

N-Channel Trench Power MOSFET

General Description

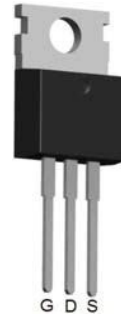
The CS72N12 is N-channel MOS Field Effect Transistor designed for high current switching applications. Rugged E_{AS} capability and ultra low $R_{DS(ON)}$ is suitable for PWM, load switching especially for E-Bike controller applications.

Features

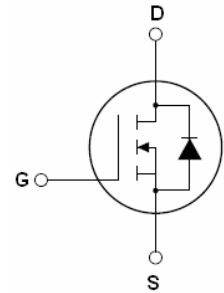
- $V_{DS}=95V$; $I_D=118A@V_{GS}=10V$;
 $R_{DS(ON)}<8.0m\Omega @V_{GS}=10V$
- Special Designed for E-Bike Controller Application
- Ultra Low On-Resistance
- High UIS and UIS 100% Test

Application

- 72V E-Bike controller applications
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply



To-220 Top View



Schematic Diagram

$$V_{DS} = 95V$$

$$I_D = 118A$$

$$R_{DS(ON)} = 6.5m\Omega$$

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
CS72N12	CS72N12	TO-220	-	-	-

Table 1. Absolute Maximum Ratings (TA=25°C)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage ($V_{GS}=0V$)	95	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	± 20	V
$I_{D(DC)}$	Drain Current (DC) at $T_c=25^\circ C$	118	A
$I_{D(DC)}$	Drain Current (DC) at $T_c=100^\circ C$	82.6	A
$I_{DM(pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	472	A
dv/dt	Peak Diode Recovery Voltage	7.6	V/ns
P_D	Maximum Power Dissipation($T_c=25^\circ C$)	250	W
	Derating Factor	1.67	W/°C
E_{AS}	Single Pulse Avalanche Energy (Note 2)	992	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 175	°C

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

2. E_{AS} condition: $T_J=25^\circ C, V_{DD}=50V, V_G=10V, R_G=25\Omega$

Table 2. Thermal Characteristic

Symbol	Parameter	Value	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	---	0.6	$^{\circ}C/W$

