



Description

The HXYG70N10P uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS} = 100V$ $I_D = 70A$

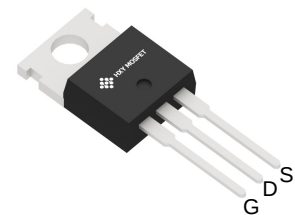
$R_{DS(ON)} < 10.5m\Omega$ @ $V_{GS}=10V$

Application

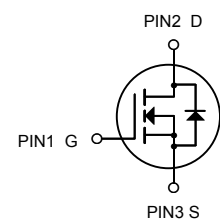
Battery protection

Load switch

Uninterruptible power supply



TO-220



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
HXYG70N10P	TO-220		50

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current $T_C=25^{\circ}C$	70	A
I_{DM}	Puled Drain Current note1	280	A
EAS	Single Pulse Avalanche Energy ³	110	mJ
$P_D@T_C=25^{\circ}C$	Total Power Dissipation ⁴	100	W
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	64	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Ambient ¹	1.25	$^{\circ}C/W$



Electrical Characteristics($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Static Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	100	--	--	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} =100V, V _{GS} =0V	--	--	1	μA
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} =+20V, V _{DS} =0V	--	--	100	nA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} =-20V, V _{DS} =0V	--	--	-100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.3	1.8	2.3	V
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =10V, I _D =20A	--	8.5	10.5	mΩ
		V _{GS} =4.5V, I _D =15A		9.5	15	mΩ
Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = 50V f = 1.0MHz	--	1368	--	pF
C _{oss}	Output Capacitance		--	451	--	
C _{rss}	Reverse Transfer Capacitance		--	12.9	--	
R _g	Gate resistance	V _{GS} =0V,V _{DS} Open	--	0.48	--	Ω
Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	I _D = 10A V _{DS} = 50V V _{GS} = 10V R _G = 4Ω	--	16	--	ns
t _r	Rise Time		--	10	--	
t _{d(OFF)}	Turn-Off Delay Time		--	40	--	
t _f	Fall Time		--	6	--	
Q _g	Total Gate Charge	V _{GS} = 10V V _{DS} = 50V I _D = 10A	--	31.3	--	nC
Q _{gs}	Gate Source Charge		--	3.49	--	
Q _{gd}	Gate Drain Charge		--	7.63	--	
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Value
			Min.	Typ.	Max.	
I _S	Diode Forward Current	T _C =25 °C	--	--	70	A
V _{SD}	Diode Forward Voltage	I _S =10A, V _{GS} =0V	--	--	1.2	V
t _{rr}	Reverse Recovery time	I _S =10A, V _{DD} =50V dI/ dt=100A/μs	--	103	--	ns
Q _{rr}	Reverse Recovery Charge		--	187	--	nC

a1: Repetitive rating; pulse width limited by maximum junction temperature

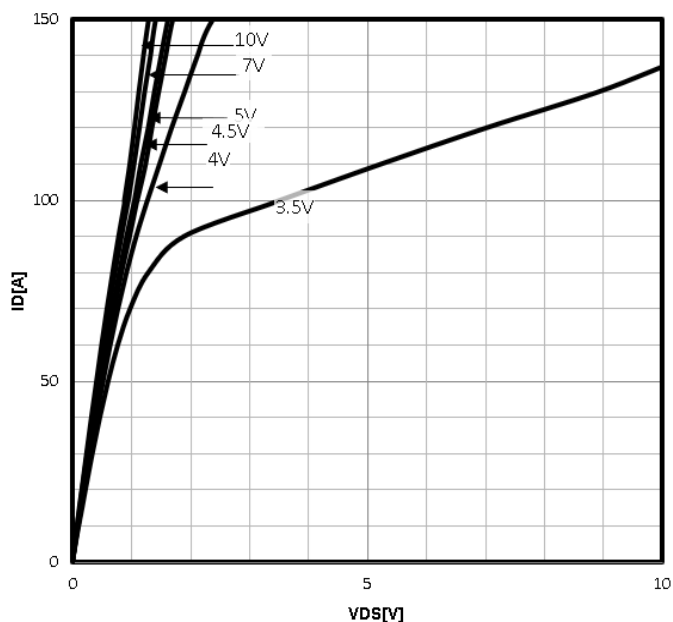
a2: $V_{DD}=50V, L=0.3mH, R_g=25\Omega$, Starting $T_J=25^{\circ}\text{C}$



