VFTV010R020NB

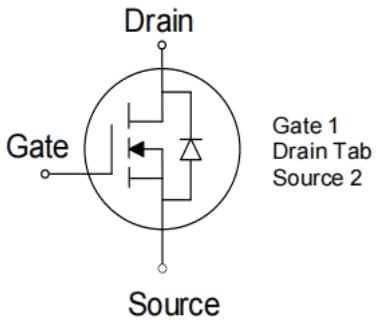
Datasheet

2mΩ, 100V, N-Channel Power MOSFET VFTV010R020NB

Description

$V_{(BR)DSS}$	$R_{DS(ON)\_max}$	I_D
100V	2mΩ@10V	283A

Symbol

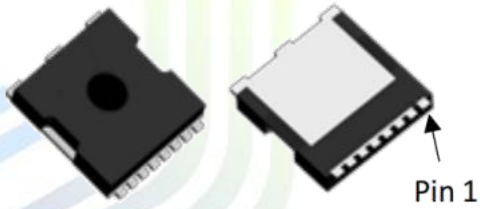


Symbol of VFTV010R020NB

Features

- Low $R_{DS(ON)}$
- RoHS compliant Note 1
- Halogen-free Note 1
- 100% UIS tested
- Wettable Flank for Improved Optical Inspection

Package Type



Package Type of VFTV010R020NB

Application

- Battery Management System
- DC-DC Converter

Ordering Information

Product Name	Package
VFTV010R020NB	TOLL

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

Parameter	Symbol	Value	Units
Drain-Source Voltage	V_{DS}	100	V
Drain Current - Continuous (T_C = 25°C) Note 1	I_D	283	A
Drain Current - Continuous (T_C = 100°C)		179	A
Drain Current - Pulsed Note 2	I_{DM}	1132	A
Gate-Source Voltage	V_{GS}	± 20	V
Single Pulsed Avalanche Energy Note 3	E_{AS}	702	mJ
Power Dissipation (TC = 25°C)	P_D	312.5	W
Operating and Storage Temperature Range	T_J,T_{STG}	-55 to +150	°C

Thermal Resistance

Parameter	Symbol	Value	Units
Thermal Resistance, Junction-to-Case, Steady-State	$R_{\theta JC}$	0.4	°C/W
Thermal Resistance, Junction-to-Ambient, Steady State Note 4	$R_{\theta JA}$	50	°C/W

Notes:

1. The max drain current rating is silicon limited
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. L = 0.5 mH, V_{DD} = 50 V, I_{AS} = 53 A, R_g = 50Ω, Starting T_J= 25°C
4. Mount on minimum PCB layout

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 uA	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100 V, V_{GS}=0V	-	-	1	uA
Gate Leakage Current	I_{GSS}	V_{GS} = ± 20 V, V_{DS} = 0 V	-	-	±100	nA
Gate Threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 uA	2	2.9	4	V
Drain-Source on-state resistance	$R_{DS(ON)}$	V_{GS} = 10 V, I_D = 20 A	-	1.5	2	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz	-	9325	-	pF
Output Capacitance	C_{oss}		-	3065	-	pF
Reverse Transfer Capacitance	C_{rss}		-	105	-	pF
Gate Resistance	R_g	f = 1 MHz	-	1.8	-	Ω
Switching Characteristics						
Turn On Delay Time	$T_{D(on)}$	V_{DD} = 50V , R_L = 1Ω, V_{GS} = 10V, R_G = 2.2 Ω	-	33	-	ns
Rise Time	t_r		-	60	-	ns
Turn Off Delay Time	$t_{D(off)}$		-	70	-	ns
Fall Time	T_f		-	55	-	ns
Total Gate Charge	Q_g	V_{DD} = 50 V , I_D = 50 A, V_{GS} = 10 V	-	147	-	nC
Gate-Source Charge	Q_{gs}		-	42	-	nC
Gate-Drain Charge	Q_{gd}		-	39	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Body-Diode Forward Current	I_S		-	-	283	A
Maximum Pulsed Body-Diode Forward Current Note1	I_{SM}		-	-	1132	A
Diode Forward Voltage	V_{SD}	V_{GS} = 0 V,I_S= 1 A	-	0.66	-	V
Reverse recovery time	t_{rr}	V_{DD} = 50 V, I_D = 50 A, di/dt = 100 A/μS	-	85	-	ns
Reverse recovery charge	Q_{rr}		-	169	-	nC
Peak Reverse Recovery Current	I_{rrm}		-	3.5	-	A