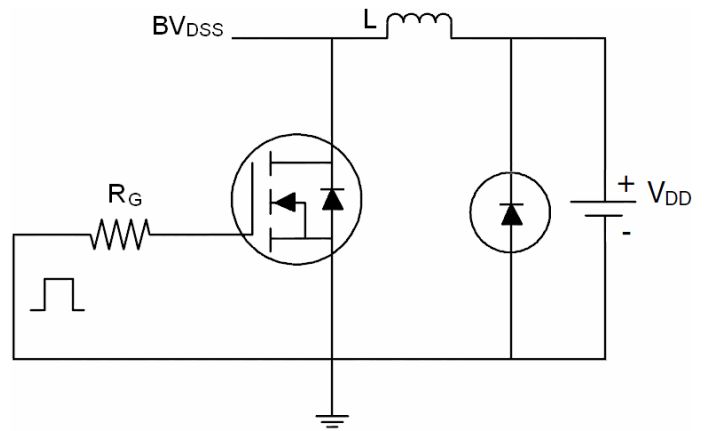
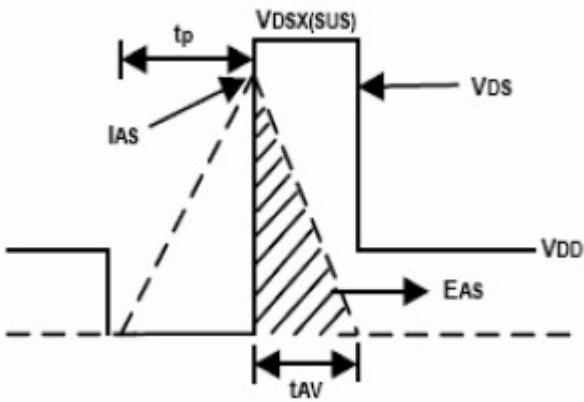
Table 3. Electrical Characteristics (TA=25 $^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	95			V
I_{DSS}	Zero Gate Voltage Drain Current(Tc=25 $^{\circ}C$)	$V_{DS}=95V, V_{GS}=0V$			1	μA
I_{DSS}	Zero Gate Voltage Drain Current(Tc=125 $^{\circ}C$)	$V_{DS}=95V, V_{GS}=0V$			10	μA
I_{GSS}	Gate-Body Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2		4	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	$V_{GS}=10V, I_D=40A$		6.5	8.0	m Ω
Dynamic Characteristics						
g_{FS}	Forward Transconductance	$V_{DS}=10V, I_D=15A$	20			S
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V$ $f=1.0MHz$		6823		PF
C_{oss}	Output Capacitance			502		PF
C_{rss}	Reverse Transfer Capacitance			344		PF
Q_g	Total Gate Charge	$V_{DS}=50V, I_D=40A$ $V_{GS}=10V$		146		nC
Q_{gs}	Gate-Source Charge			30		nC
Q_{gd}	Gate-Drain Charge			60		nC
Switching Times						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=65V, I_D=40A, R_L=15\Omega$ $V_{GS}=10V, R_G=2.5\Omega$		33		nS
t_r	Turn-on Rise Time			59		nS
$t_{d(off)}$	Turn-Off Delay Time			86		nS
t_f	Turn-Off Fall Time			29		nS
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current(Body Diode)			118		A
I_{SDM}	Pulsed Source-Drain Current(Body Diode)			472		A
V_{SD}	Forward On Voltage ^(Note 1)	$T_J=25^{\circ}C, I_{SD}=40A, V_{GS}=0V$		0.84	0.99	V
t_{rr}	Reverse Recovery Time ^(Note 1)	$T_J=25^{\circ}C, I_F=40A$ $di/dt=100A/\mu s$		53		nS
Q_{rr}	Reverse Recovery Charge ^(Note 1)			136		nC
t_{on}	Forward Turn-on Time	Intrinsic turn-on time is negligible(turn-on is dominated by L_S+L_D)				

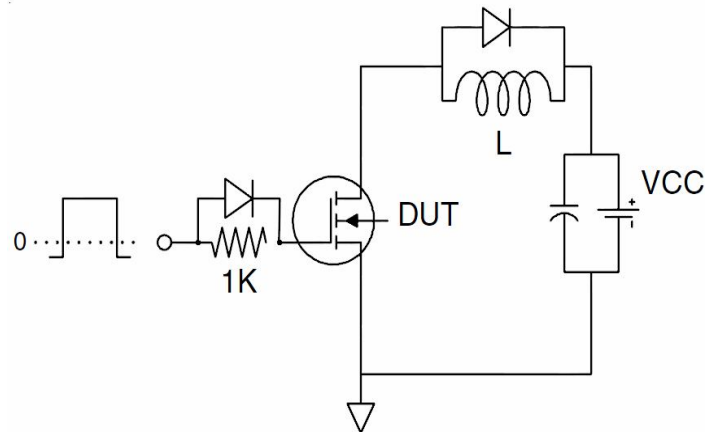
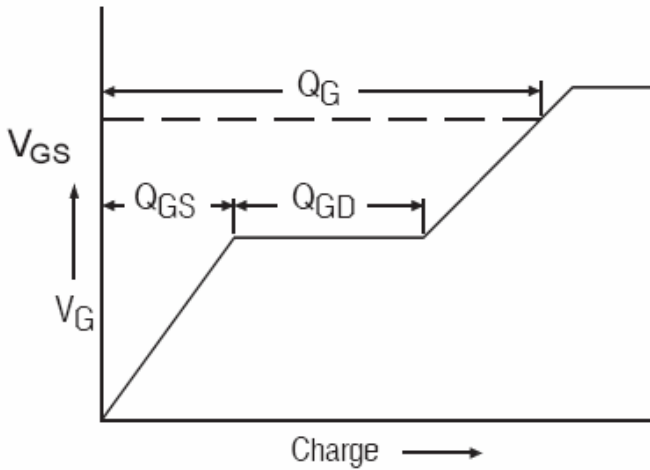
Notes 1. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 1.5\%$, $R_G=25\Omega$, Starting $T_J=25^{\circ}C$