Typical Characteristics($T_C=25^{\circ}\text{C}$ unless otherwise noted)

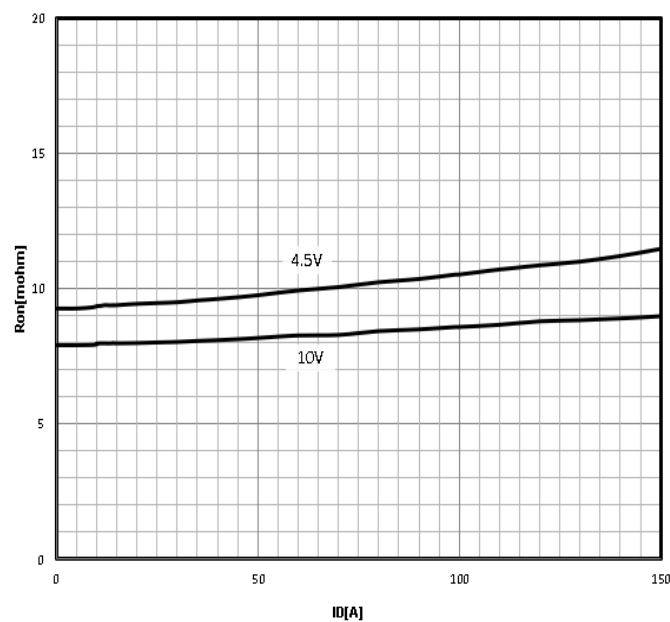
Typ. output characteristics

$$I_D=f(V_{DS})$$



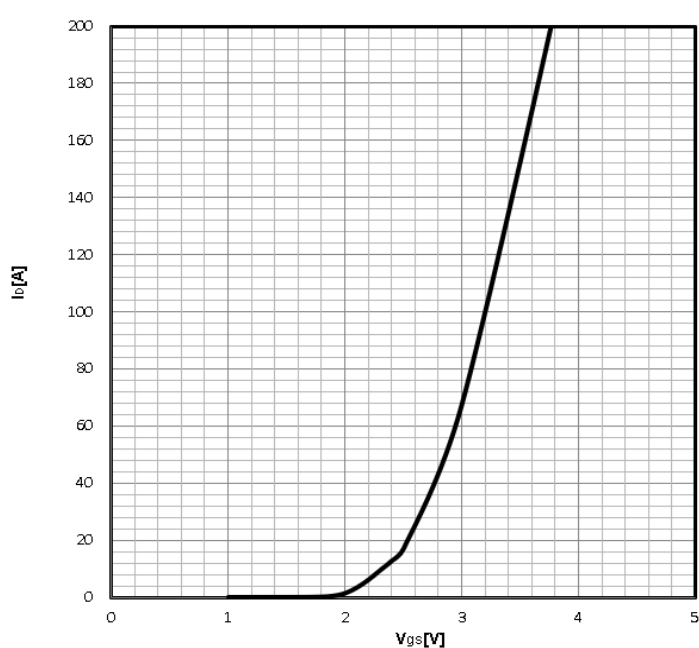
Typ. drain-source on resistance