Electrical Characteristics Diagrams

Figure 1: On-Region Characteristics

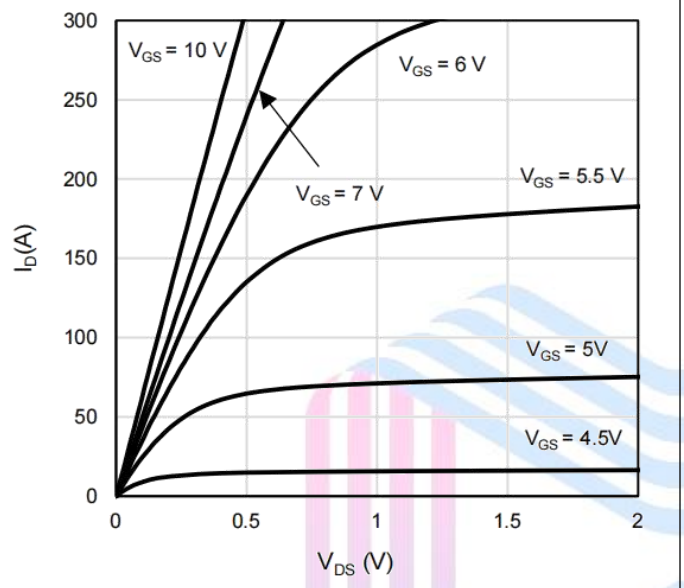


Figure 2: Transfer Characteristics

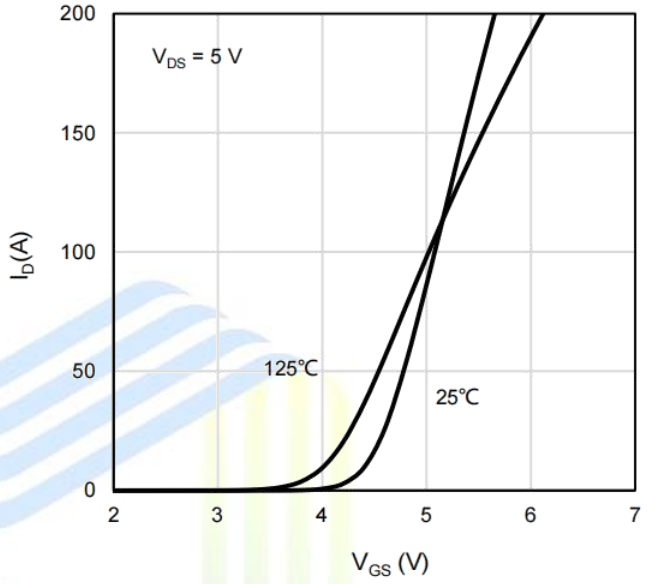


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

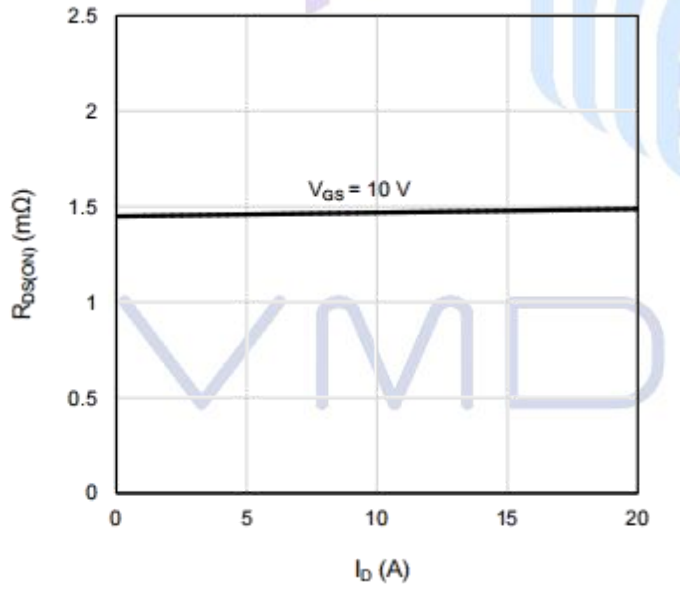


