



VMDSEMI

**VSTD065R38ANA**

**Datasheet**

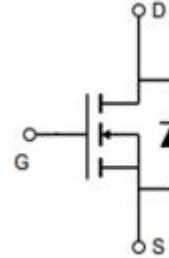


VMDSEMI

## General Description

$V_{(BR)DSS}$	$R_{DS(ON)_{max}}$	$I_D$
650V	380mΩ@10V	11A

## Symbol



Symbol of VSTD065R38ANA

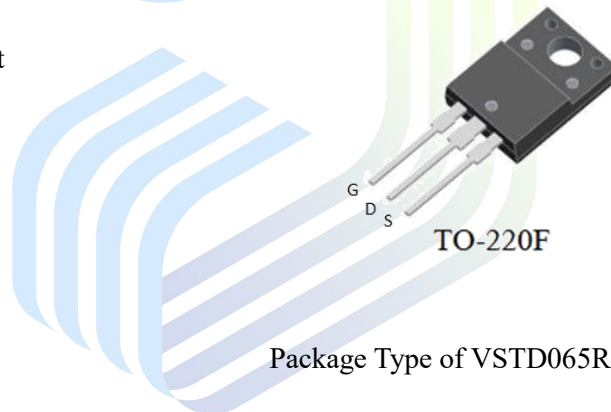
## Features

- Extremely low switching loss
- Excellent stability and uniformity
- RoHS and Halogen-Free Compliant

## Application

- PC power
- LED lighting
- Telecom power
- Server power
- Solar/UPS

## Package Type



Package Type of VSTD065R38ANA

## Ordering Information

Product Name	Package	Marking
VSTD065R38ANA	TO-220F	STD065R38ANA

## Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	650	V
Gate-Source Voltage	$V_{GS}$	±30	V
Continuous Drain Current <sup>Note 1</sup> , $T_C=25^{\circ}C$	$I_D$	11	A
Pulsed Drain Current <sup>Note 2</sup> , $T_C=25^{\circ}C$	$I_{D, pulse}$	33	A
Continuous Diode Forward Current <sup>Note 1</sup> , $T_C=25^{\circ}C$	$I_S$	11	A
Diode Pulsed Current <sup>Note 2</sup> , $T_C=25^{\circ}C$	$I_{S, pulse}$	33	A
Max Power Dissipation <sup>Note 3</sup> , $T_C=25^{\circ}C$	$P_D$	79	W
Avalanche Current, Single Pulse <sup>Note 4</sup>	$I_{AS}$	3.4	A
Avalanche Energy, Single Pulse <sup>Note 4</sup>	$E_{AS}$	453.4	mJ
MOSFET dv/dt ruggedness, $V_{DS}=0\sim 480V$	dv/dt	50	V/ns
Reverse diode dv/dt, $V_{DS}=0\sim 480V$ , $I_{SD}\leq I_D$	dv/dt	15	V/ns
Operation and storage temperature	$T_J, T_{STG}$	-55 to 150	$^{\circ}C$

## Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$		1.59		$^{\circ}C/W$
Thermal Resistance, Junction-to-Ambient <sup>Note 5</sup>	$R_{\theta JA}$		62		

## Notes:

Note1: Calculated continuous current based on maximum allowable junction temperature.

Note2: Pulse width limited by safe operating area.

Note3: Based on max. junction temperature, using junction-case thermal resistance.

