

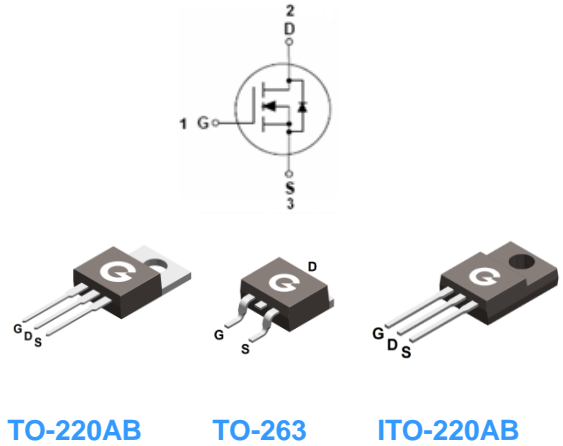
Features

- Low $R_{DS(ON)}$
- Fast switching
- Low gate charge
- Low Reverse transfer capacitances
- HBM: JESD22-A114-B: 1A
- RoHS compliant with Halogen-free

HF

Mechanical Data

- Case: TO-220AB, TO-263, ITO-220AB
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matted-Tin plated; Solderable Per MIL-STD-202, Method 208



Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
BL13N50	TO-220AB	50 pcs / Tube	13N50
BL13N50B	TO-263	50 pcs / Tube or 800 pcs / Tape & Reel	13N50B
BL13N50F	ITO-220AB	50 pcs / Tube	13N50F

Maximum Ratings (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	500	V
Gate-to-Source Voltage	V_{GSS}	± 30	V
Continuous Drain Current ($T_C = 25^\circ\text{C}$)	I_D	13	A
Continuous Drain Current ($T_C = 100^\circ\text{C}$)		8.2	A
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_C = 25^\circ\text{C}$)	I_{DM}	52	A
Single Pulse Avalanche Energy ²	E_{AS}	800	mJ
Power Dissipation (TO-220AB, $T_C = 25^\circ\text{C}$)	P_D	125	W
Power Dissipation (TO-263, $T_C = 25^\circ\text{C}$)		125	W
Power Dissipation (ITO-220AB, $T_C = 25^\circ\text{C}$)		46	W
Operating Junction Temperature Range	T_J	-55 ~ +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 ~ +150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case (TO-220AB, TO-263)	R _{θJC}	-	0.9	1.0	°C/W
Thermal Resistance Junction-to-Case (ITO-220AB)		-	-	2.7	°C/W
Thermal Resistance Junction-to-Air (TO-220AB, TO-263)	R _{θJA}	-	-	50	°C/W
Thermal Resistance Junction-to-Air (ITO-220AB)		-	-	62.5	°C/W

Electrical Characteristics (@ T_A = 25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	500	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 500V, V _{GS} = 0V	-	-	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±30V, V _{DS} = 0V	-	-	±100	nA
On Characteristics						
R _{DS(ON)}	Drain-Source On-resistance *1	V _{GS} = 10V, I _D = 6.5A	-	0.4	0.5	Ω
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2	3	4	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	3	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V V _{DS} = 25V f = 1MHz	-	1990	-	pF
C _{OSS}	Output Capacitance		-	185	-	
C _{RSS}	Reverse Transfer Capacitance		-	1.8	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time	V _{DD} = 250V V _{GS} = 15V I _D = 13A R _G = 3.3Ω	-	20	-	ns
t _r	Turn-on Rise Time		-	39	-	
t _{d(OFF)}	Turn-Off Delay Time		-	48	-	
t _f	Turn-Off Fall Time		-	21	-	
Q _G	Total Gate-Charge	V _{DD} = 400V V _{GS} = 10V I _D = 13A	-	37.1	-	nC
Q _{GS}	Gate to Source Charge		-	9.5	-	
Q _{GD}	Gate to Drain (Miller) Charge		-	13.4	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *1	I _{SD} = 13A, V _{GS} = 0V	-	0.9	1.5	V
t _{rr}	Reverse Recovery Time	I _{SD} = 13A, V _R = 400V	-	360	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μs	-	4.1	-	μC

