



VMDSEMI

VUTP010R058NA

Datasheet



VMDSEMI

General Description

$V_{(BR)DSS}$	$R_{DS(ON)_{max}}$	I_D
100V	5.8mΩ@10V	200A

Symbol

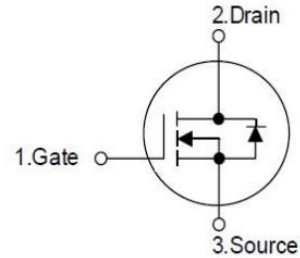


Figure 1 Symbol of VUTP010R058NA

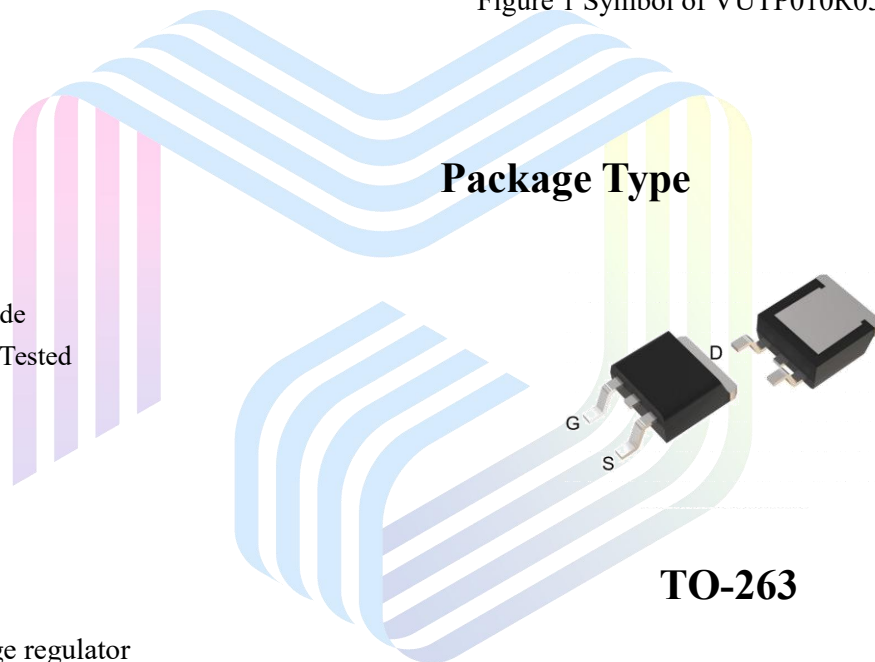
Features

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

Application

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

Package Type



TO-263

Figure 2 Package Type of VUTP010R058NA

VMDSEMI

Ordering Information

Product Name	Package
VUTP010R058NA	TO-263

Absolute Maximum Ratings ($T_A=25\text{ }^\circ\text{C}$, unless otherwise specified)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	± 25	V
Continuous Drain Current	$T_C=25^\circ\text{C}$	I_D	200	A
Continuous Drain Current	$T_C=100^\circ\text{C}$		142	
Pulsed Drain Current ^{Note 2}	$T_C=25^\circ\text{C}$	$I_{D,pulse}$	800	A
Continuous Diode Forward Current	$T_C=25^\circ\text{C}$	I_S	200	A
Continuous Drain Current	$T_A=25^\circ\text{C}$	I_{DSM}	15	A
Continuous Drain Current	$T_A=70^\circ\text{C}$		12	A
Max Power Dissipation	$T_C=25^\circ\text{C}$	P_D	375	W
Max Power Dissipation ^{Note 3}	$T_A=25^\circ\text{C}$	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	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$		0.4	0.5	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$		62.5	75	