Figure 4:On-Resistance vs. Junction Temperature

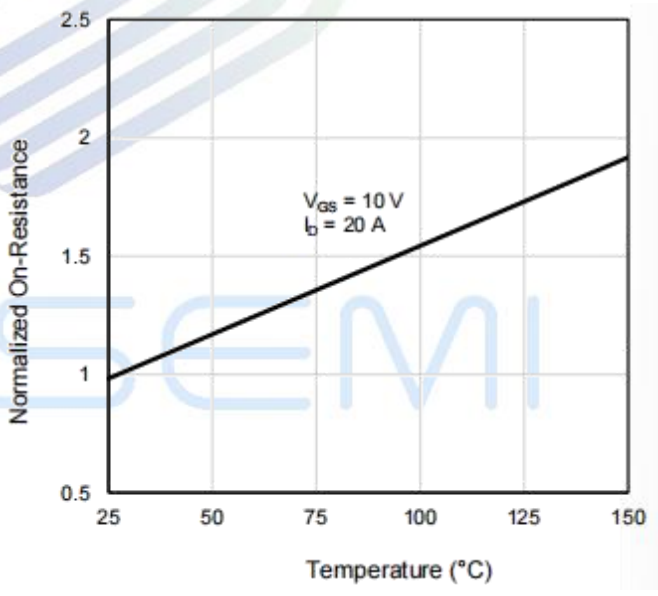


Figure 5: Breakdown Voltage vs. Junction Temperature

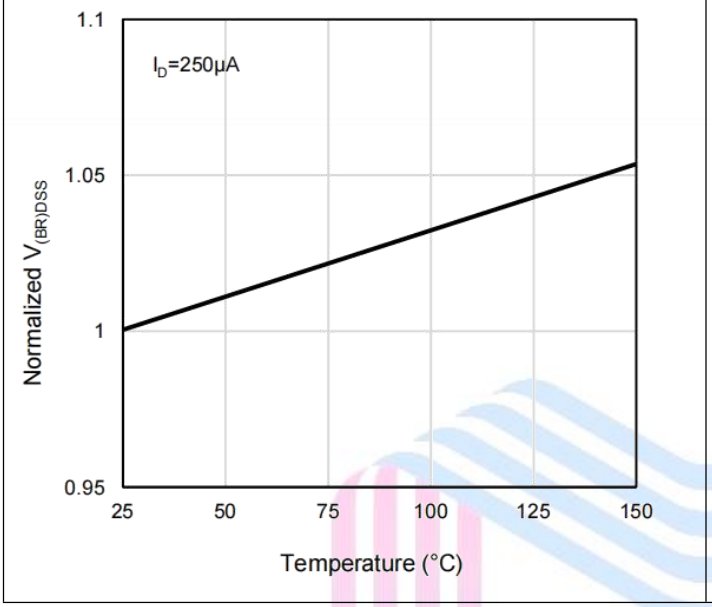


Figure 6: Threshold Voltage vs. Junction Temperature

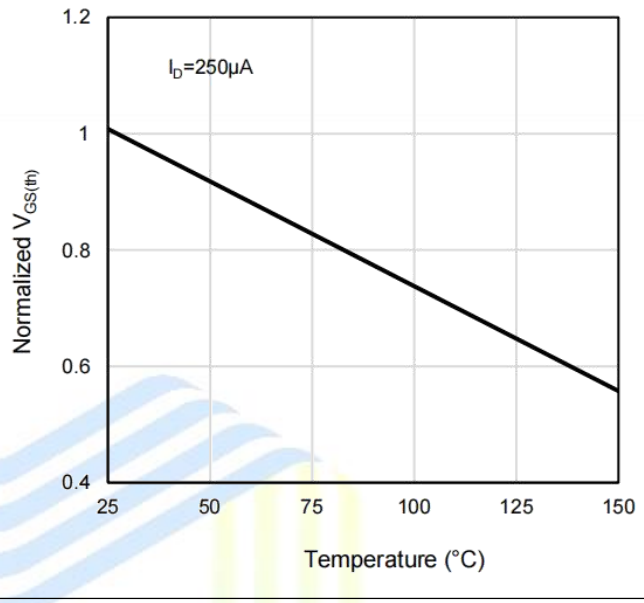


Figure 7: Body-Diode Characteristics

