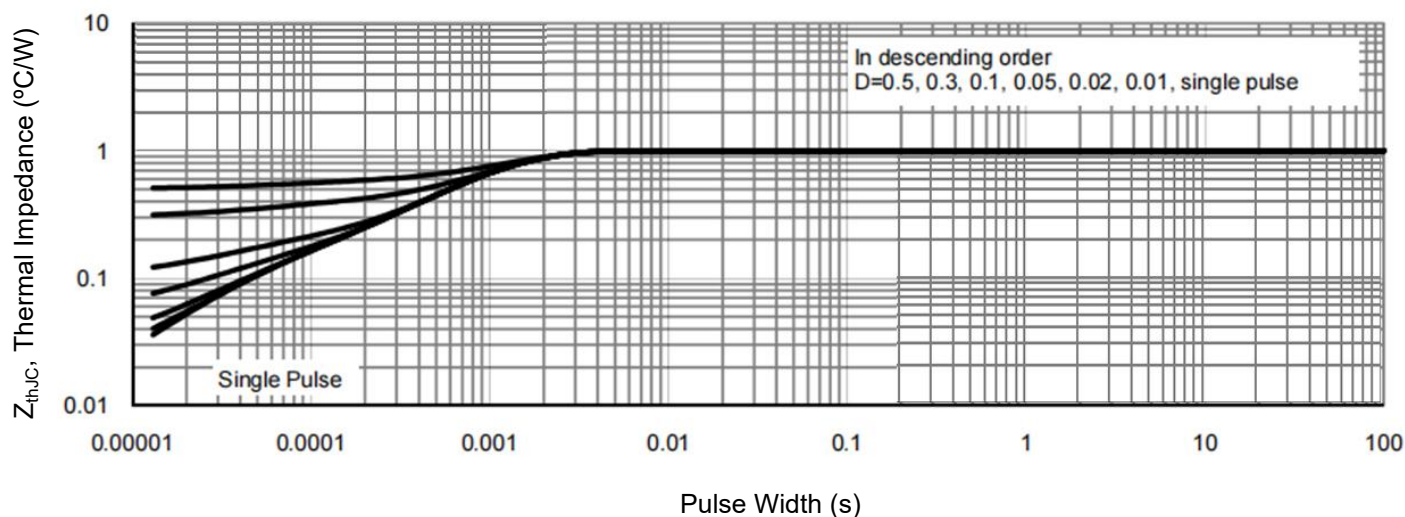
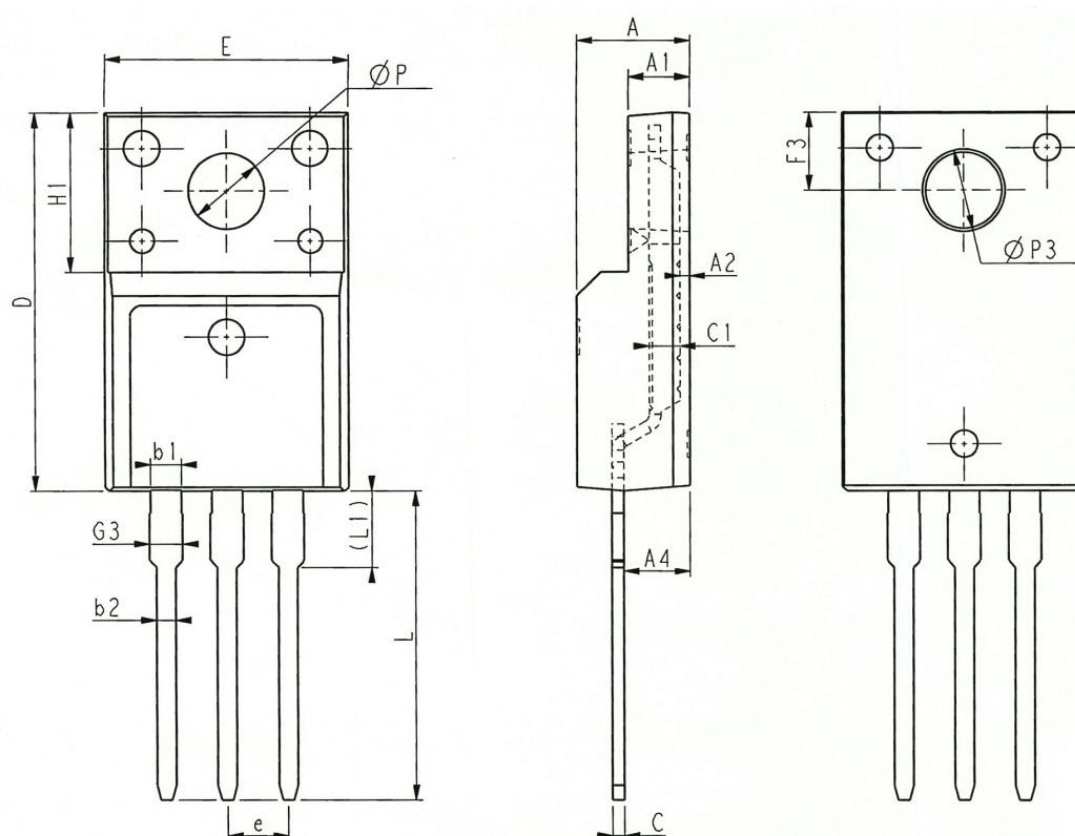


Figure 10. Normalized Maximum Transient Thermal Impedance



TO-220F Package Information



SYMBOL	MM		
	MIN	NOM	MAX
E	9.96	10.16	10.36
A	4.50	4.70	4.90
A1	2.34	2.54	2.74
A2	0.30	0.45	0.60
A4	2.56	2.76	2.96
c	0.40	0.50	0.65
c1	1.20	1.30	1.35
D	15.57	15.87	16.17
H1	6.70REF		
e	2.54BSC		
L	12.68	12.98	13.28
L1	3.03	3.23	3.43
ΦP	3.03	3.18	3.38
ΦP3	3.15	3.45	3.65
F3	3.15	3.30	3.45
G3	1.25	1.35	1.55
b1	1.18	1.28	1.43
b2	0.70	0.80	0.95

(UNIT:mm)