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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Statistic Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$			1	μA
Zero Gate Voltage Drain Current $T_J=125\text{ }^\circ\text{C}$		$V_{DS}=100V, V_{GS}=0V$			100	μA
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	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.5	3.1	3.6	V
Drain-Source On-Resistance ^{Note1}	$R_{DS(ON)}$	$V_{GS}=10V, I_D=80A$		4.6	5.8	mΩ
Drain-Source On-Resistance ^{Note1} $T_J=100\text{ }^\circ\text{C}$				6.2		
Gate resistance	R_G	$f=1\text{ MHz, Open drain}$	0.2	2.3	5	Ω
Dynamic Characteristics						
Input Capacitance	C_{ISS}	$V_{DS}=30V$	10480	13970	18580	pF
Output Capacitance	C_{OSS}	$V_{GS}=0V$	495	660	880	pF
Reverse Transfer Capacitance	C_{RSS}	$f=1\text{ MHz}$	370	495	660	pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=50V$		38		ns
Rise Time	t_r	$I_D=40A$		65		
Turn-off Delay Time	$t_{d(off)}$	$R_G=3\Omega$		125		
Fall Time	t_f	$V_{GS}=10V$		53		
Gate Charge Characteristics						
Gate to Source Charge	Q_{gs}	$V_{GS}=10V$		67	89	nC
Gate to Drain Charge	Q_{gd}	$V_{DS}=50V$		63	95	
Gate Charge Total	Q_g	$I_D=40A$		238	317	
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}	$di/dt=100A/\mu s$		80	160	nC

Notes:

- Pulse width $\leq 380\mu s$; duty cycle $\leq 2\%$.
- Repetitive rating; pulse width limited by max junction temperature.
- The power dissipation P_{DSM} is based on $R_{\theta JA}$ and $@T_J = 125\text{ }^\circ\text{C}$
- Limited by T_{Jmax} , starting $T_J = 25\text{ }^\circ\text{C}$, $L = 0.5\text{ mH}$, $R_G = 25\Omega$, $I_{AS} = 60A$, $V_{GS} = 10V$.

