VUTS010R055NB

Datasheet

General Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
100V	5.5mΩ@10V	130A

Symbol

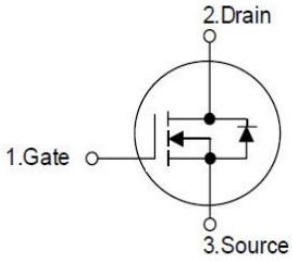


Figure 1 Symbol of VUTS010R055NB

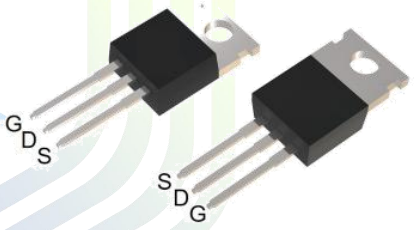
Features

- Low $R_{DS(ON)}$
- Enhancement mode
- 100% Avalanche Tested

Application

- PD charger
- Motor driver
- Switching voltage regulator
- DC-DC converter
- Switched mode power supply

Package Type



TO-220AB

Figure 2 Package Type of VUTS010R055NB

Ordering Information

Product Name	Package
VUTS010R055NB	TO-220AB

Absolute Maximum Ratings (T_A= 25 ºC, unless otherwise specified)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	±25	V
Continuous Drain Current (Silicon limited)	T_C=25ºC	I_D	200	A
Continuous Drain Current (Wire Bond limited)	T_C=25ºC		130	
Continuous Drain Current (Silicon limited)	T_C=100ºC		142	
Pulsed Drain Current[Note 2]	T_C=25ºC	$I_{D.pulse}$	800	A
Continuous Diode Forward Current	T_C=25ºC	I_S	200	A
Continuous Drain Current	T_A=25ºC	I_{DSM}	15	A
Continuous Drain Current	T_A=70ºC		12	A
Max Power Dissipation	T_C=25ºC	P_D	375	W
Max Power Dissipation[Note 3]	T_A=25ºC	P_{DSM}	2	W
Avalanche Energy, Single Pulse [Note 4]		E_{AS}	900	mJ
Operation and storage temperature		T_J,T_{STG}	-55 to 175	ºC

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{θJC}$		0.4	0.5	ºC/W
Thermal Resistance, Junction-to-Ambient	$R_{θJA}$		62.5	75	

Electrical Characteristics(T_J= 25 ºC, unless otherwise specified)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Statistic Characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250uA	100			V
Zero Gate Voltage Drain Current		I_{DSS}	V_{DS}=100V, V_{GS}=0V			1	uA
Zero Gate Voltage Drain Current T_J= 125 ºC			V_{DS}=100V, V_{GS}=0V			100	uA
Gate-Body Leakage Current	Forward	I_{GSSF}	V_{GS}=25V, V_{DS}=0V			100	nA
	Reverse	I_{GSSR}	V_{GS}=-25V, V_{DS}=0V			-100	
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250uA	2.4	3	3.6	V
Drain-Source On-Resistance[Note1]		$R_{DS(ON)}$	V_{GS}=10V, I_D=80A		4.5	5.5	mΩ
Drain-Source On-Resistance[Note1] T_J= 100 ºC					6.5		
Gate resistance		R_G	f=1 MHz, Open drain	0.2	2.3	5	Ω
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=30V	11065	14755	19625	pF
Output Capacitance		C_{OSS}	V_{GS}=0V	500	665	885	pF
Reverse Transfer Capacitance		C_{RSS}	f=1MHz	370	495	660	pF
Turn-on Delay Time		$t_{d(on)}$	V_{DS}=50V		35		ns
Rise Time		t_r	I_D=40A		67		
Turn-off Delay Time		$t_{d(off)}$	R_G=3Ω		128		
Fall Time		t_f	V_{GS}=10V		64		
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{GS}=10V		59	78	nC
Gate to Drain Charge		Q_{gd}	V_{DS}=50V		60	90	
Gate Charge Total		Q_g	I_D=40A		232	309	
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_{SD}=80A		0.9	1.2	V
Reverse Recovery Time		t_{rr}	I_{SD}=40A V_{GS}=0V		44	88	ns
Reverse Recovery Charge		Q_{rr}	di/dt=100A/us		77	154	nC

Notes:

1. Pulse width≤380μs; duty cycle≤ 2%.
2. Repetitive rating;pulse width limited by max junction temperature.
3. The power dissipation P_{DSM} is based on $R_{\theta JA}$ and @T_J= 125°C
4. Limited by T_{Jmax}, starting T_J= 25°C, L = 0.5mH, R_G = 25Ω, I_{AS} = 60A, V_{GS} =10V.

