

Features

- Low power loss by high speed switching and low on-resistance
- Excellent thermal behavior
- HBM: JESD22-A114-B: 1A
- Product validation acc. JEDEC Standard

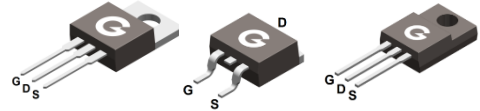
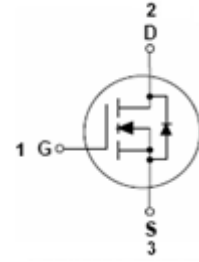
HF

Applications

- PFC power supply stages
- Lighting applications
- Adapter

Mechanical Data

- Case: TO-220AB, TO-263, ITO-220AB
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



TO-220AB TO-263 ITO-220AB

Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
SJ60R380	TO-220AB	50 pcs / Tube	SJ60R380
SJ60R380B	TO-263	50 pcs / Tube or 800 pcs / Tape & Reel	SJ60R380B
SJ60R380F	ITO-220AB	50 pcs / Tube	SJ60R380F

Maximum Ratings (@ T_C = 25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V _{DSS}	600	V
Gate-to-Source Voltage	V _{GSS}	±30	V
Continuous Drain Current (T _C = 25°C)	I _D	11	A
Continuous Drain Current (T _C = 100°C)		7	A
Pulsed Drain Current (t _p = 10μs, T _C = 25°C)	I _{DM}	44	A
Single Pulse Avalanche Energy ²	E _{AS}	100	mJ
Power Dissipation (TO-220AB, T _C = 25°C)	P _D	90	W
Power Dissipation (TO-263, T _C = 25°C)		90	W
Power Dissipation (ITO-220AB, T _C = 25°C)		38	W
Operating Junction Temperature Range	T _J	-55 ~ +150	°C
Storage Temperature Range	T _{STG}	-55 ~ +150	°C

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case (TO-220AB, TO-263)	R _{θJC}	-	1.2	1.4	°C/W
Thermal Resistance Junction-to-Case (ITO-220AB)		-	3	3.3	°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	600	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 600V, 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 = 5A	-	0.34	0.38	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	-	4	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V V _{DS} = 40V f = 250kHz	-	633	-	pF
C _{OSS}	Output Capacitance		-	49	-	
C _{RSS}	Reverse Transfer Capacitance		-	2	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time ^{*3}	V _{DD} = 480V V _{GS} = 10V I _D = 5A	-	57	-	ns
t _r	Turn-on Rise Time ^{*3}		-	30	-	
t _{d(OFF)}	Turn-Off Delay Time ^{*3}		-	73	-	
t _f	Turn-Off Fall Time ^{*3}		-	15	-	
Q _G	Total Gate-Charge	V _{DD} = 480V V _{GS} = 10V I _D = 10A	-	24	-	nC
Q _{GS}	Gate to Source Charge		-	3.3	-	
Q _{GD}	Gate to Drain (Miller) Charge		-	14	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage ^{*1}	I _{SD} = 5A, V _{GS} = 0V	-	0.8	1.2	V
t _{rr}	Reverse Recovery Time	I _F = 10A, V _R = 400V	-	250	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μs	-	2.45	-	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
- Guaranteed by design, not subject to production