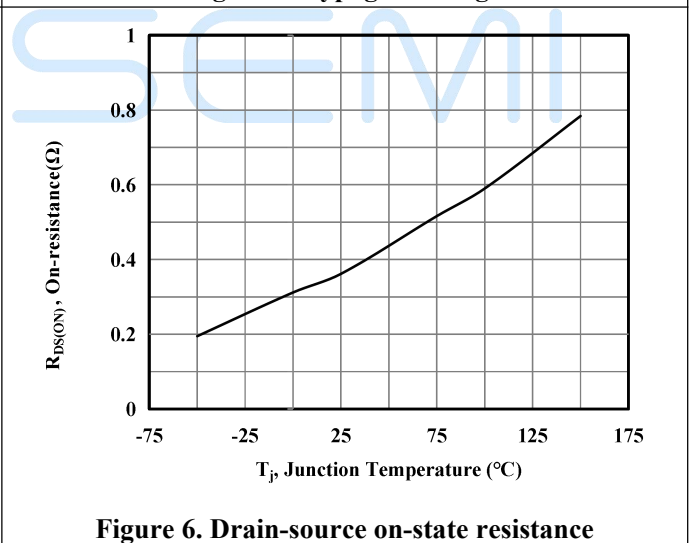
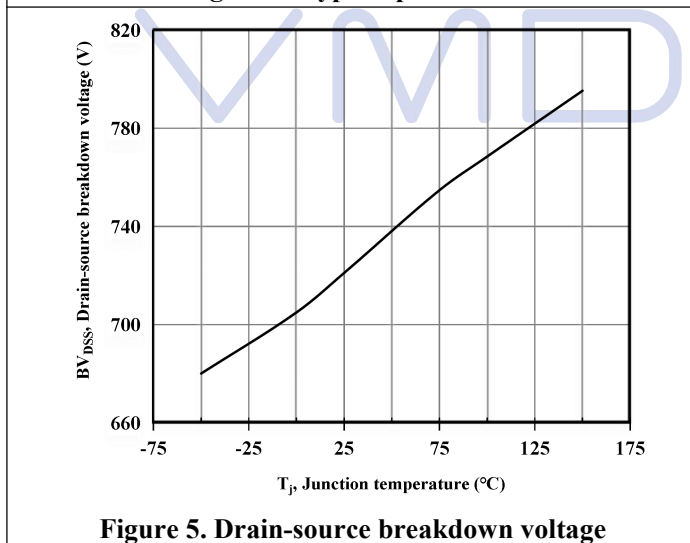
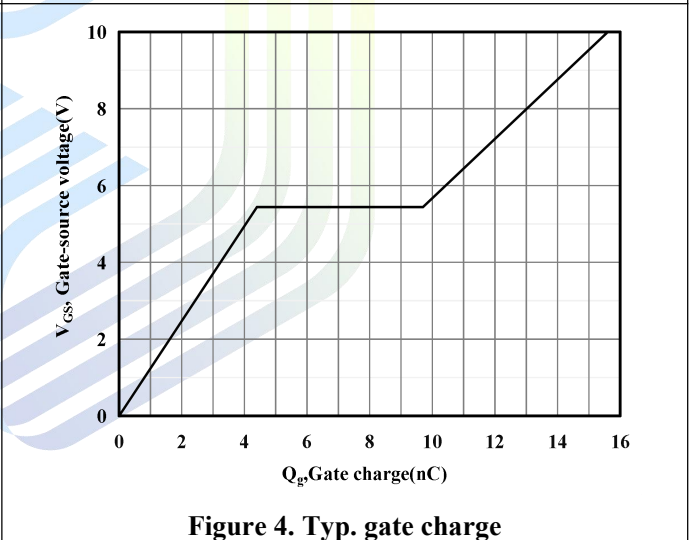
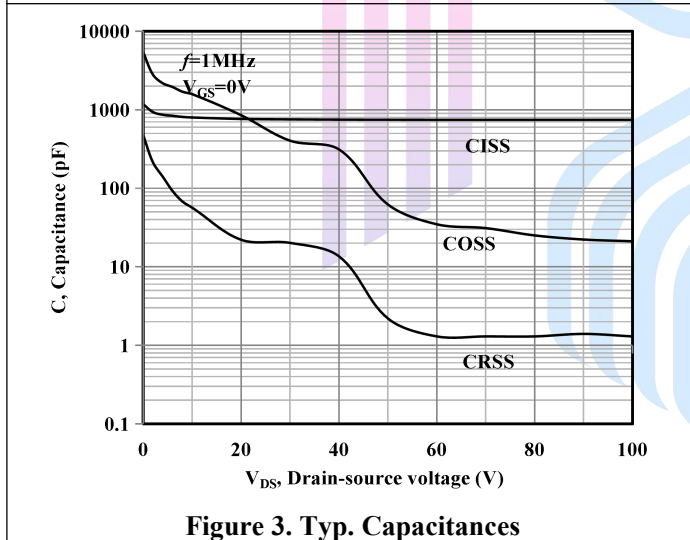