$$R_{DS(on)}=f(I_D)$$



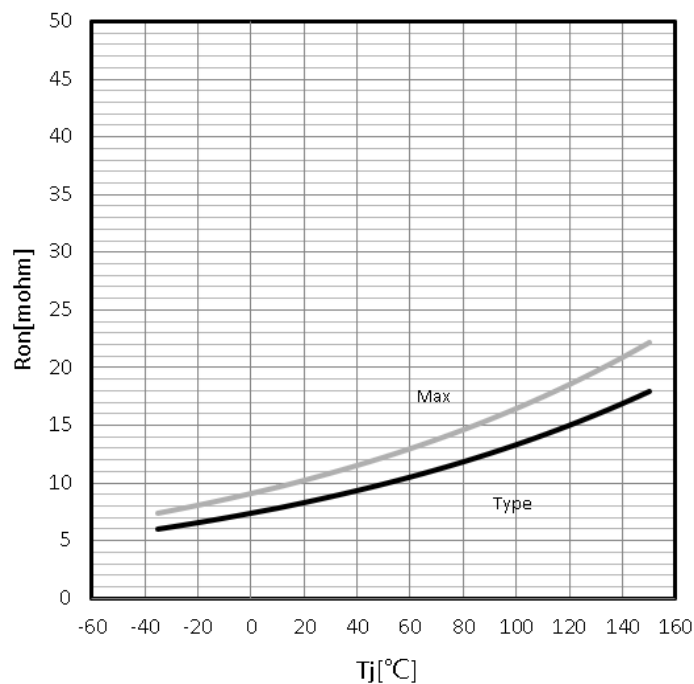
Typ. transfer characteristics

$$I_D=f(V_{GS})$$



Drain-source on-state resistance

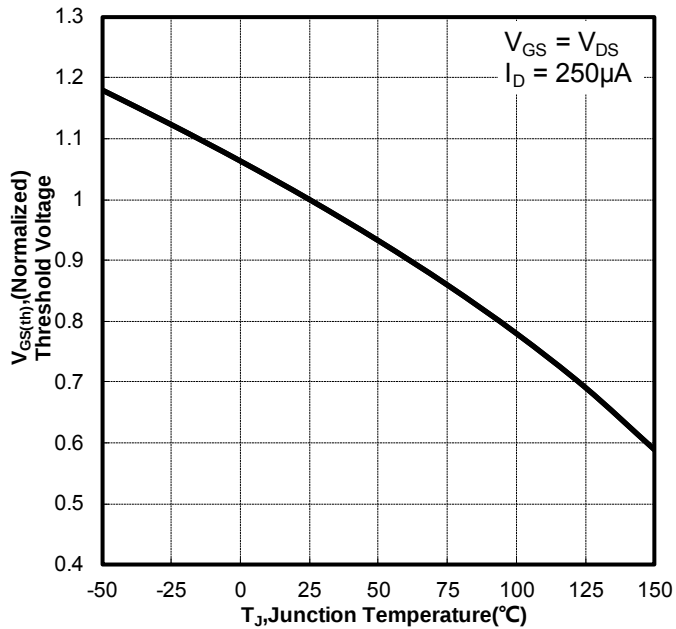
$$R_{DS(on)}=f(T_j); I_D=20\text{A}; V_{GS}=10\text{V}$$