Typical Performance Characteristics

Figure 3: Typ. Output Characteristics

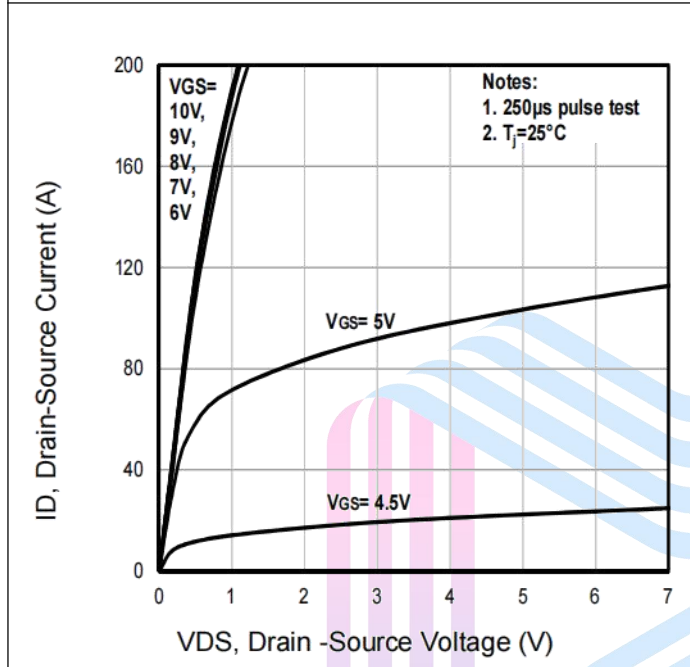


Figure 4: Typ. Gate Charge

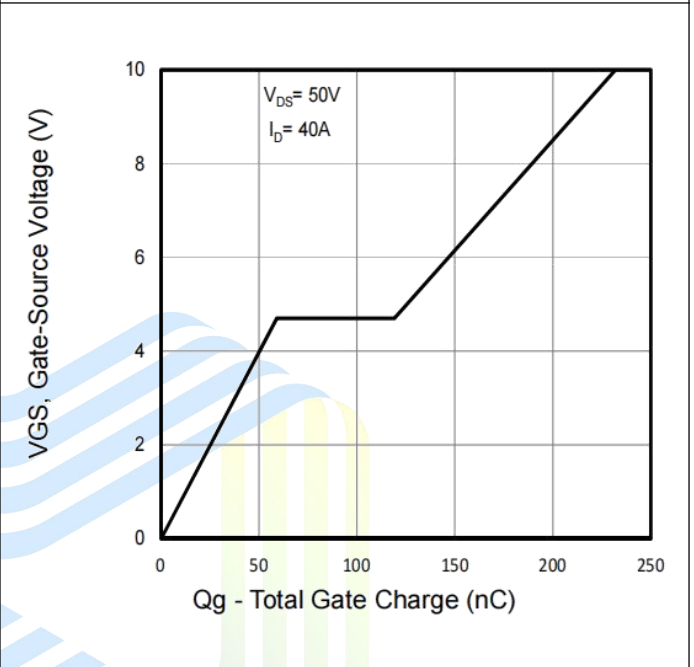


Figure 5: Normalized On-State Resistance

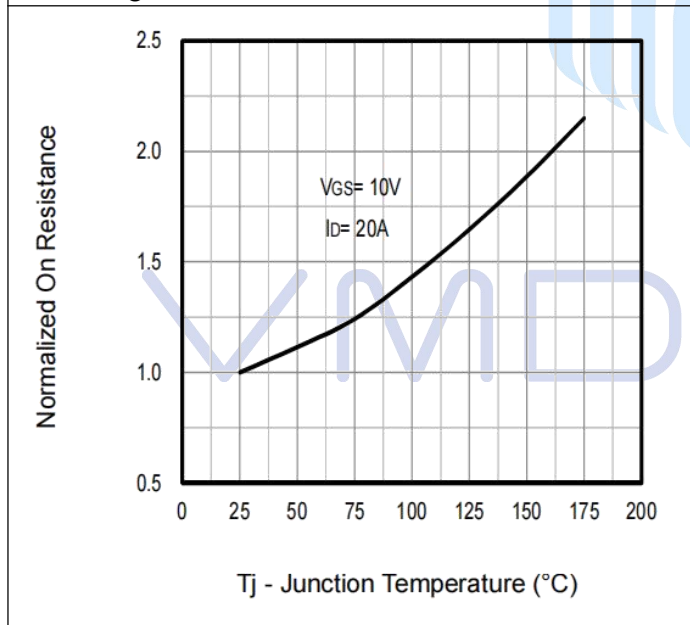


Figure 6: Typ. Transfer Characteristics

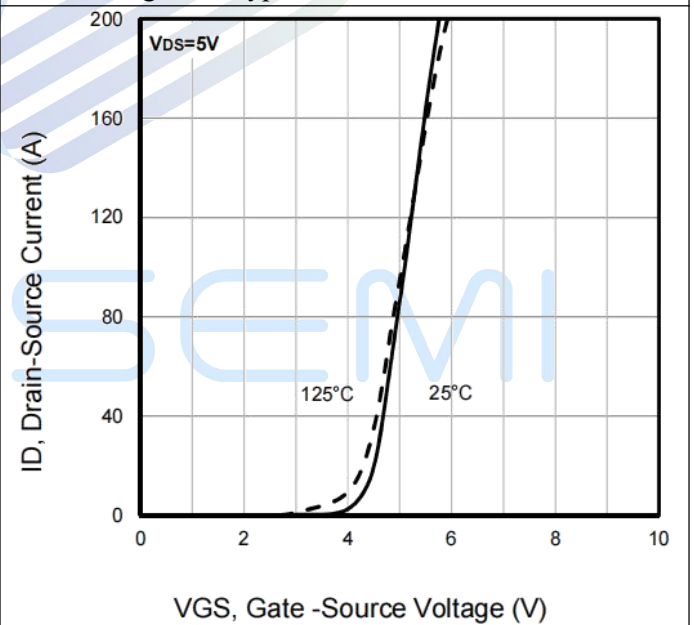