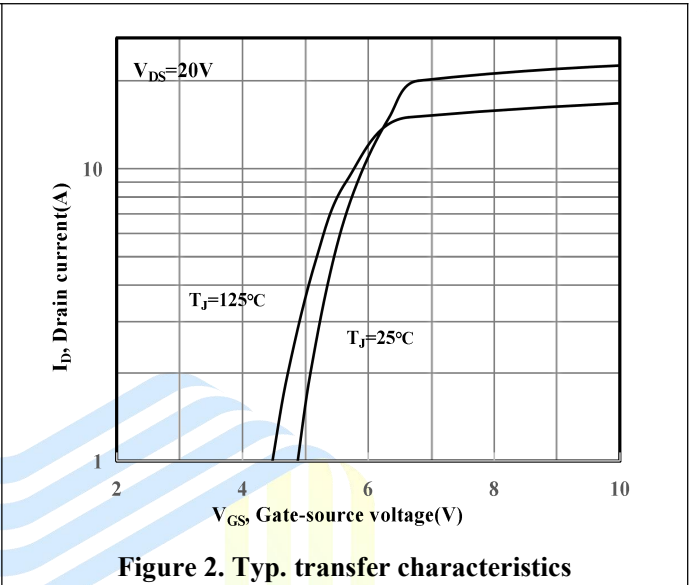
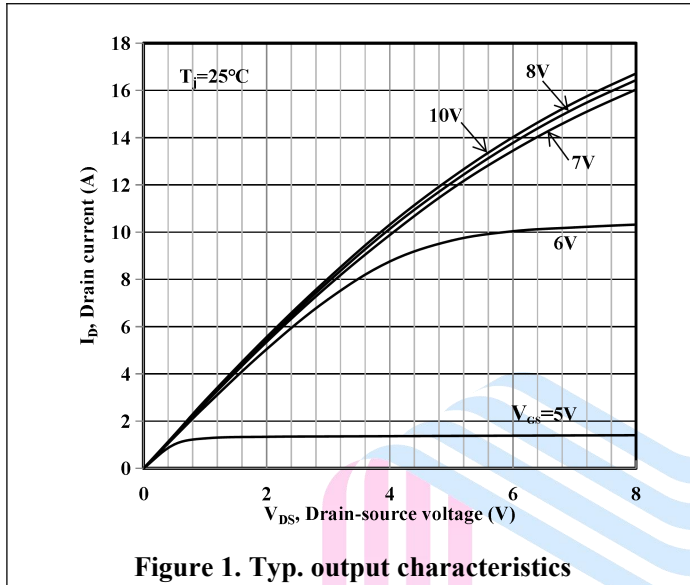
Note4:  $V_{DD}=100V, V_{GS}=10V, L=80mH$ , starting  $T_A=25^{\circ}C$ .