Notes:

- The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%
- The E_{AS} data shows Max. rating. The test condition is V_{DD} = 100V, V_{GS} = 15V, L = 50mH

Ratings and Characteristics Curves (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

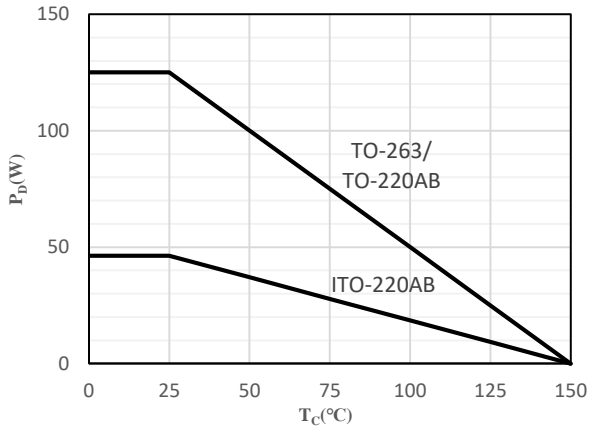


Fig 1 Power Dissipation

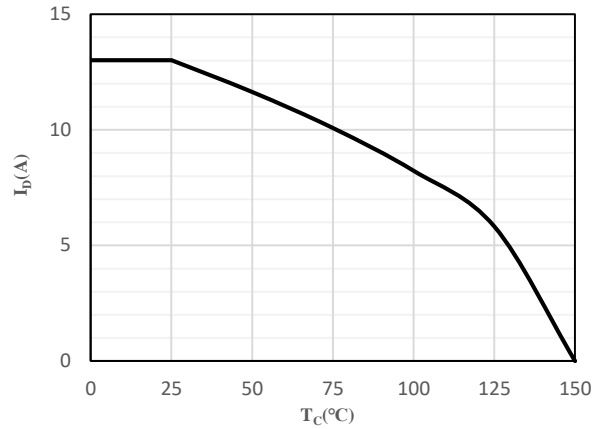


Fig 2 Drain Current

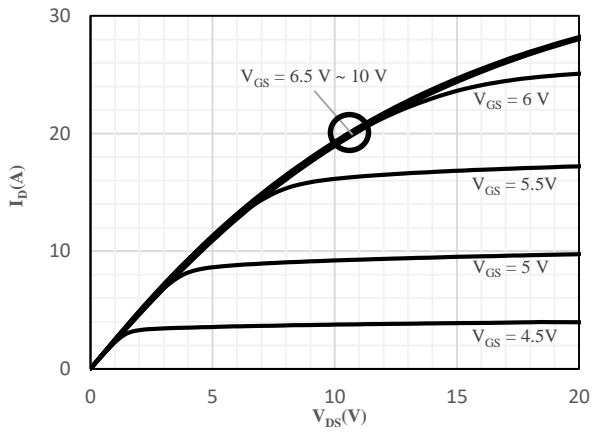