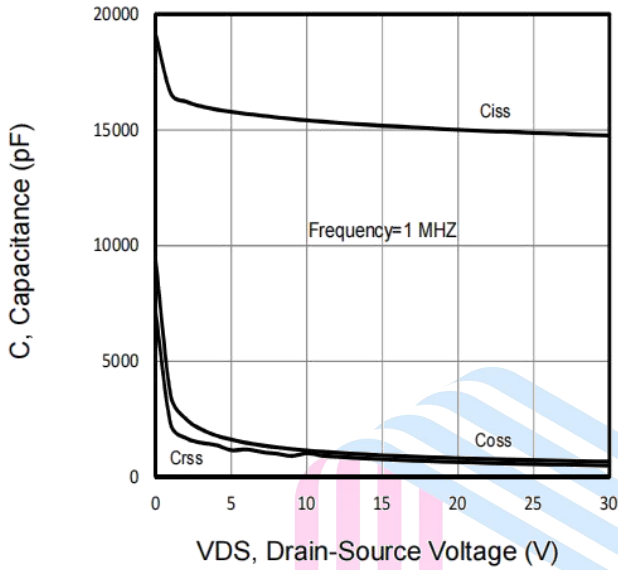
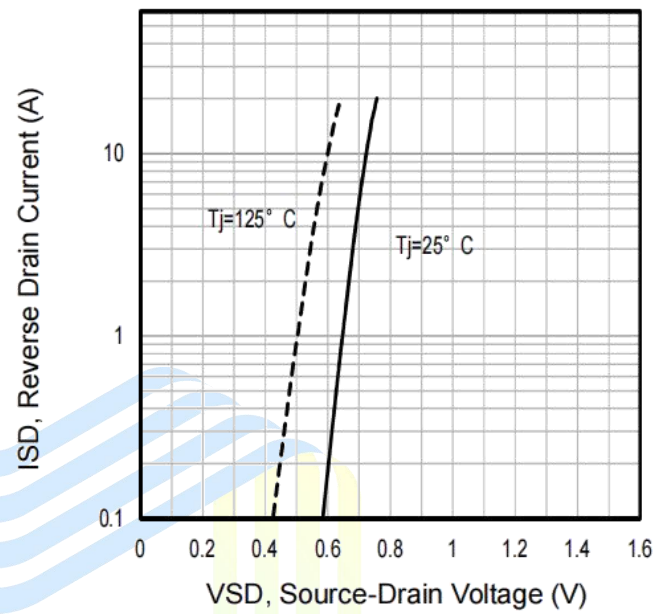
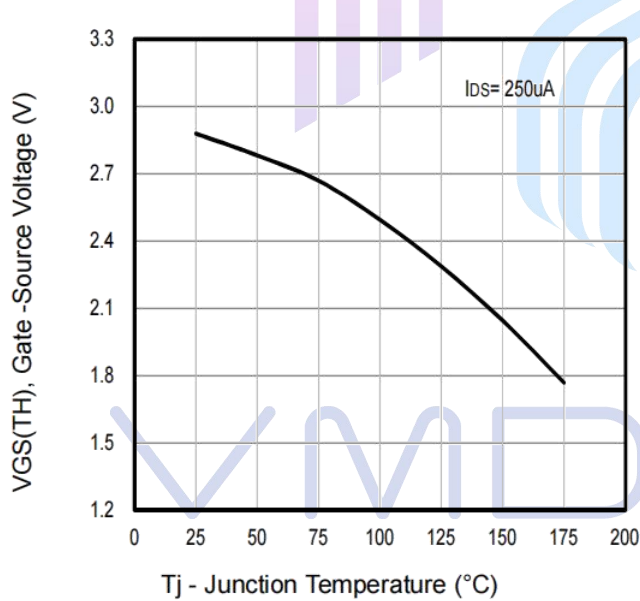
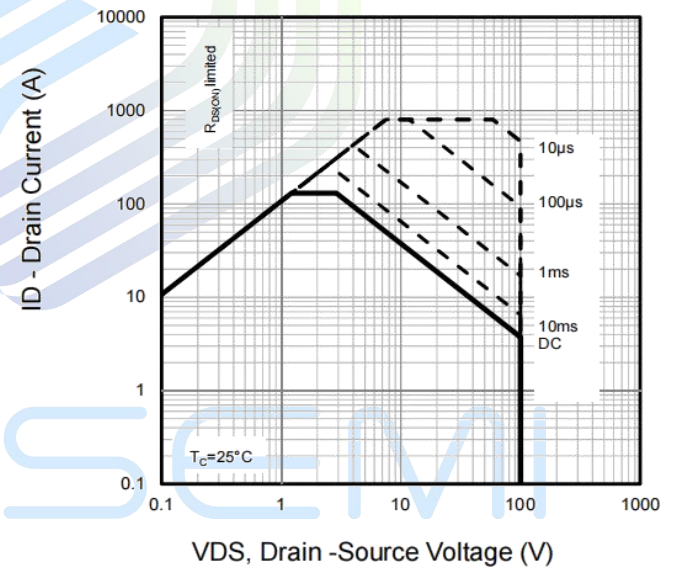
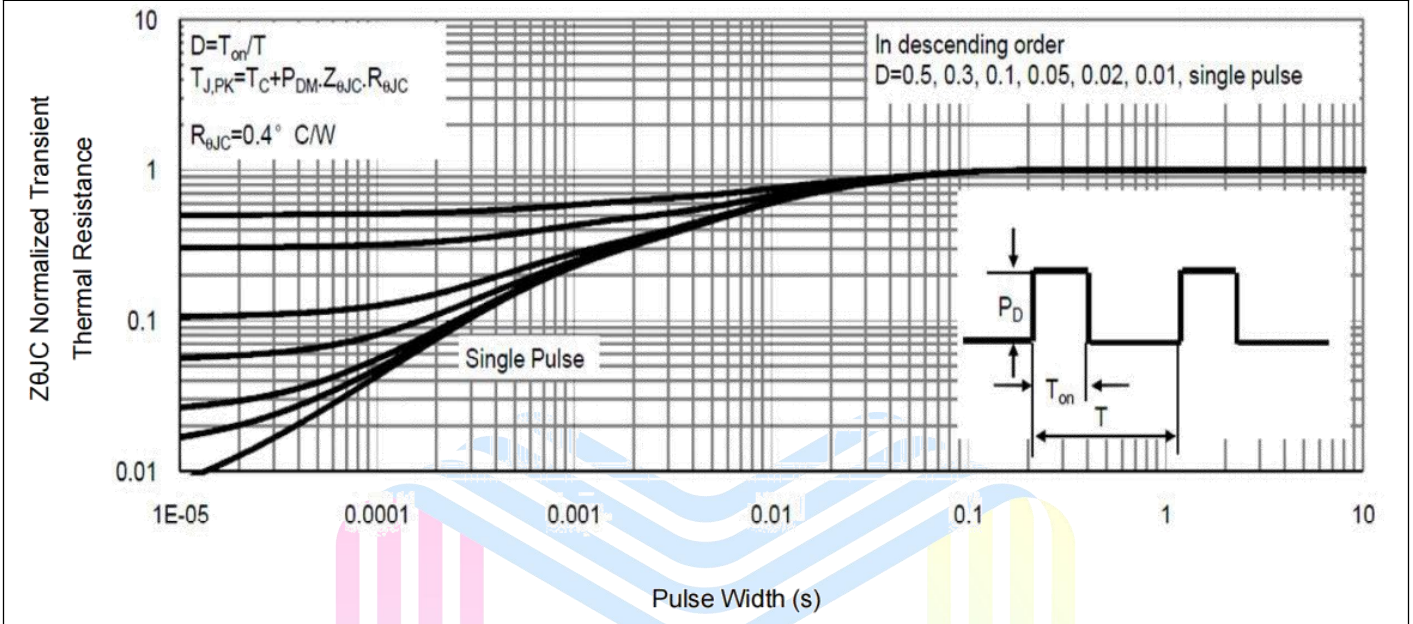
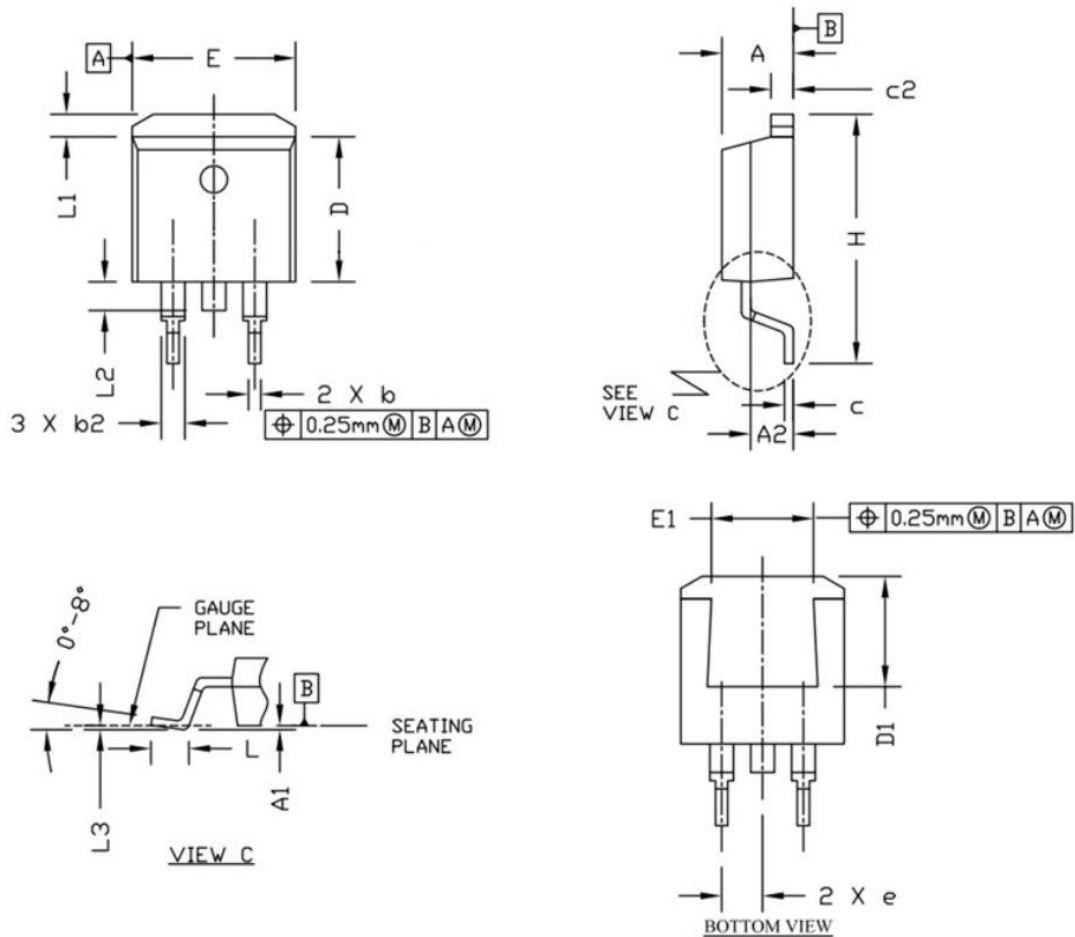
Figure 7: Typ. Capacitances

Figure 8: Forward Characteristics of Body Diode

Figure 9: Gate-Source Threshold Voltage

Figure 10: Safe Operating Area


Figure 11: Normalized Maximum Transient Thermal Impedance




Mechanical Dimensions

Package Information TO-263



Symbol	Dimensions (unit: mm)		
	Min	Typ	Max
A	4.400	4.570	4.700
A1	0.000	0.100	0.200
A2	2.300	2.400	2.500
b	0.700	0.800	0.900
b2	1.200	1.270	1.360
c	0.381	0.500	0.737
c2	1.220	1.300	1.350
D	8.600	9.200	9.300
D1	6.860		
e	2.540 BSC		
E	9.780	9.880	10.260
E1	6.225		
H	14.700	15.100	15.500
L	2.000	2.550	2.750
L1	1.000	1.200	1.400
L2	1.300	1.600	1.700
L3	0.255 BSC		

Notes:

1. Refer to JEDEC TO-263 variation AB
2. Dimension "D" & "E" do NOT include mold flash, mold flash shall not exceed 0.127mm per side.

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