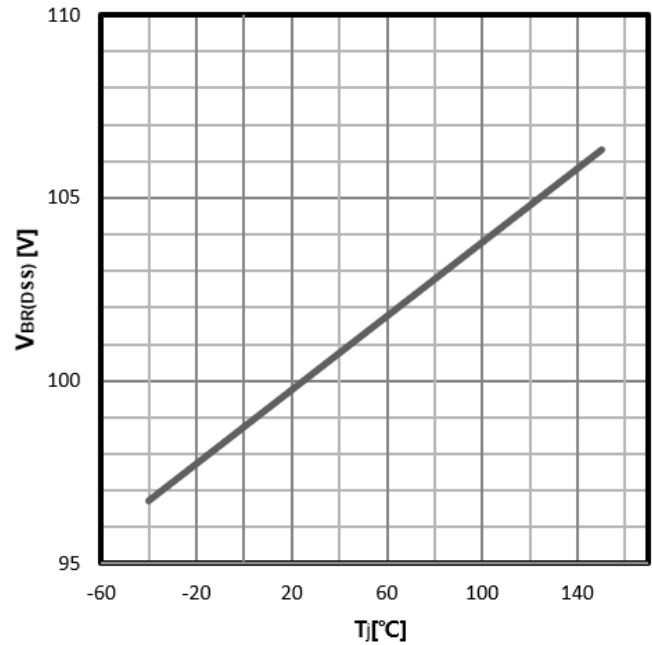
Gate Threshold Voltage

$$V_{TH}=f(T_j); I_D=250\mu A$$



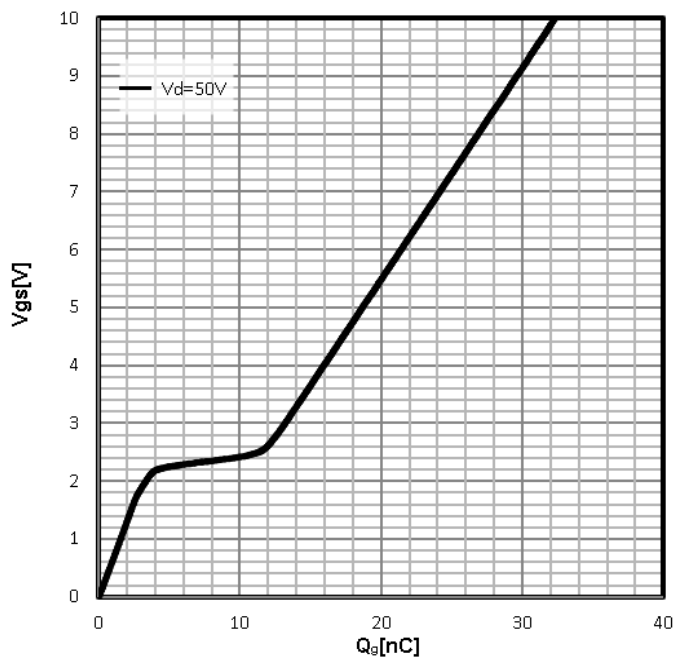
Drain-source breakdown voltage

$$V_{BR(DSS)}=f(T_j); I_D=250\mu A$$



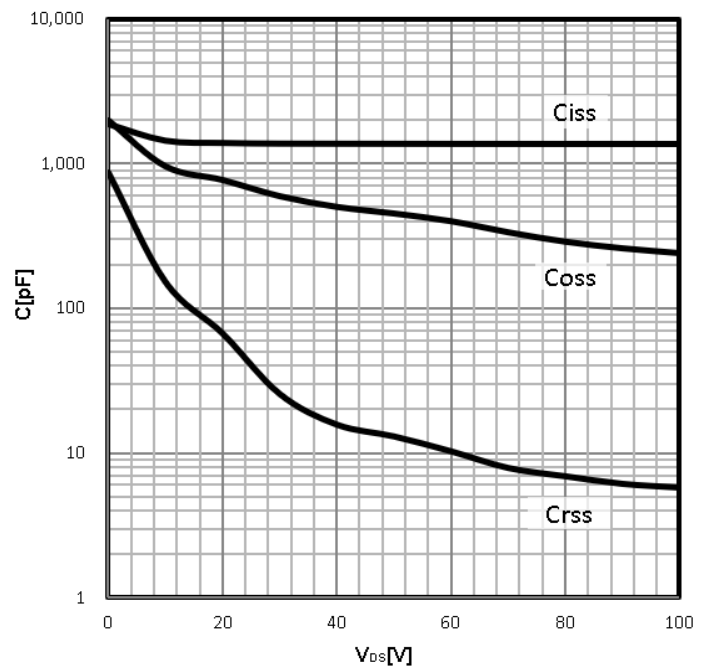
Typ. gate charge

$$V_{GS}=f(Q_g); I_D=10A$$



Typ. capacitances

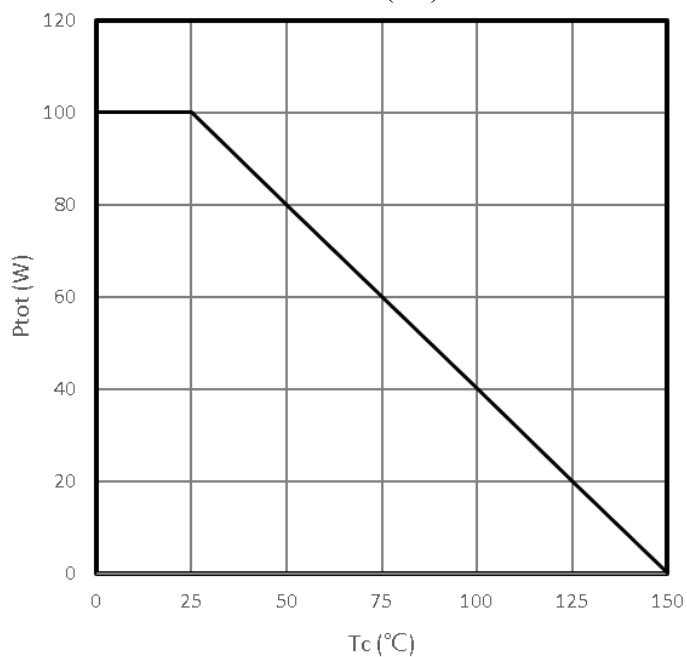
$$C=f(V_{DS}); V_{GS}=0V; f=1MHz$$





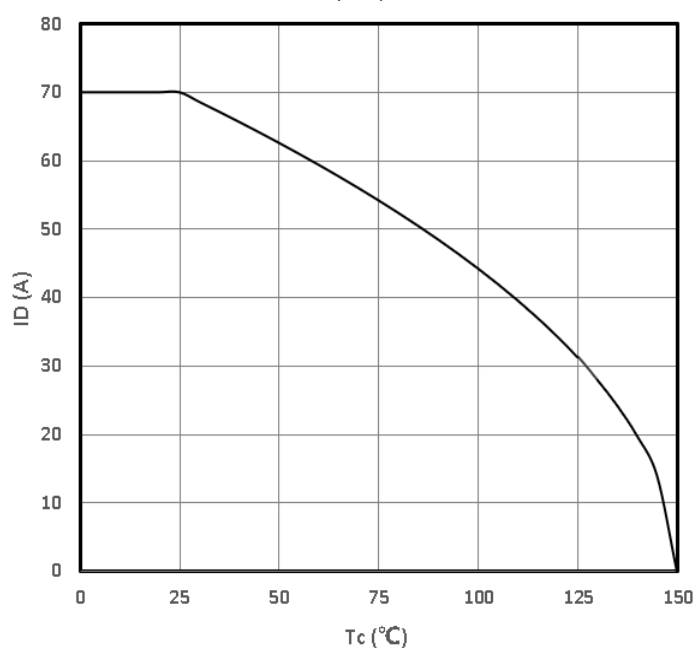