Fig 3 Typical Output Characteristics

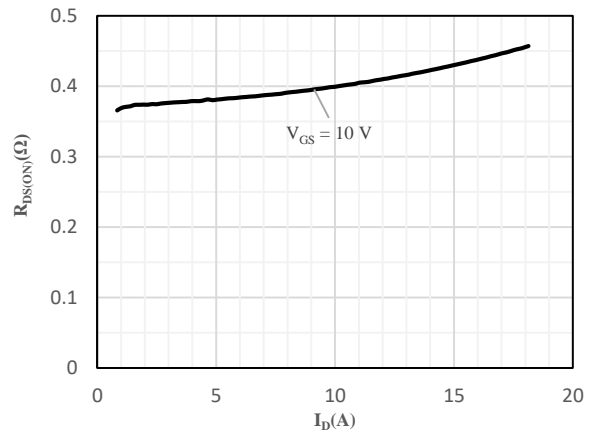


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

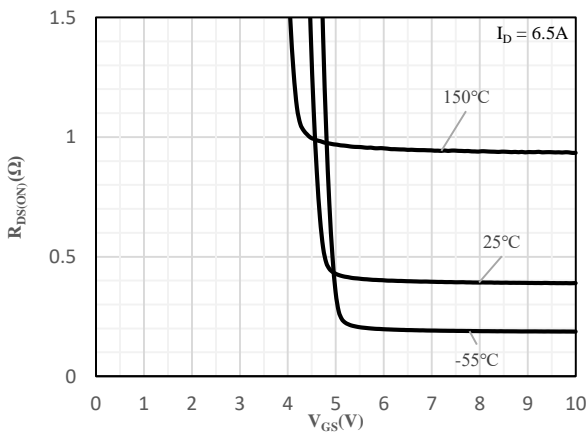


Fig 5 On-Resistance vs. Gate-Source Voltage

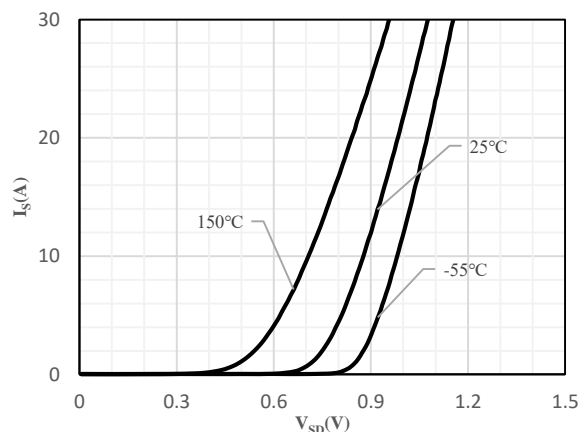


Fig 6 Body-Diode Characteristics

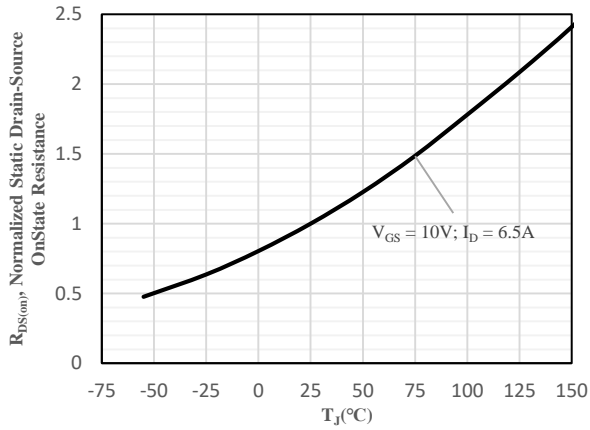


Fig 7 Normalized On-Resistance vs. Junction Temperature

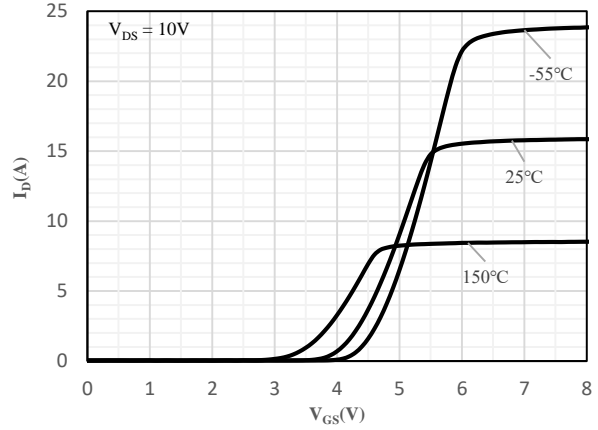


Fig 8 Transfer Characteristics