Test Circuit

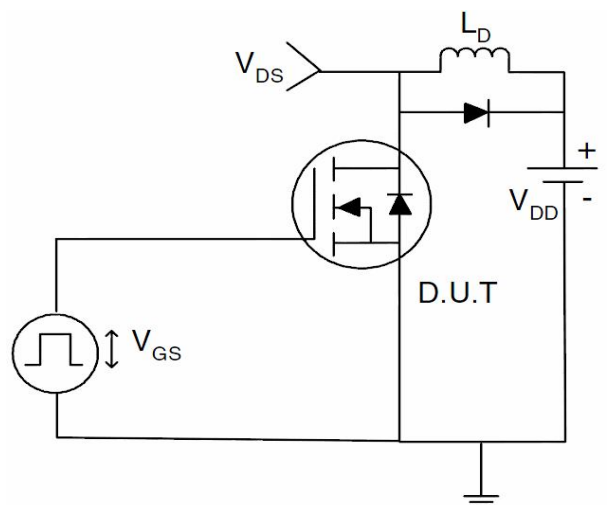
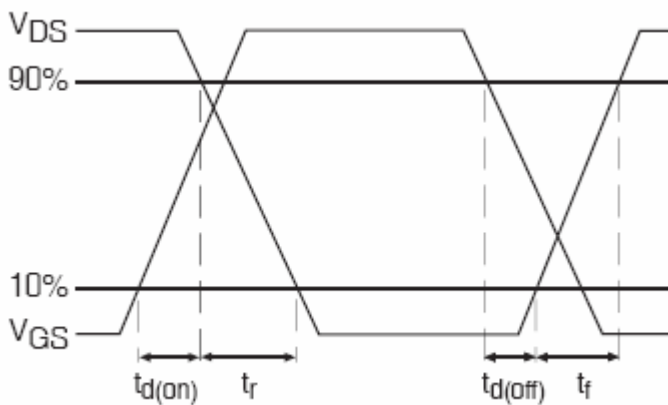
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit:



3) Switch Time Test Circuit:



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)