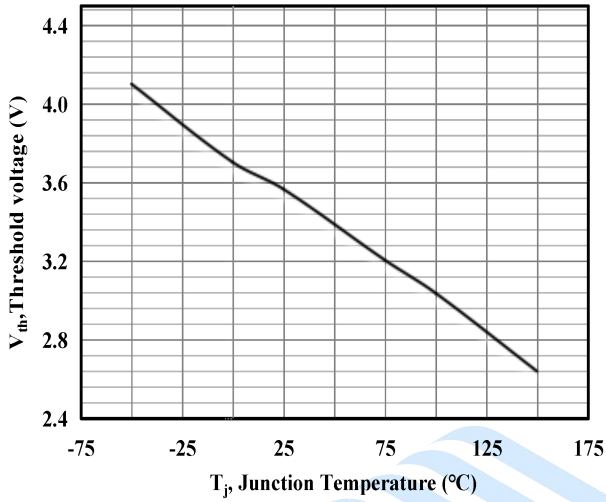
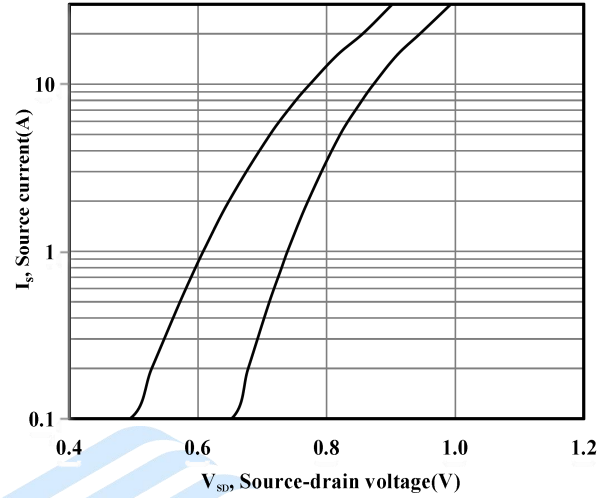
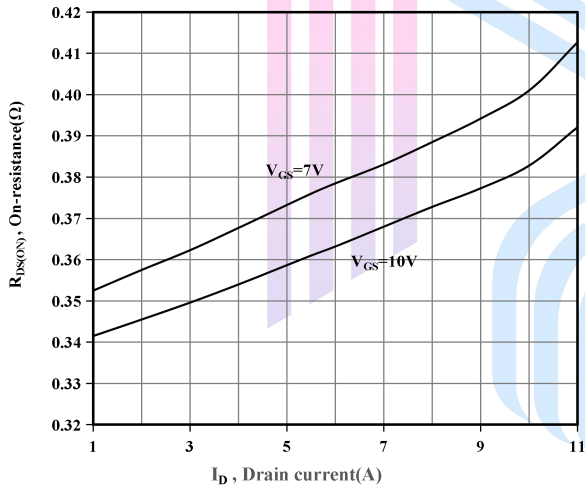
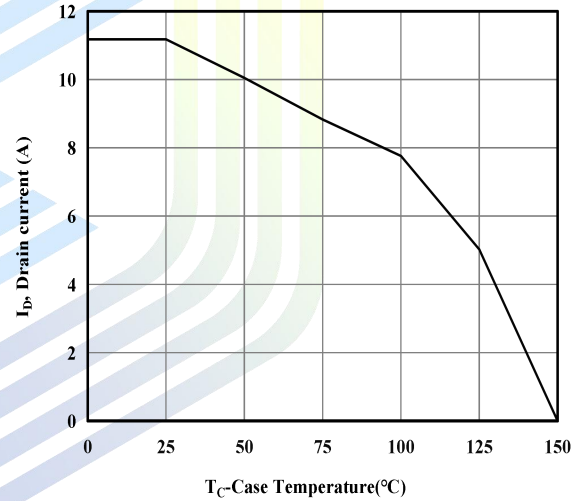
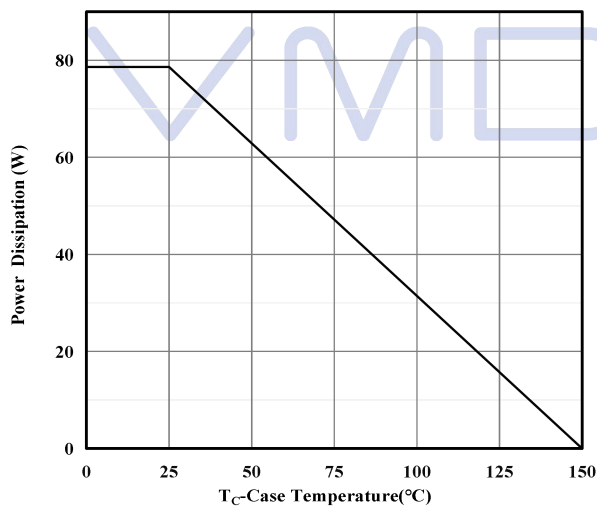
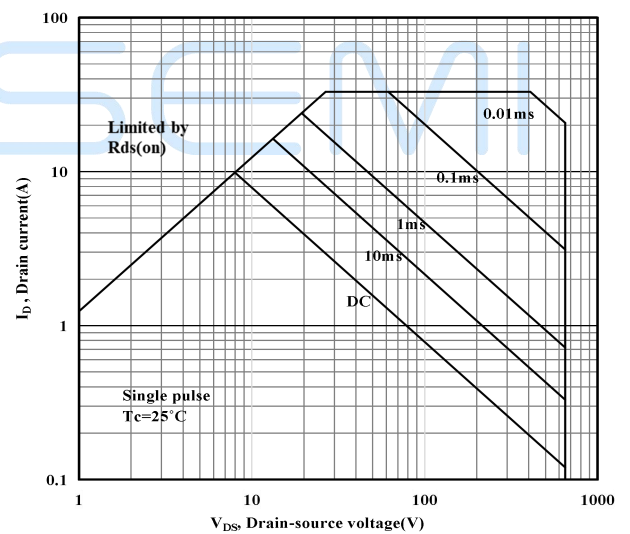
Note5: When mounted on 1 inch square copper board,  $t\leq 10sec$ . The value in any given application depends on the user's specific board design.