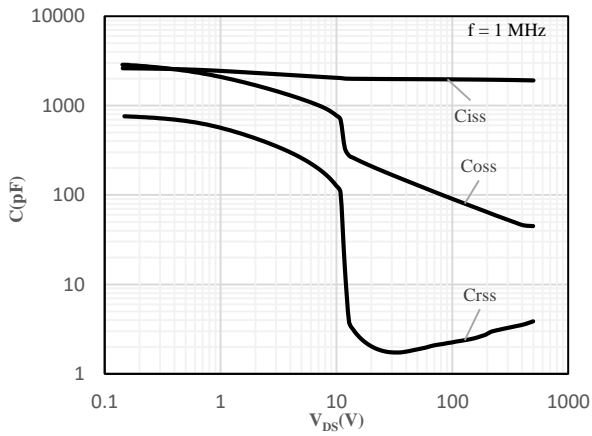


Fig 9 Capacitance Characteristics

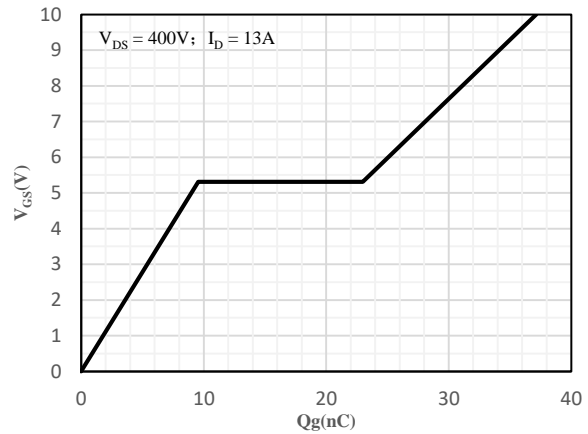


Fig 10 Gate-Charge Characteristics

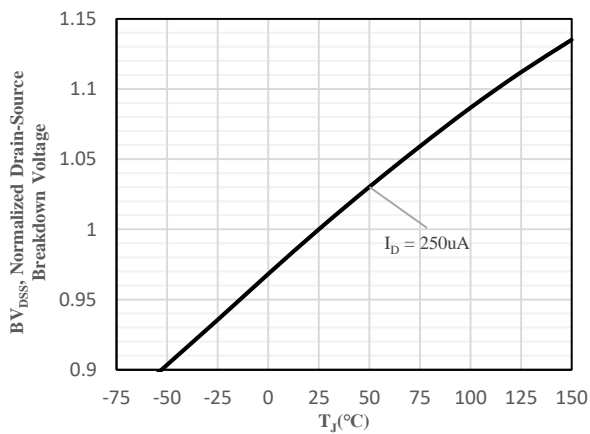


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

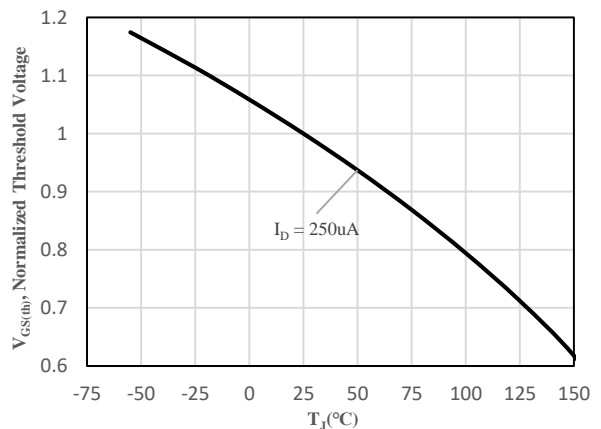


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

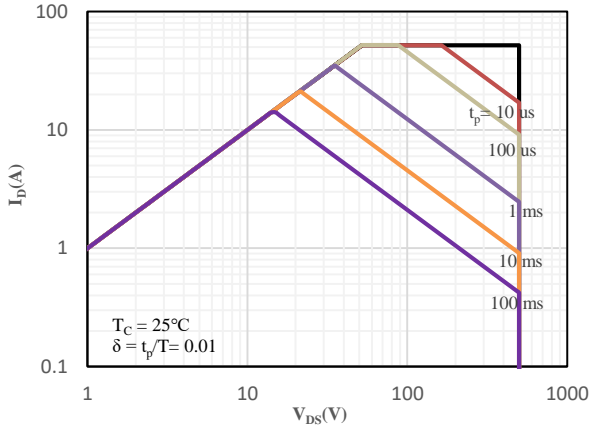


Fig 13 Safe Operating Area (TO-220AB / TO-263)