Typical Performance Characteristics

Figure 3: Typ. Output Characteristics

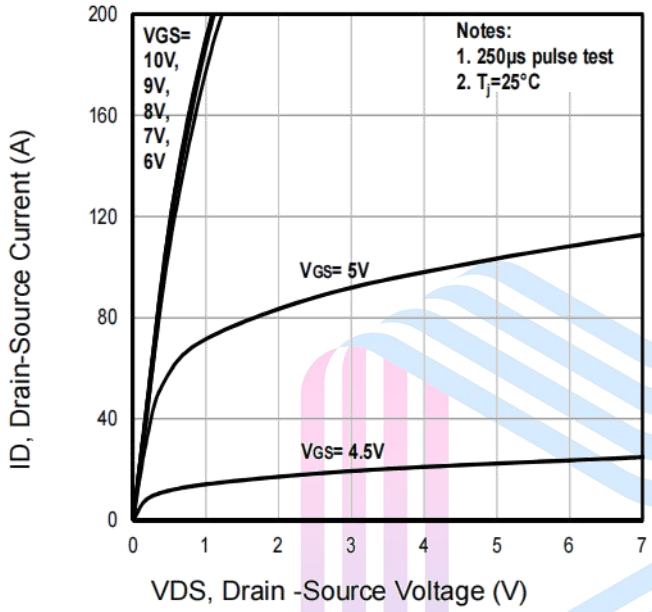


Figure 4: Typ. Gate Charge

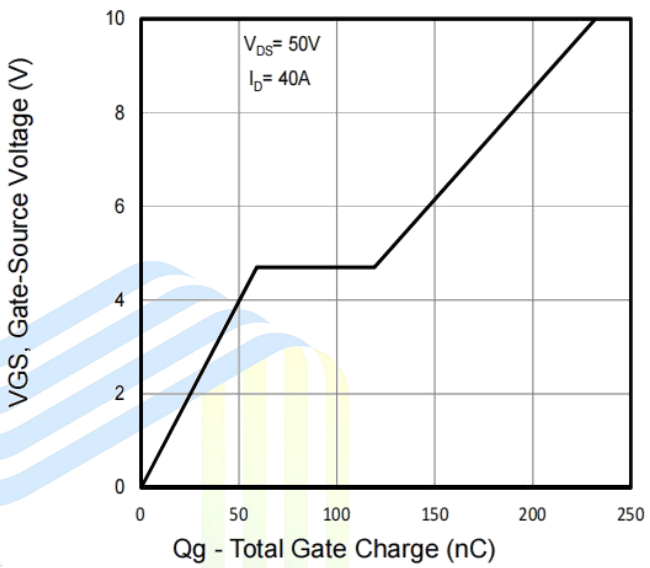


Figure 5: Normalized On-State Resistance

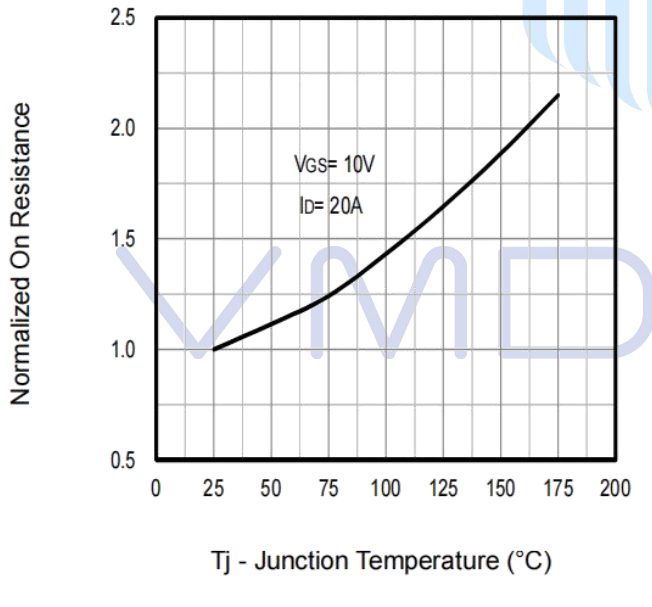


Figure 6: Typ. Transfer Characteristics