Power Dissipation

$$P_{\text{tot}}=f(T_C)$$



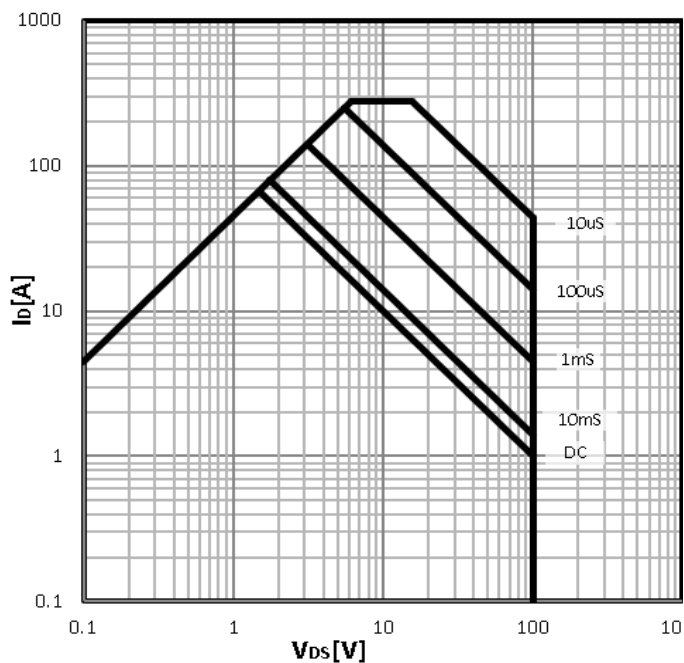
Maximum Drain Current

$$I_D=f(T_C)$$



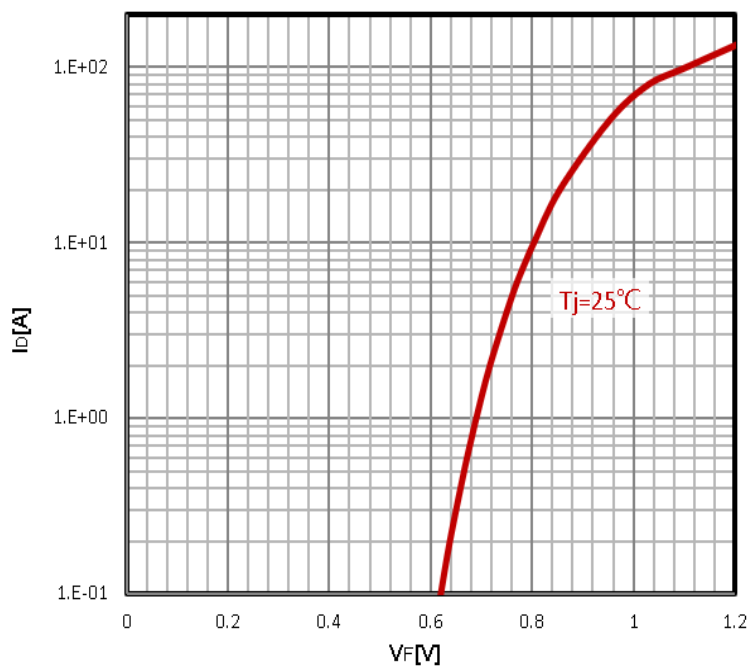
Safe operating area

$$I_D=f(V_{DS})$$



Body Diode Forward Voltage Variation

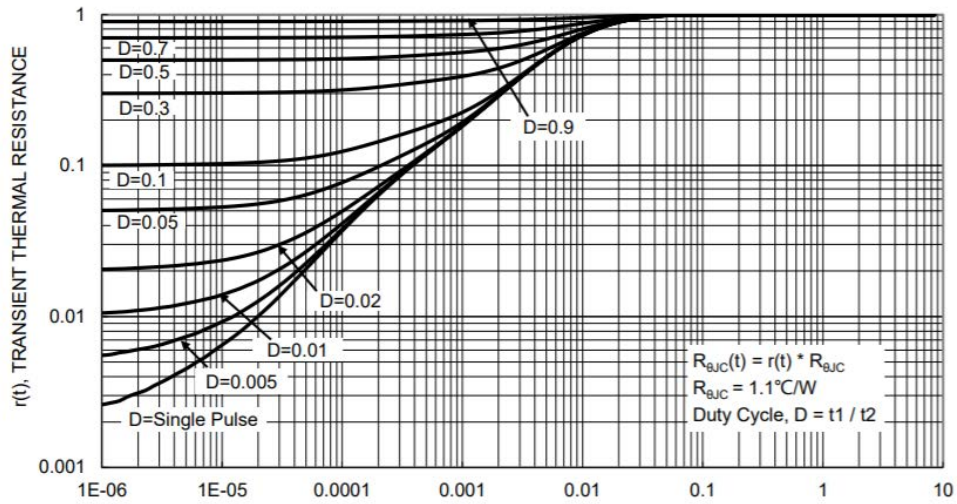
$$I_F=f(V_{GS})$$





Max. transient thermal impedance

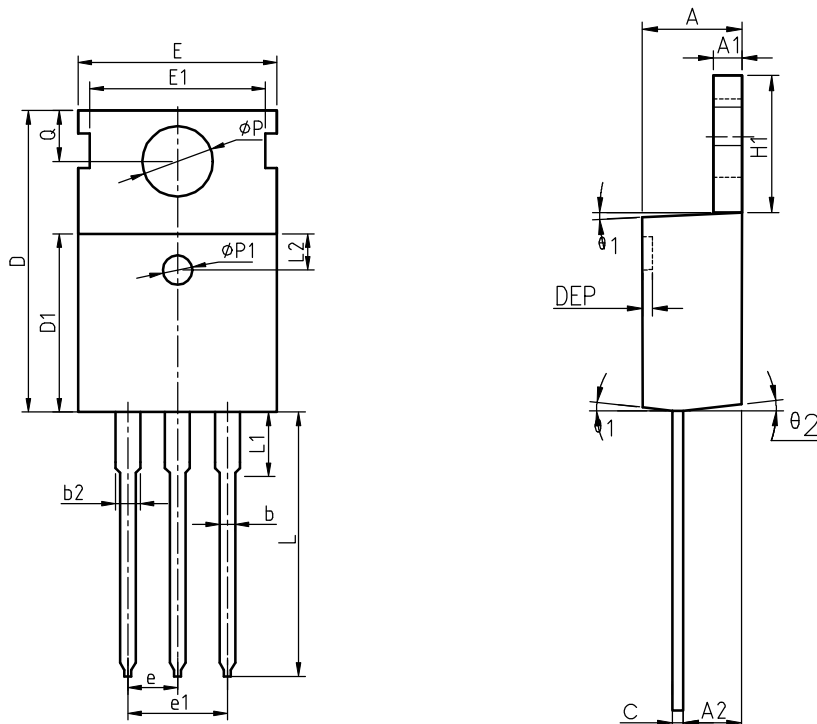
$$Z_{thJC} = f(t_p)$$





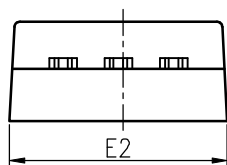