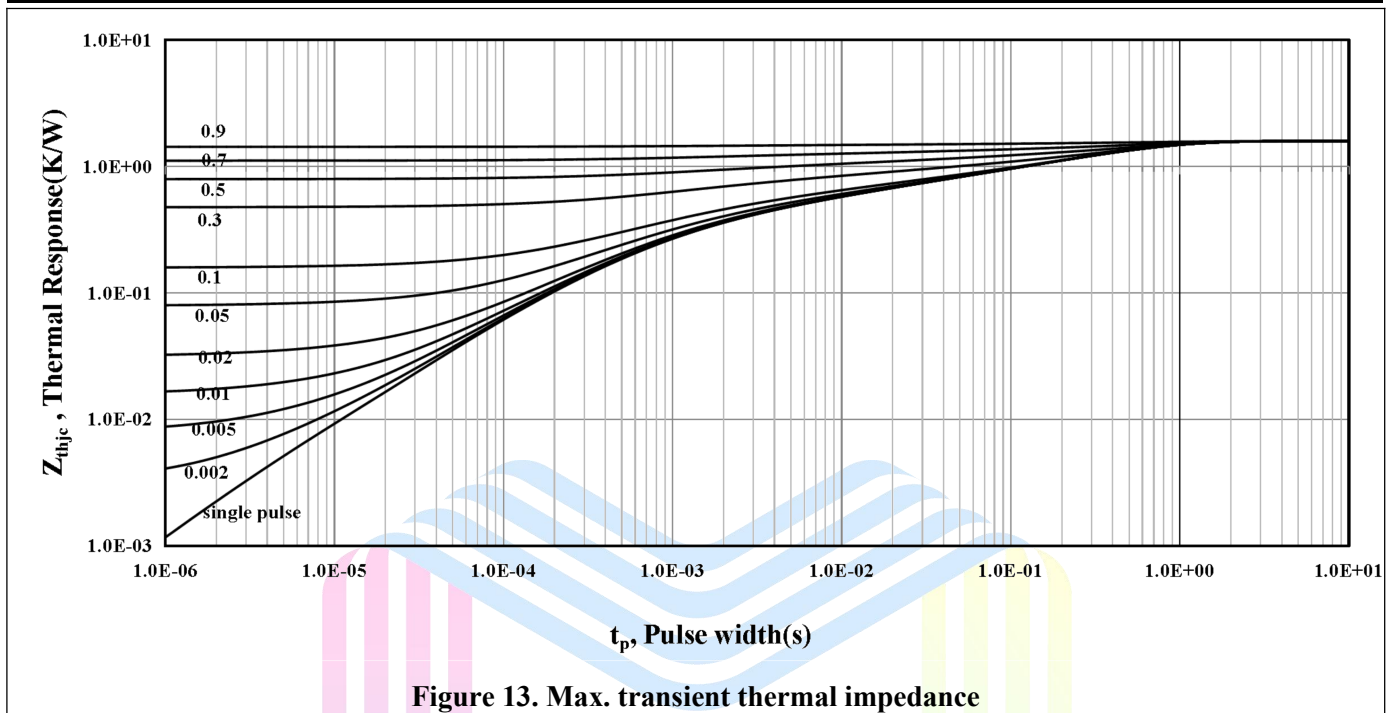
**Electrical Characteristics**( $T_A=25\text{ }^\circ\text{C}$ , unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Statistic Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	650			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$			1	$\mu A$
Gate-Source Leakage Current	Forward	$I_{GSSF}, V_{GS}=30V, V_{DS}=0V$			100	nA
	Reverse	$I_{GSSR}, V_{GS}=-30V, V_{DS}=0V$			-100	
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.9		3.9	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=5.5A$		360	380	$m\Omega$
Gate Resistance	$R_G$	$F=1MHz, \text{Open Drain}$		5.14		$\Omega$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=50V$		746.5		pF
Output Capacitance	$C_{oss}$	$V_{GS}=0V$		62.2		pF
Reverse Transfer Capacitance	$C_{rss}$	$f=1MHz$		2.2		pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=400V$		10.7		ns
Rise Time	$t_r$	$I_D=6A$		6.6		
Turn-off Delay Time	$t_{d(off)}$	$R_G=2\Omega$		29.5		
Fall Time	$t_f$	$V_{GS}=10V$		6.1		
<b>Gate Charge Characteristics</b>						
Gate to Source Charge	$Q_{gs}$	$V_{DS}=400V$ $I_D=6A$ $V_{GS}=0 \text{ to } 10V$		4.4		nC
Gate to Drain Charge	$Q_{gd}$			5.3		
Gate Charge Total	$Q_g$			15.6		
Gate Plateau Voltage	$V_{plateau}$			5.44		V
<b>Reverse Diode Characteristics</b>						
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1A$		0.73		V
Reverse Recovery Time	$t_{rr}$	$V_R=400V$		294.5		ns
Reverse Recovery Charge	$Q_{rr}$	$I_S=6A$		2.6		$\mu C$
Peak Reverse Recovery Current	$I_{rrm}$	$di/dt=100A/\mu s$		17.5		A