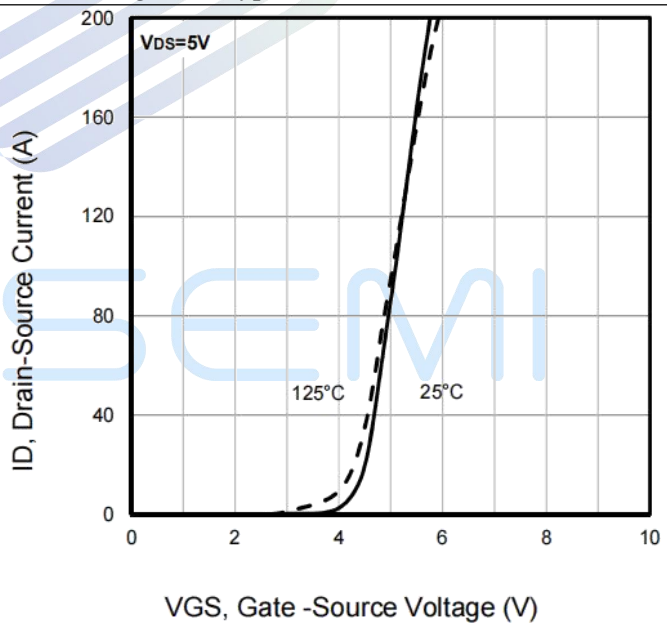


Figure 7: Typ. Capacitances

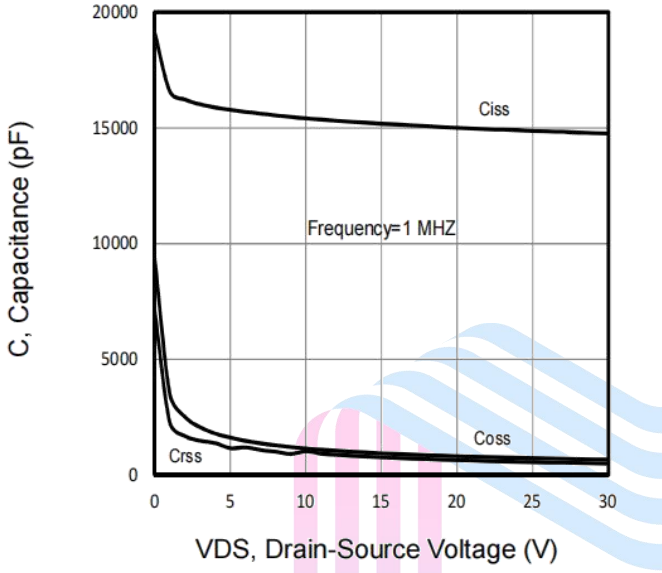


Figure 8: Forward Characteristics of Body Diode

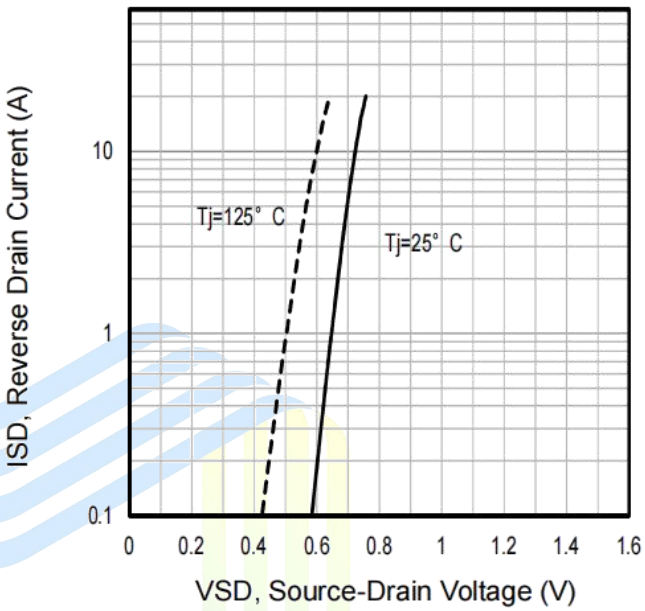


Figure 9: Gate-Source Threshold Voltage

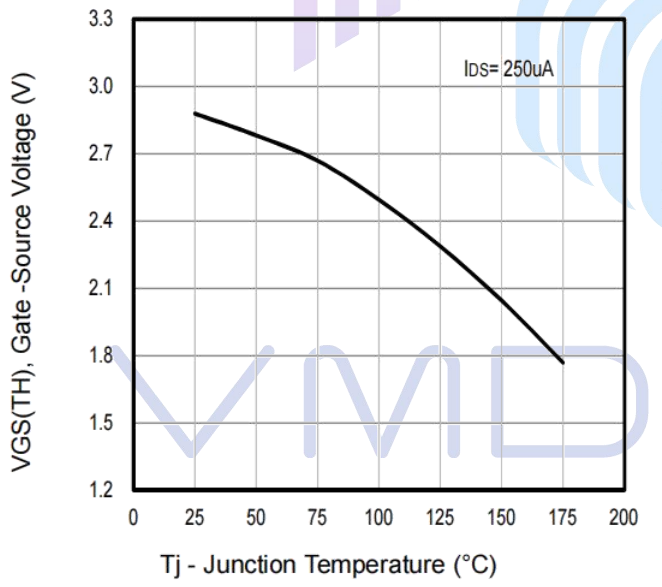


Figure 10: Safe Operating Area