Figure1. Output Characteristics

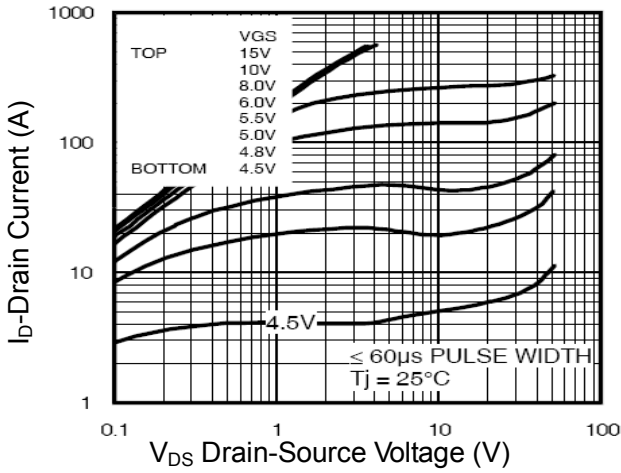


Figure2. Transfer Characteristics

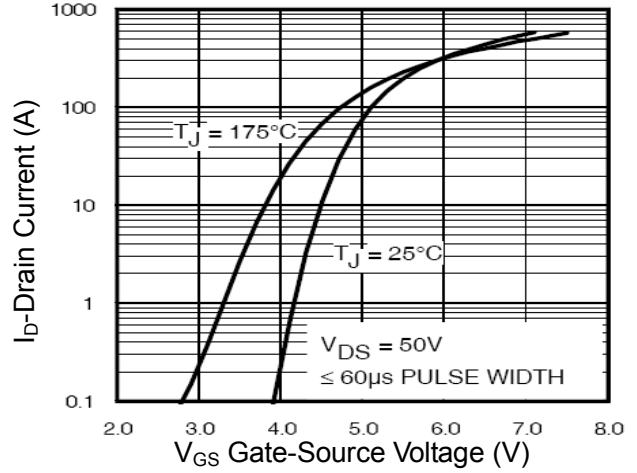


Figure3. ID vs Junction Temperature

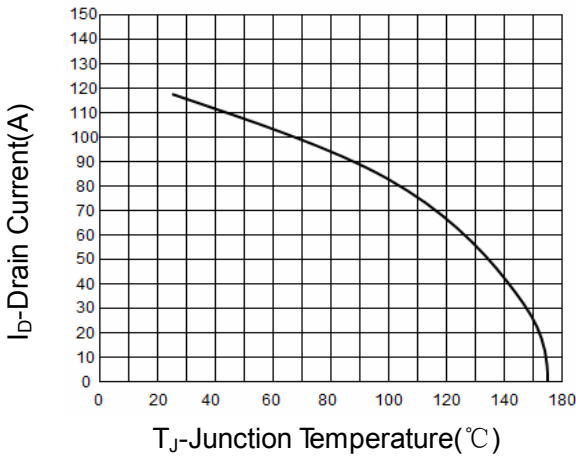


Figure4. RDS(ON)- Junction Temperature