## Electrical Characteristics Diagrams



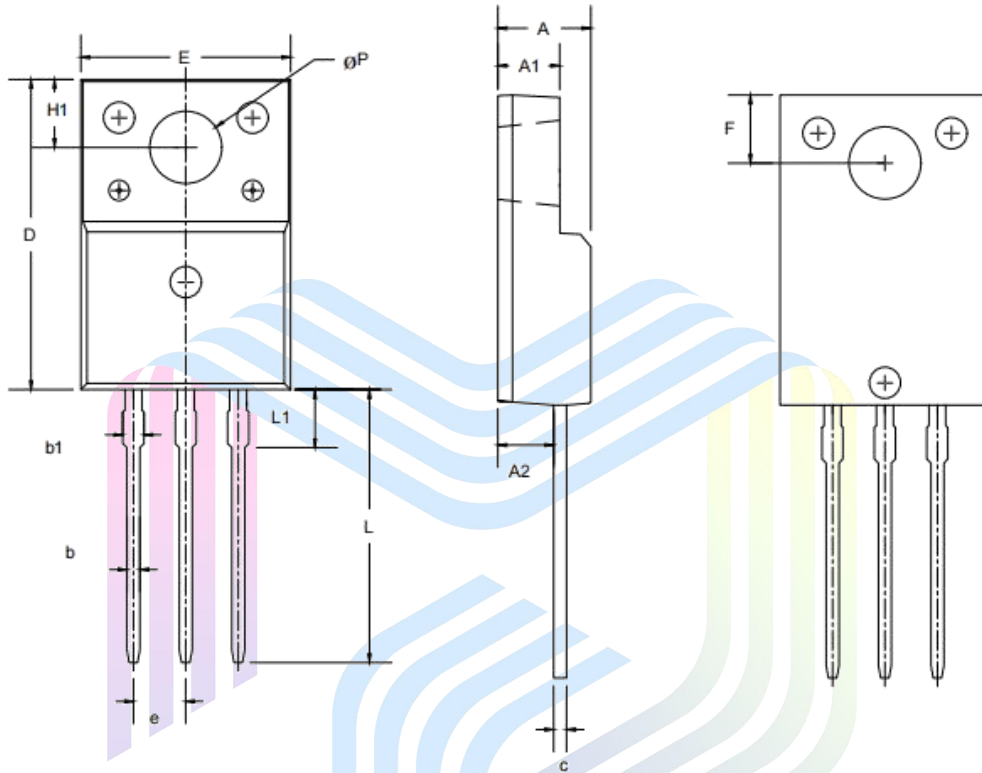

**Figure 7. Threshold voltage**

**Figure 8. Forward characteristic of body diode**

**Figure 9. Drain-source on-state resistance**

**Figure 10. Drain current Derating**

**Figure 11. Power Dissipation**

**Figure 12. Safe operation area T<sub>c</sub>=25°C**



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## Mechanical Dimensions

### TO-220F Package Information



COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	MAX
A	4.50	4.90
A1	2.30	2.80
A2	2.50	2.90
b	0.70	0.95
b1	1.08	1.55
c	0.40	0.70
D	15.00	16.17
E	9.50	10.50
e	2.54BSC	
F	2.80	3.65
H1	6.7REF	
L	12.50	13.50
L1	2.90	3.90
ΦP	2.90	3.40



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