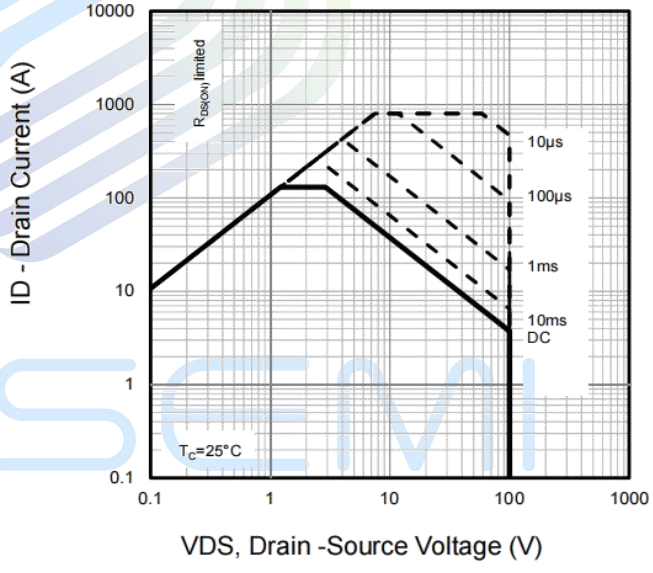


Figure 11: On Resistance Vs Gate -Source Voltage

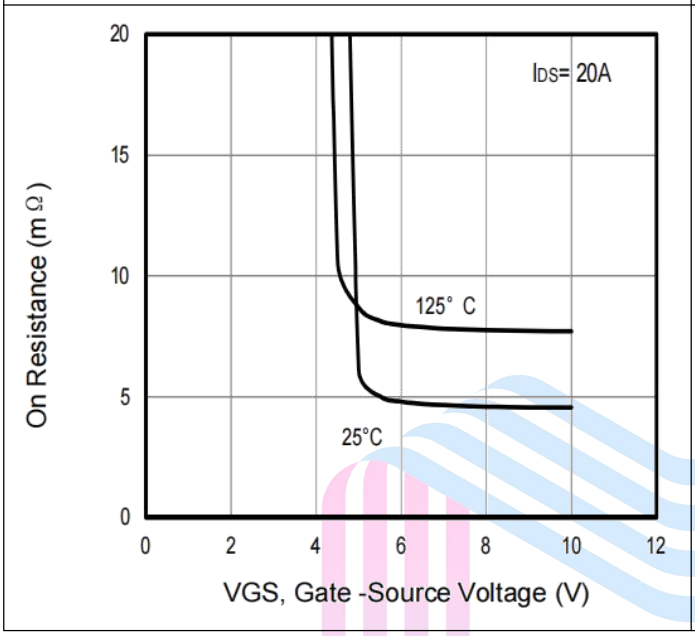


Figure 12: On Resistance Vs Drain Current and Gate Voltage

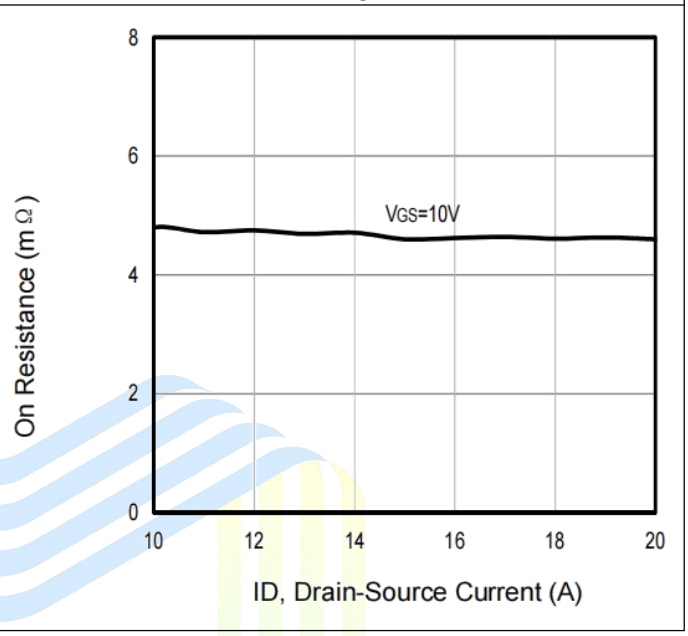


Figure 13: Power Dissipation Vs. Case Temperature