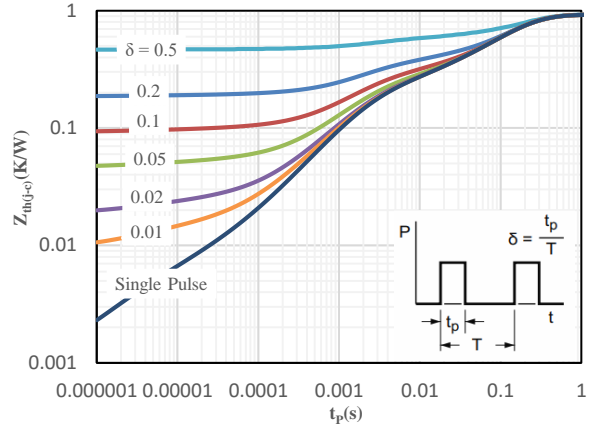
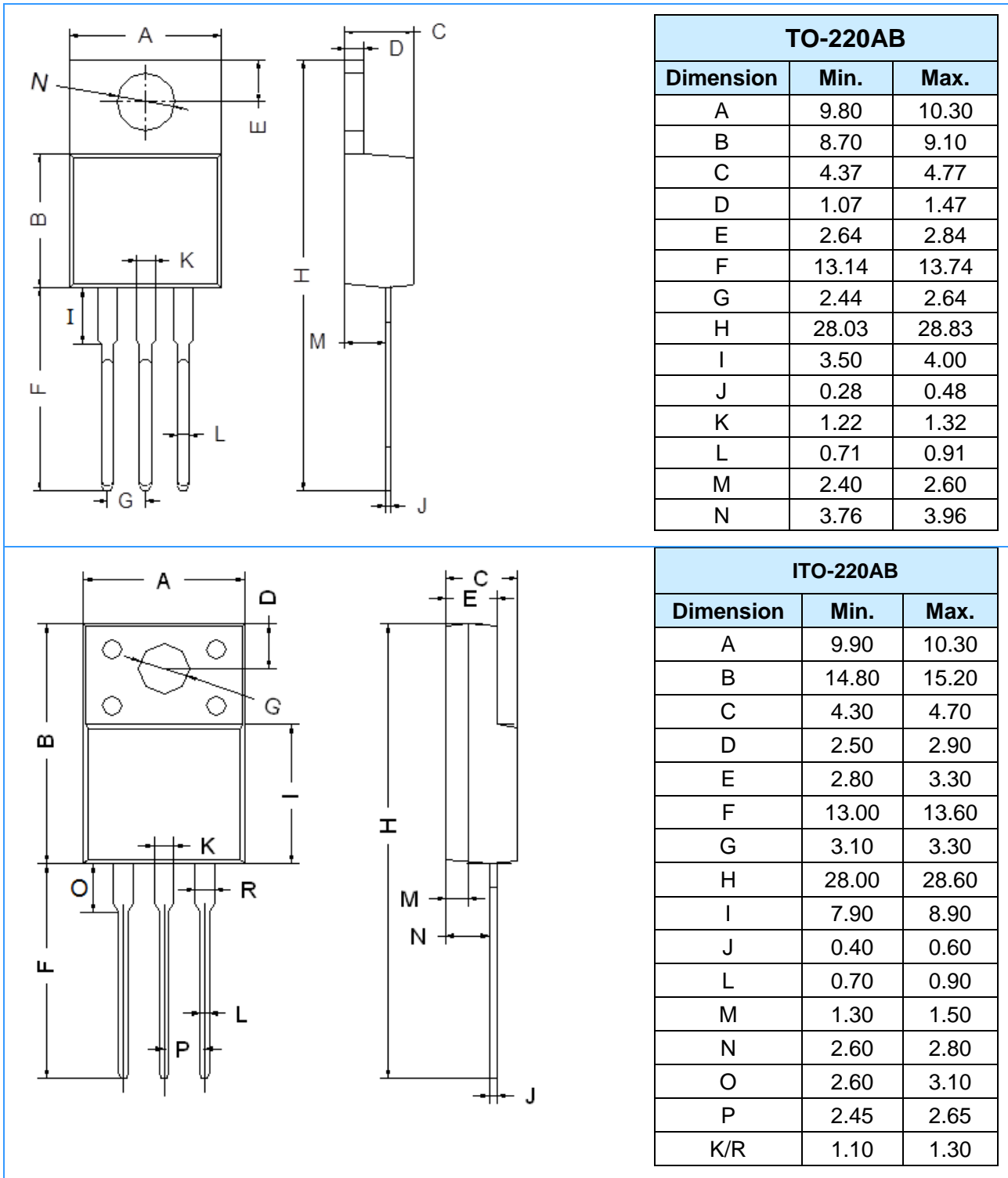
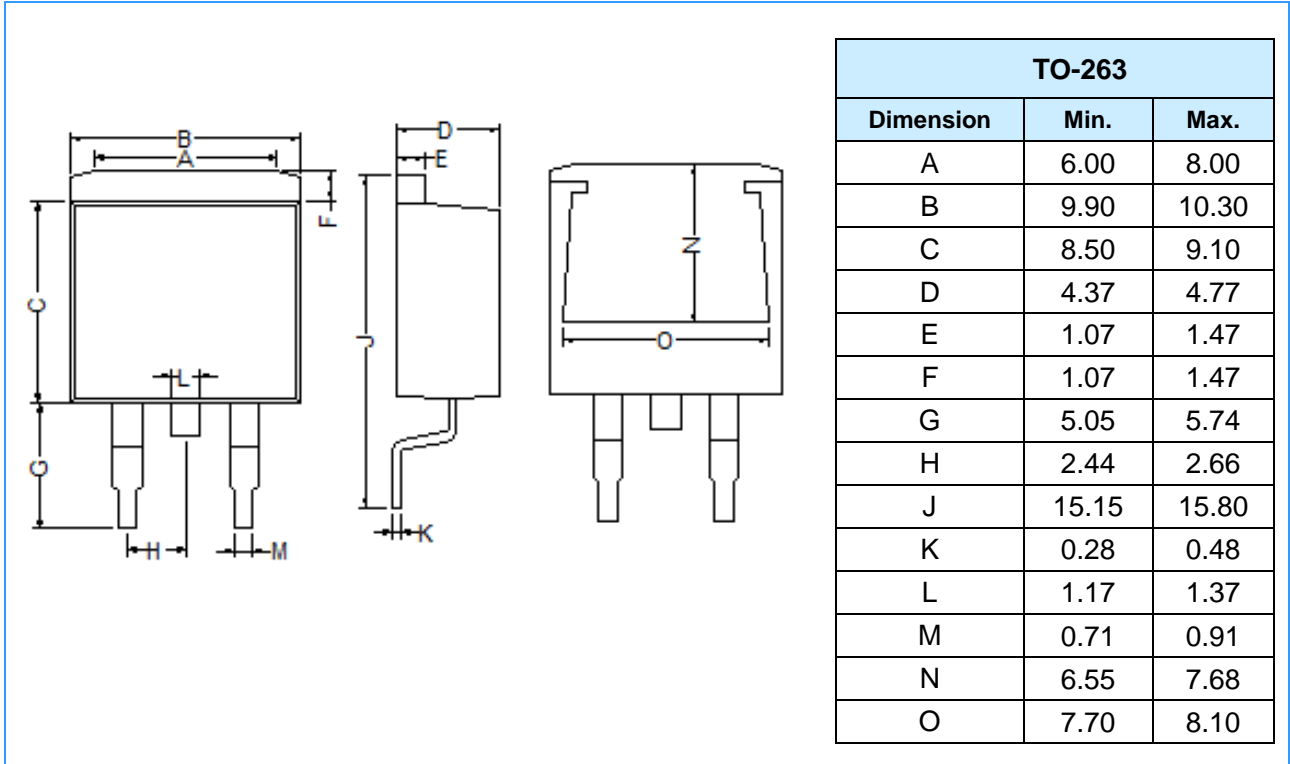


Fig 14 Maximum transient thermal impedance (TO-220AB / TO-263)

Package Outline Dimensions (Unit: mm)





Mounting Pad Layout (Unit: mm)