Package Information

TO-220



COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185
A1	1.27	1.30	1.33	0.050	0.051	0.052
A2	2.35	2.40	2.50	0.093	0.094	0.098
b	0.77	0.80	0.90	0.030	0.031	0.035
b2	1.17	1.27	1.36	0.046	0.050	0.054
c	0.48	0.50	0.56	0.019	0.020	0.022
D	15.40	15.60	15.80	0.606	0.614	0.622
D1	9.00	9.10	9.20	0.354	0.358	0.362
DEP	0.05	0.10	0.20	0.002	0.004	0.008
E	9.80	10.00	10.20	0.386	0.394	0.402
E1	-	8.70	-	-	0.343	-
E2	9.80	10.00	10.20	0.386	0.394	0.402
e		2.54	BSC		0.100	BSC
e1		5.08	BSC		0.200	BSC
H1	6.40	6.50	6.60	0.252	0.256	0.260
L	12.75	13.50	13.65	0.502	0.531	0.537
L1	-	3.10	3.30	-	0.122	0.130
L2		2.50	REF		0.098	REF
P	3.50	3.60	3.63	0.138	0.142	0.143
P1	3.50	3.60	3.63	0.138	0.142	0.143
Q	2.73	2.80	2.87	0.107	0.110	0.113
θ 1	5°	7°	9°	5°	7°	9°
θ 2	1°	3°	5°	1°	3°	5°
θ 3	1°	3°	5°	1°	3°	5°





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