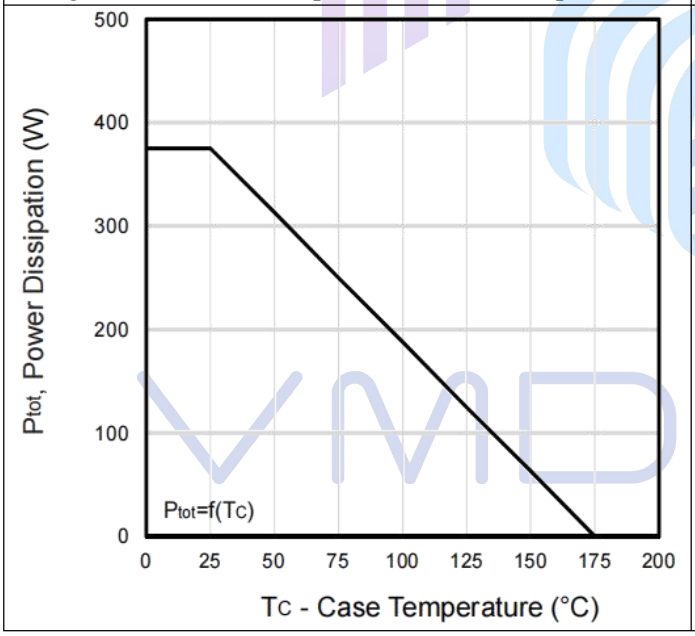


Figure 14: Drain Current Vs. Case Temperature

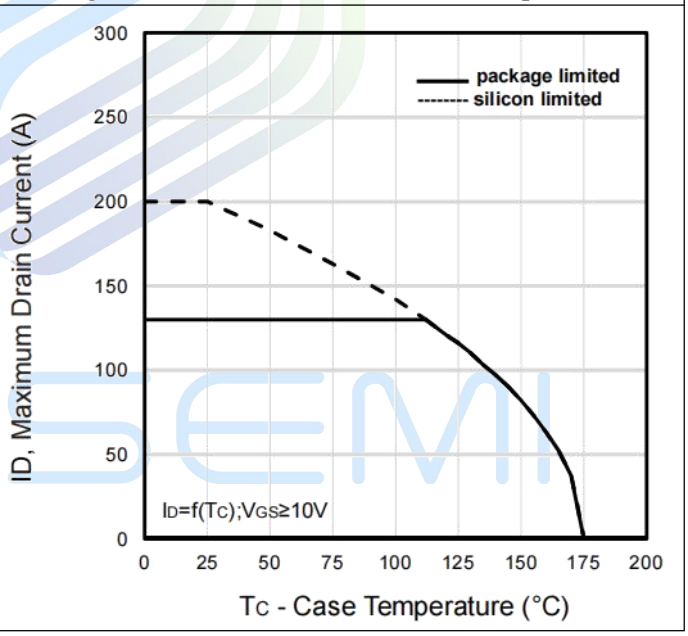
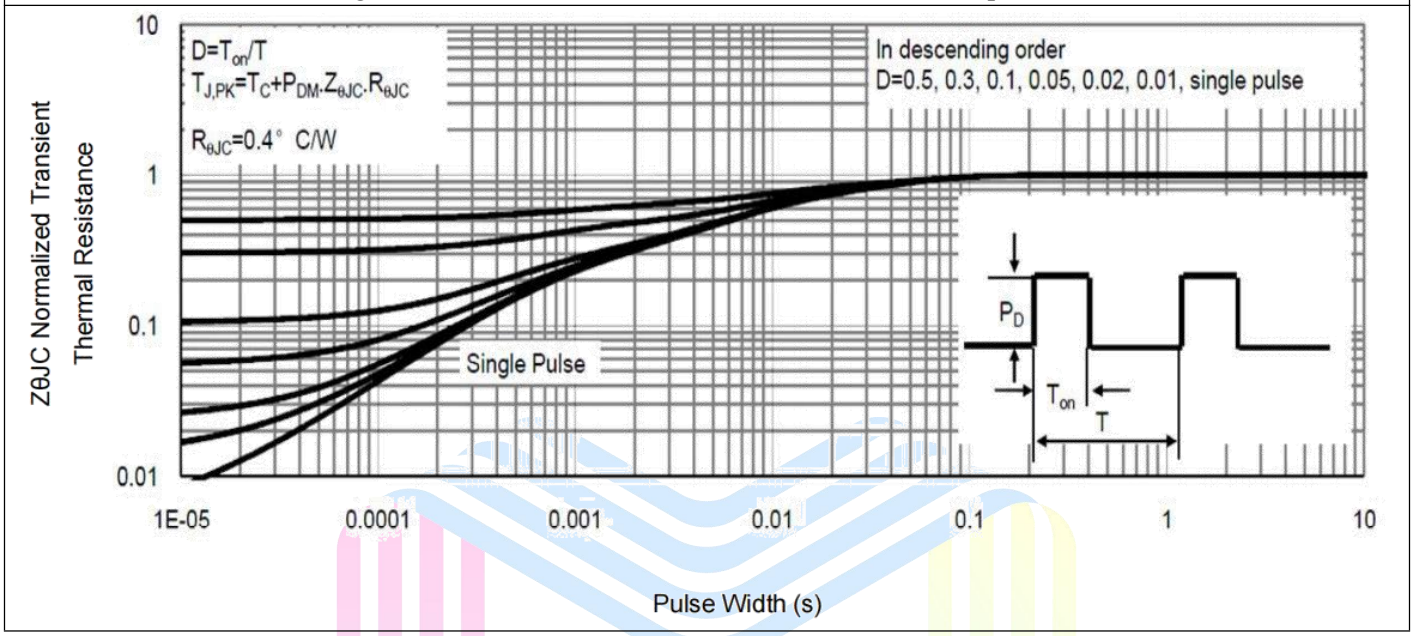
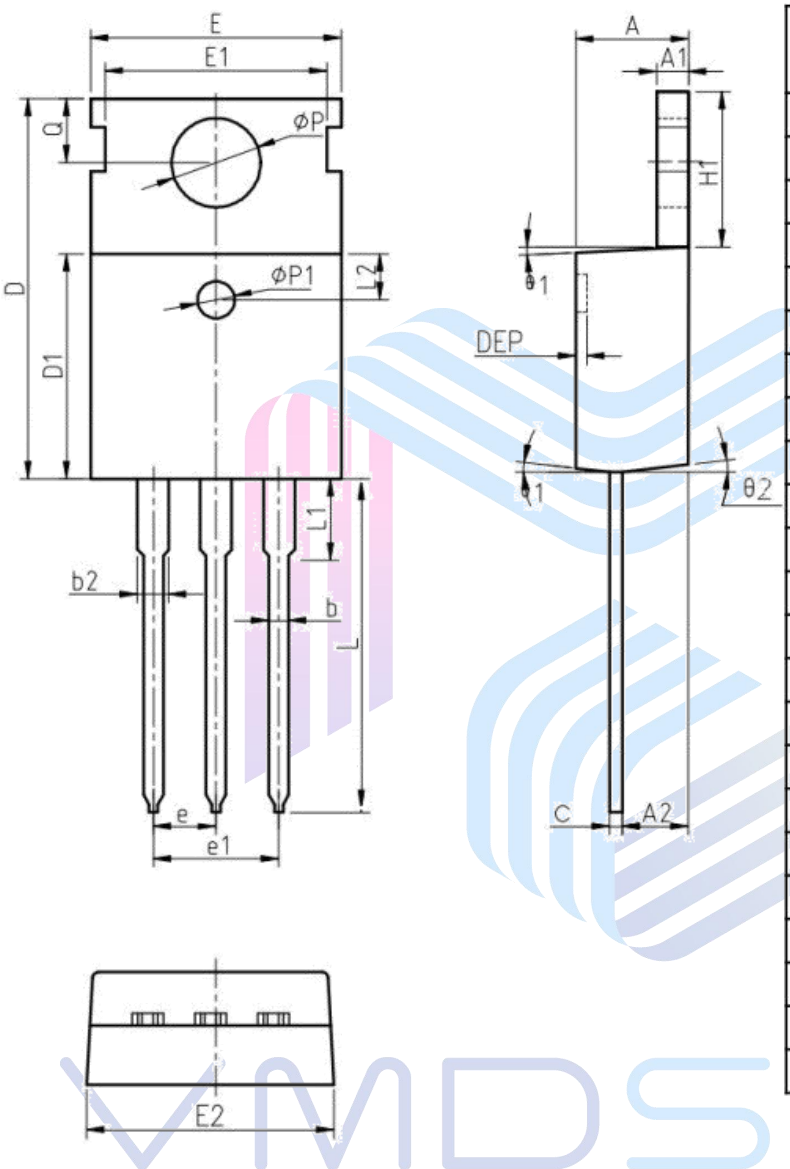


Figure 15: Normalized Maximum Transient Thermal Impedance



Mechanical Dimensions

Package Information TO-220AB



Symbol	Dimensions (unit: mm)		
	Min	Typ	Max
A	4.30	4.52	4.70
A1	1.15	1.30	1.40
A2	2.20	2.40	2.60
b	0.70	0.80	1.00
b2	1.17	1.32	1.50
c	0.45	0.50	0.61
D	15.30	15.65	15.90
D1	9.00	9.20	9.40
DEP	0.05	0.10	0.25
E	9.66	9.90	10.28
E1	-	8.70	-
E2	9.80	10.00	10.20
ΦP1	1.40	1.50	1.60
e	2.54 BSC		
e1	5.08 BSC		
H1	6.40	6.50	6.80
L	12.70	-	14.27
L1	-	-	3.95
L2	2.40	2.50	2.60
ΦP	3.53	3.60	3.70
Q	2.70	2.80	2.90
θ1	5 °	7 °	9 °
θ2	1 °	3 °	5 °

Notes:

1. Refer to JEDEC TO-220 variation AB
2. Dimension "D" and "E" do NOT include mold flash. Mold flash shall not exceed 0.127mm per side.

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