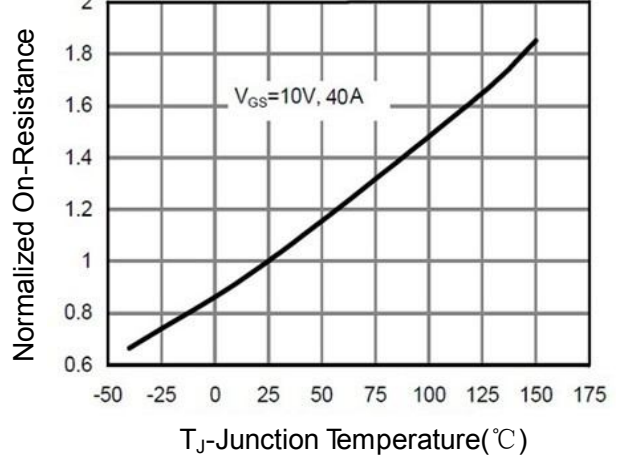


Figure5. BVDS vs Junction Temperature

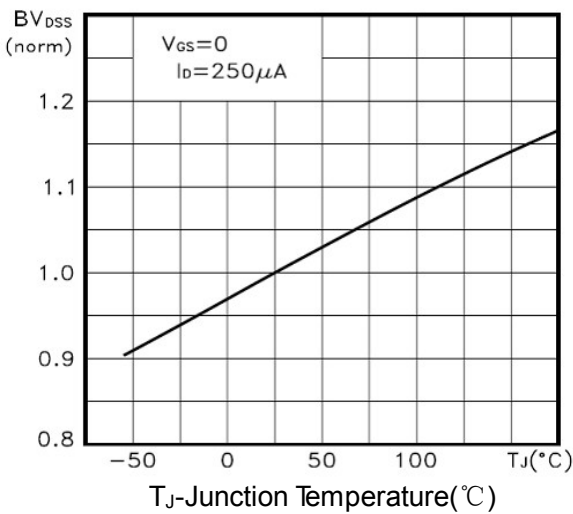


Figure6. VGS(th) vs Junction Temperature

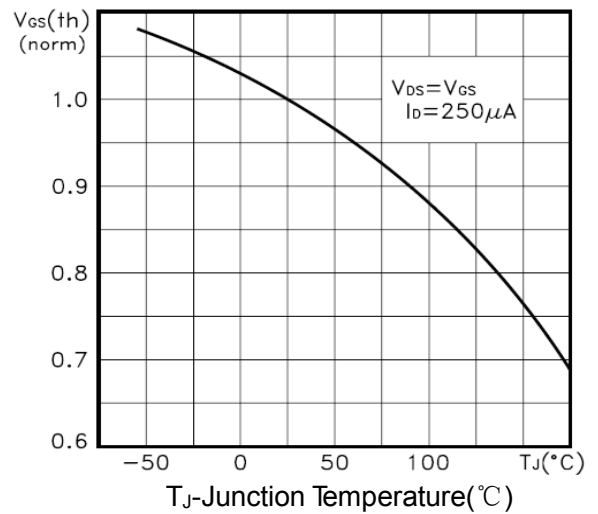


Figure7. Gate Charge

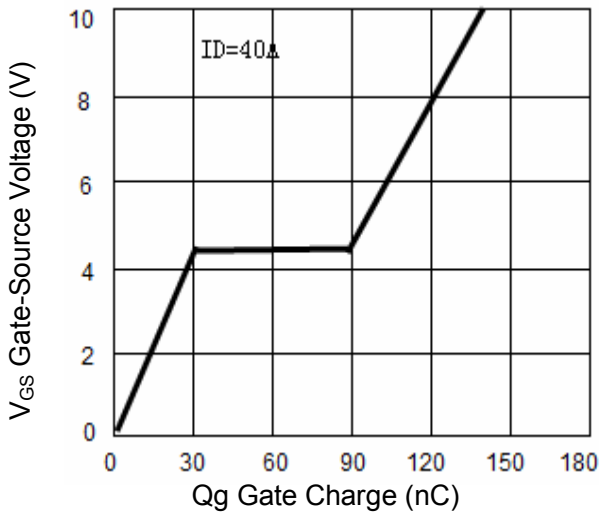


Figure8. Capacitance vs Vds