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

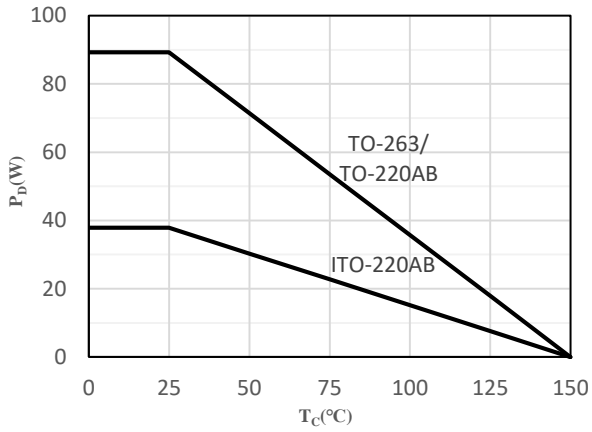


Fig 1 Power Dissipation

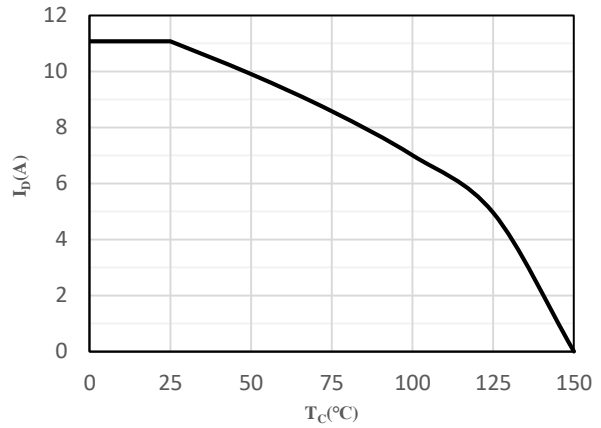


Fig 2 Drain Current

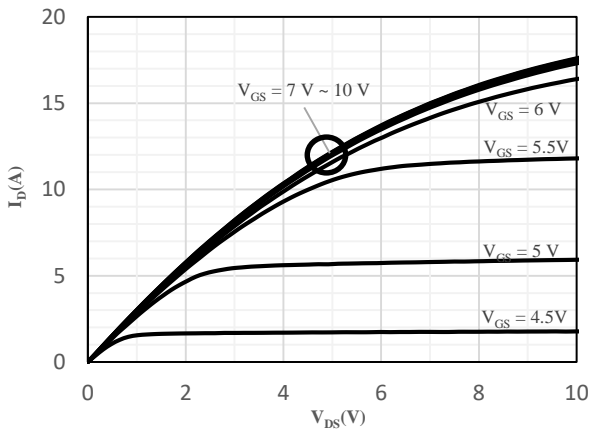


Fig 3 Typical Output Characteristics

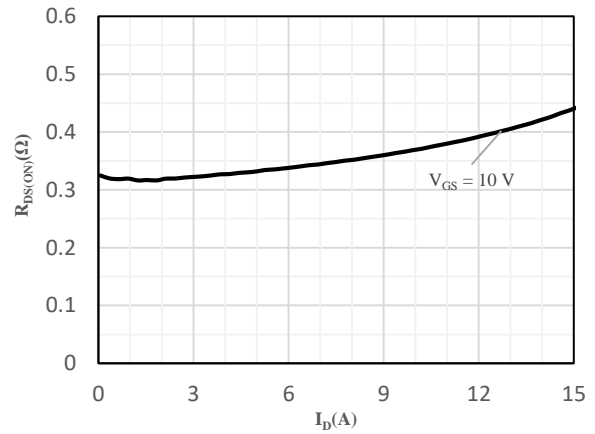


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

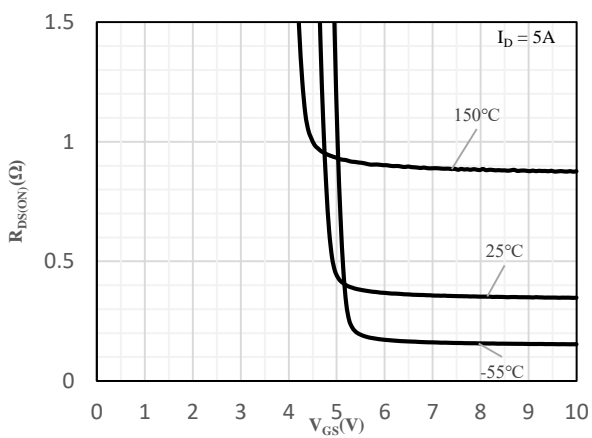