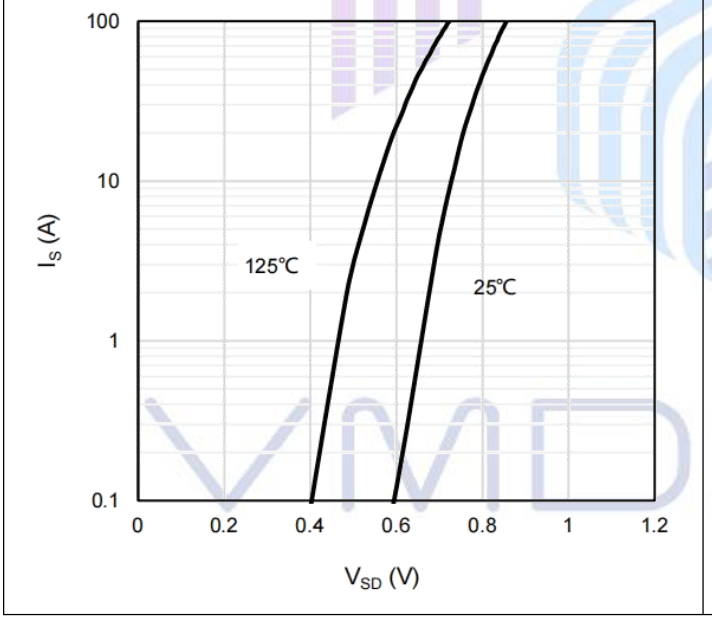


Figure 8:On-Resistance vs. Gate-Source Voltage

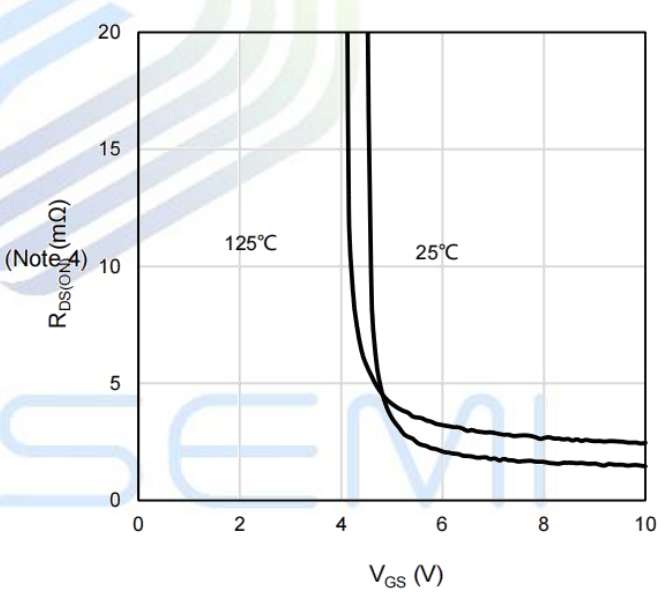


Figure 9: Capacitance Characteristics

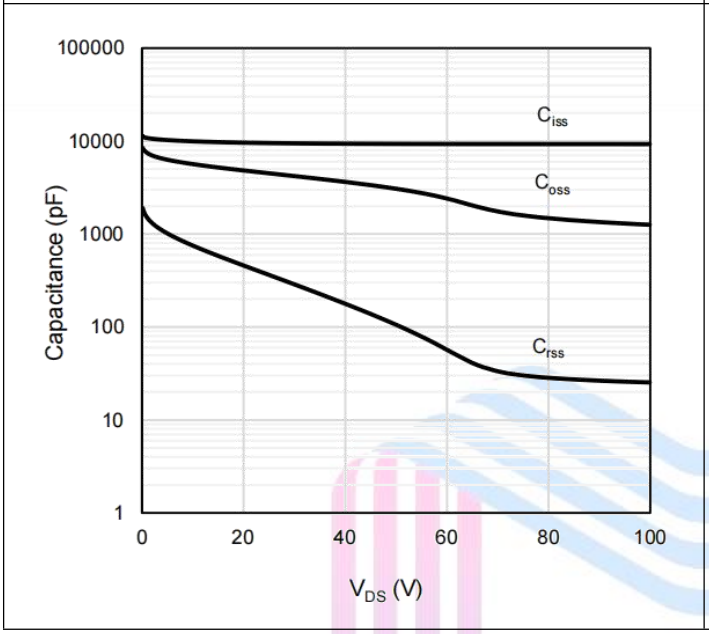


Figure 10: Gate-Charge Characteristics

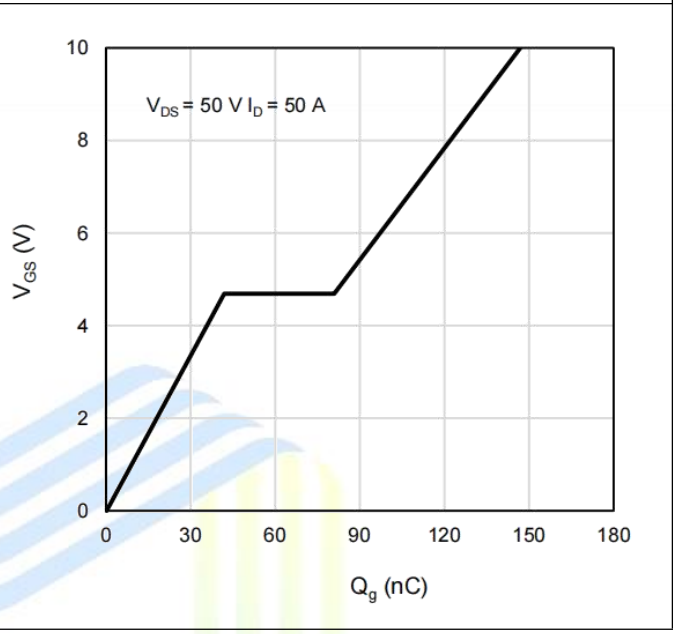


Figure 11: Power De-rating