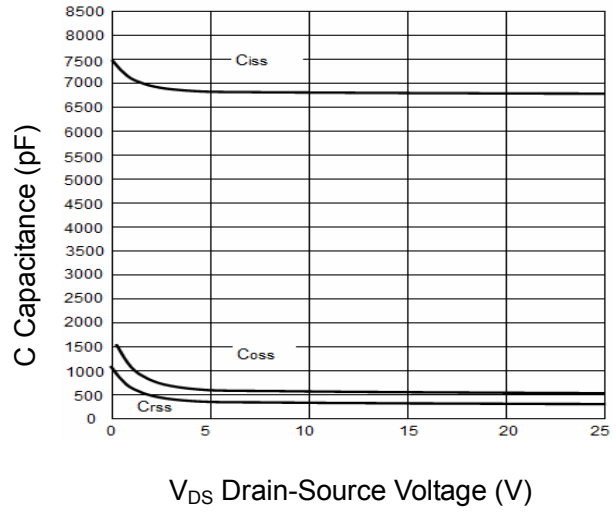


Figure9. Safe Operation Area

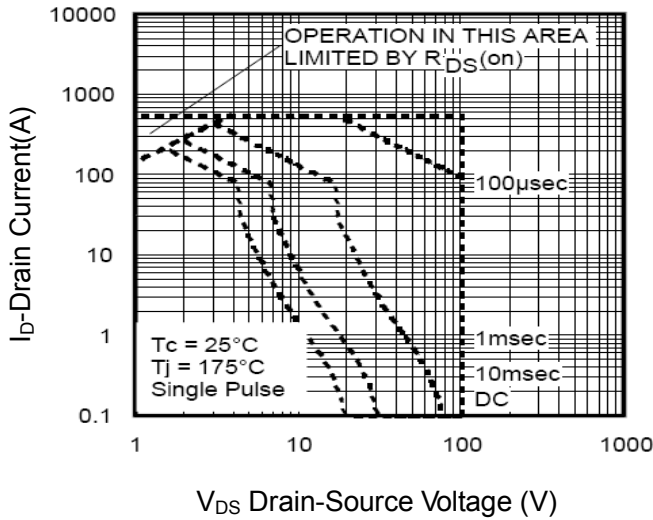


Figure10. Source- Drain Diode Forward

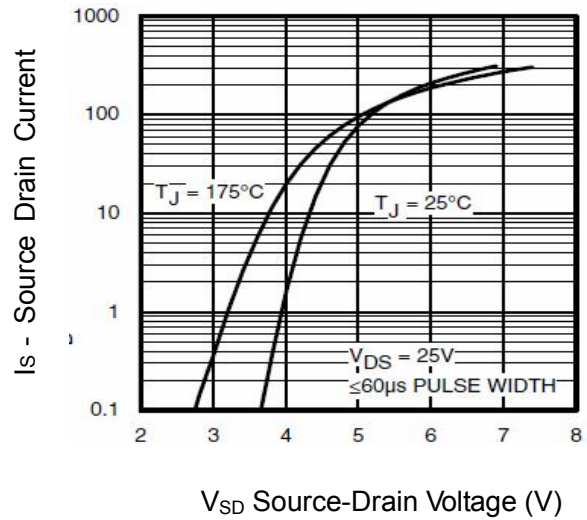
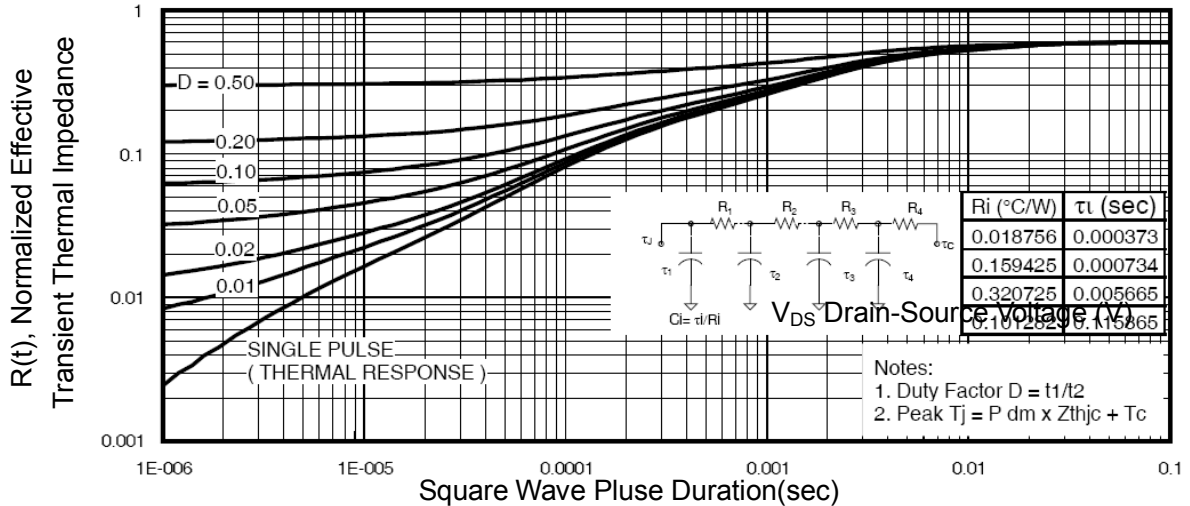
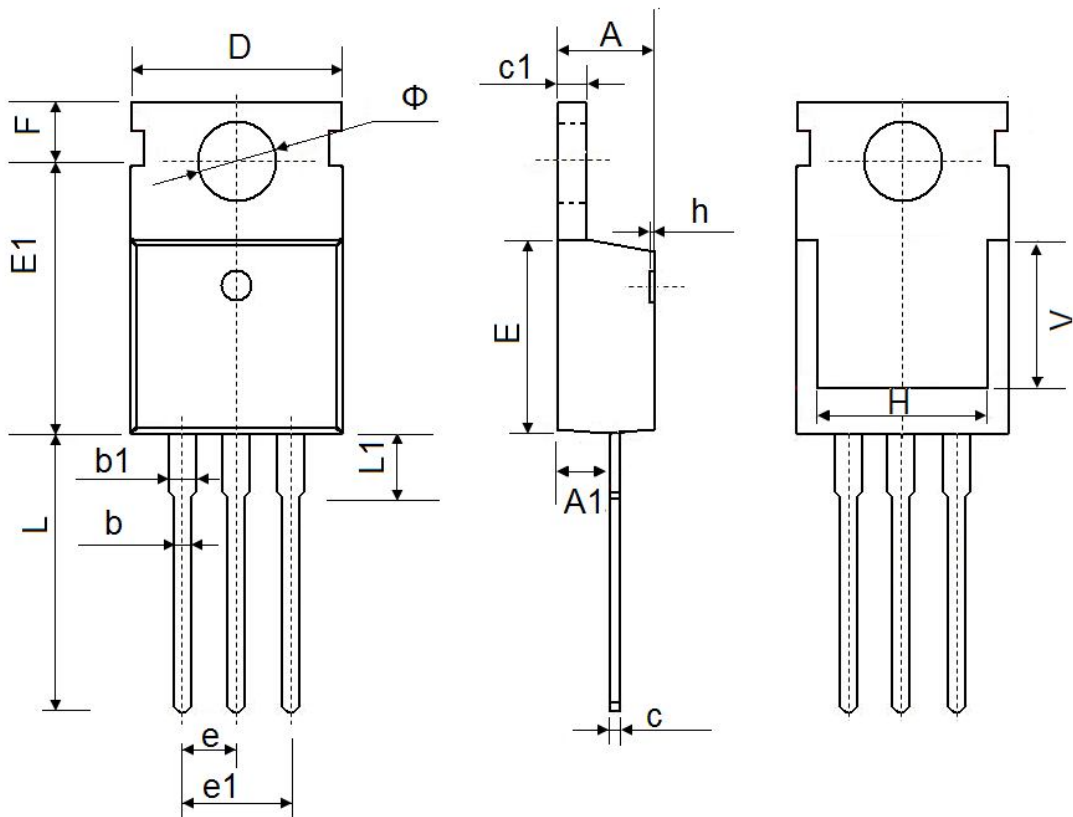


Figure11. Normalized Maximum Transient Thermal Impedance



TO-220 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max
A	4.300	4.700	0.169	0.185
A1	2.200	2.600	0.087	0.102
b	0.700	0.950	0.028	0.037
b1	1.170	1.410	0.046	0.056
c	0.450	0.650	0.018	0.026
c1	1.200	1.400	0.047	0.055
D	9.600	10.400	0.378	0.409
E	8.8500	9.750	0.348	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.750	14.300	0.502	0.563
L1	2.850	3.950	0.112	0.156
V	7.500 REF.		0.295 REF.	
Φ	3.400	4.000	0.134	0.157

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [MOSFET](#) category:

Click to view products by [CASS](#) manufacturer:

Other Similar products are found below :

[614233C](#) [648584F](#) [IRFD120](#) [IRFF430](#) [JANTX2N5237](#) [2N7000](#) [FCA20N60_F109](#) [FDZ595PZ](#) [AOD464](#) [2SK2267\(Q\)](#) [2SK2545\(Q,T\)](#)
[405094E](#) [423220D](#) [MIC4420CM-TR](#) [VN1206L](#) [614234A](#) [715780A](#) [SSM6J414TU,LF\(T](#) [751625C](#) [PSMN4R2-30MLD](#)
[TK31J60W5,S1VQ\(O](#) [2SK2614\(TE16L1,Q\)](#) [DMN1017UCP3-7](#) [EFC2J004NUZTDG](#) [FCAB21350L1](#) [P85W28HP2F-7071](#) [DMN1053UCP4-7](#)
[NTE2384](#) [NTE2969](#) [NTE6400A](#) [DMN2080UCB4-7](#) [DMN61D9UWQ-13](#) [US6M2GTR](#) [DMN31D5UDJ-7](#) [SSM6P54TU,LF](#) [DMP22D4UFO-](#)
[7B](#) [IPS60R3K4CEAKMA1](#) [DMN1006UCA6-7](#) [DMN16M9UCA6-7](#) [STF5N65M6](#) [STU5N65M6](#) [C3M0021120D](#) [DMN13M9UCA6-7](#)
[BSS340NWH6327XTSA1](#) [MCM3400A-TP](#) [DMTH10H4M6SPS-13](#) [IRF40SC240ARMA1](#) [IPS60R1K0PFD7SAKMA1](#)
[IPS60R360PFD7SAKMA1](#) [IPS60R600PFD7SAKMA1](#)