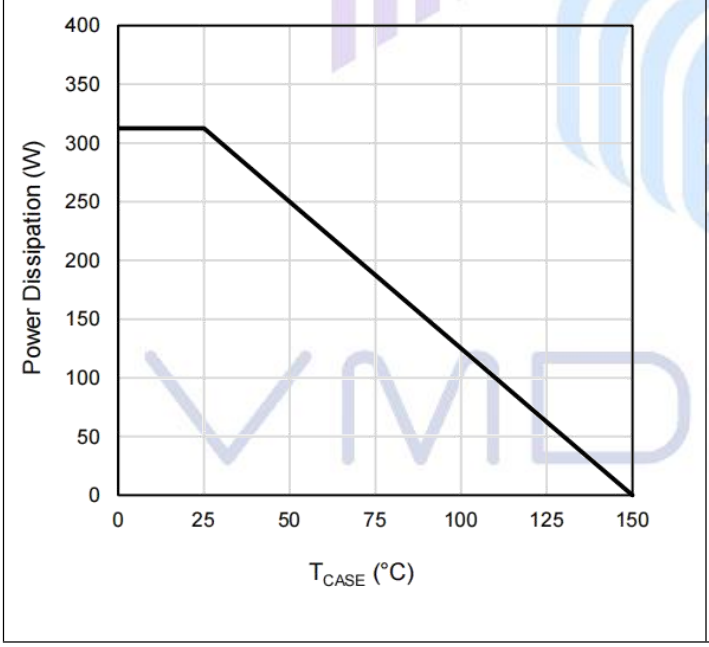


Figure 12: Current De-rating

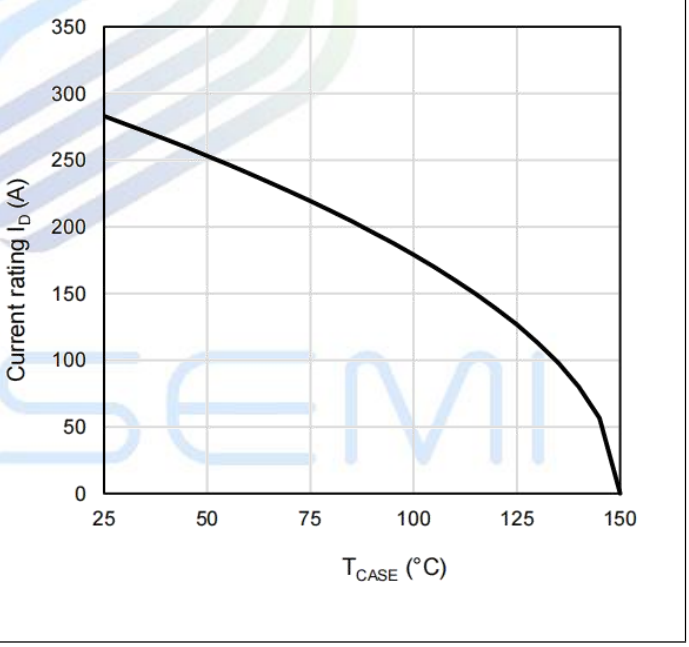


Figure 13: Normalized Maximum TransientThermal Impedance

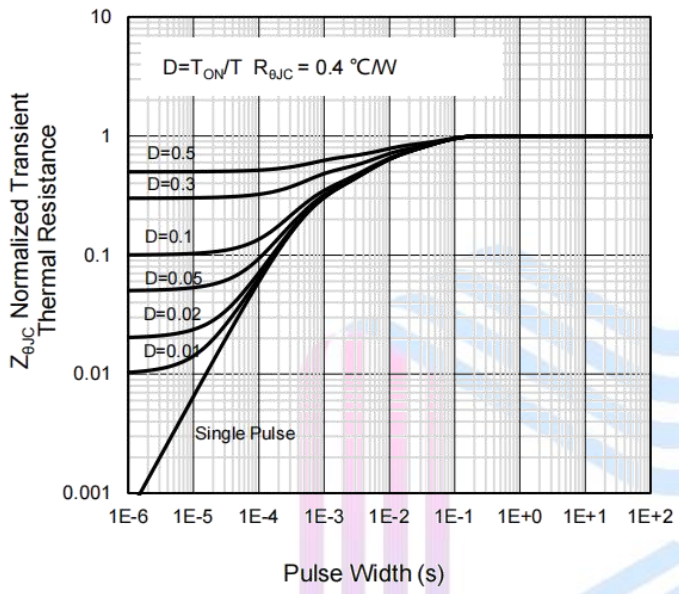
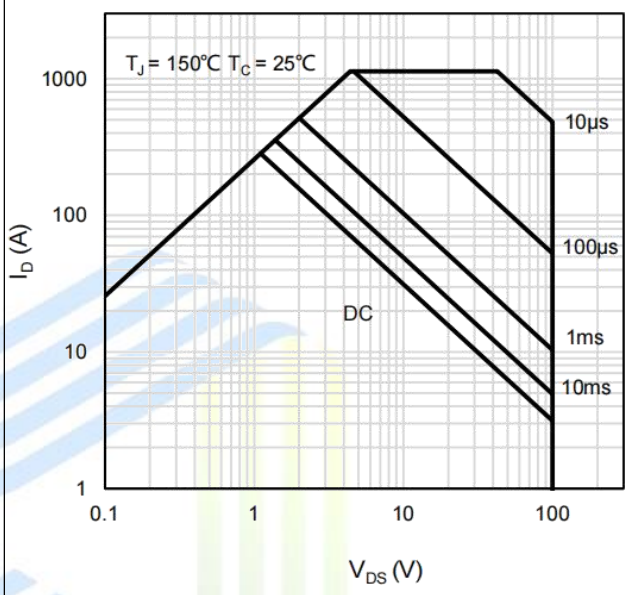
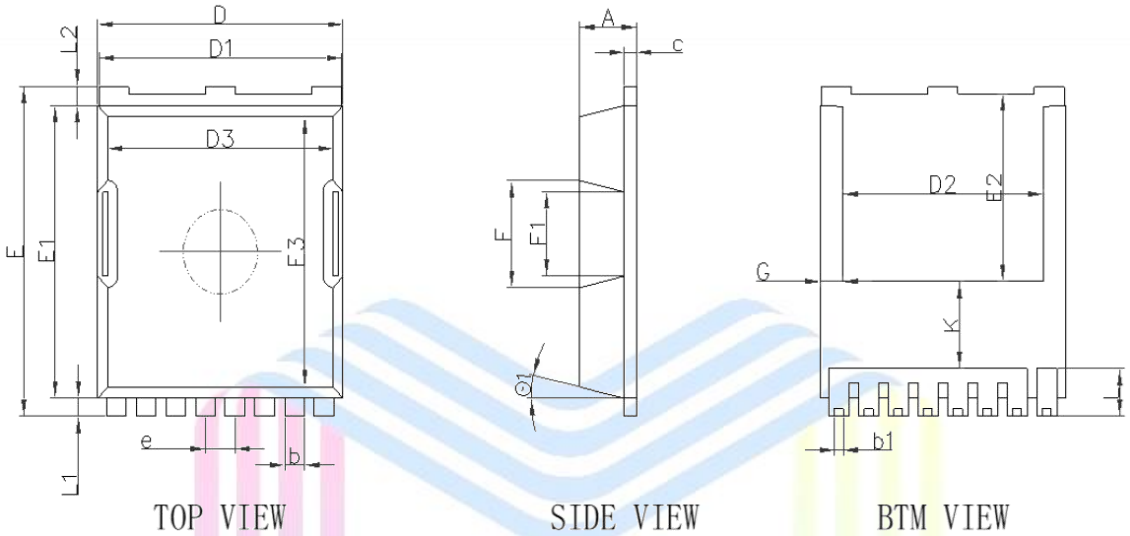


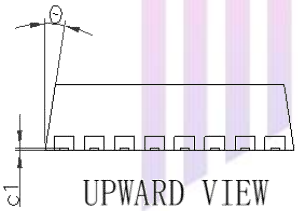
Figure 14: Maximum Forward Biased Safe Operating Area



Mechanical Dimensions

TOLL Package Information





SYMBOL	MIN	NOM	MAX
A	2.20	2.30	2.40
b	0.75	0.80	0.85
b1	0.30	0.35	0.40
c	0.45	0.50	0.55
c1	0.05	0.10	0.15
D	9.80	9.90	10.00
D1	9.70	9.80	9.90
D2	8.00	8.10	8.30
D3	9.10 TYP.		
e	1.20 BSC		
E	11.60	11.70	11.80
E1	10.30	10.40	10.50
E2	6.55	6.65	6.75
E3	9.60 TYP.		
F	3.80 TYP.		
F1	3.00 TYP.		
G	0.80	0.90	1.00
K	3.00	3.10	3.20
L	1.59	1.69	1.79
L1	0.54	0.64	0.74
L2	0.56	0.66	0.76
θ	8°	10°	12°
θ1	10°	12°	14°

(UNITS OF MEASURE = MILLIMETER)

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