Fig 5 On-Resistance vs. Gate-Source Voltage

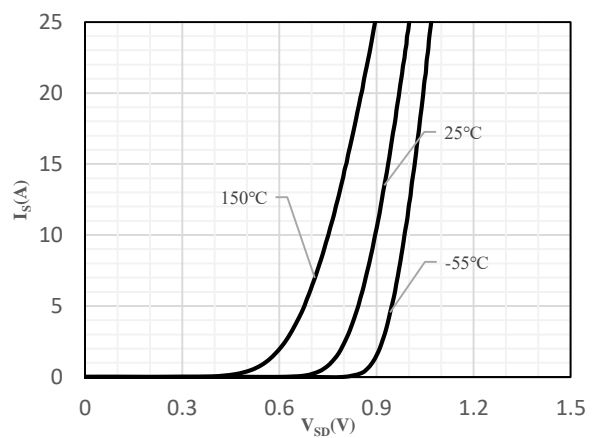


Fig 6 Body-Diode Characteristics

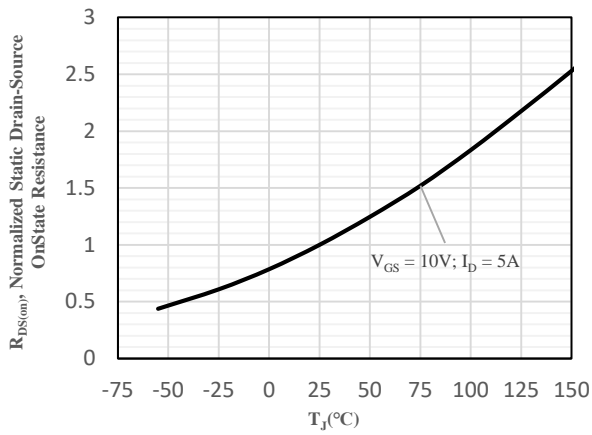


Fig 7 Normalized On-Resistance vs. Junction Temperature

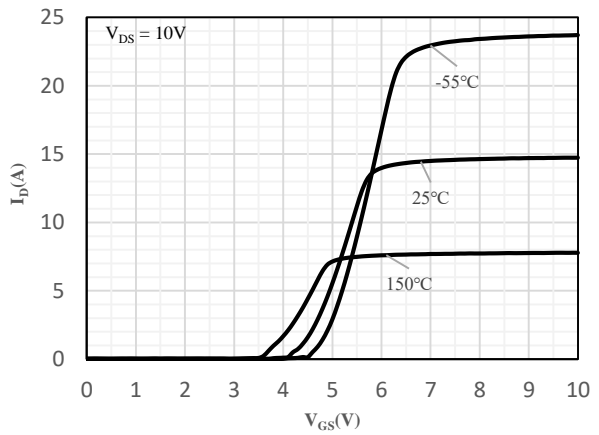


Fig 8 Transfer Characteristics

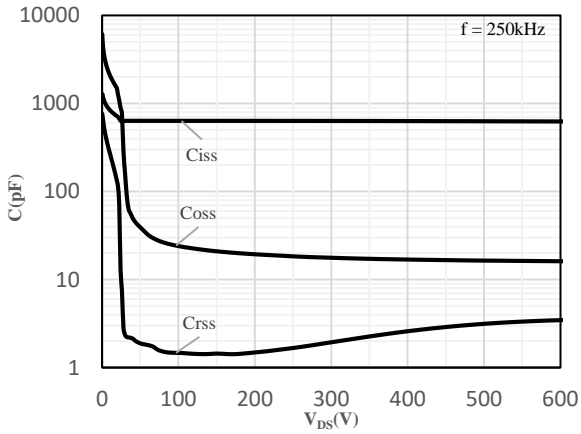


Fig 9 Capacitance Characteristics

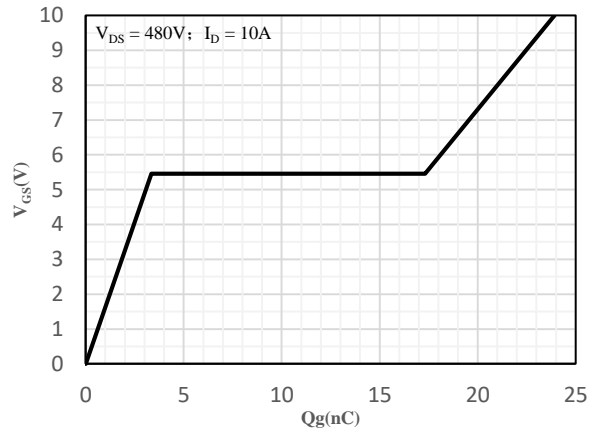


Fig 10 Gate-Charge Characteristics

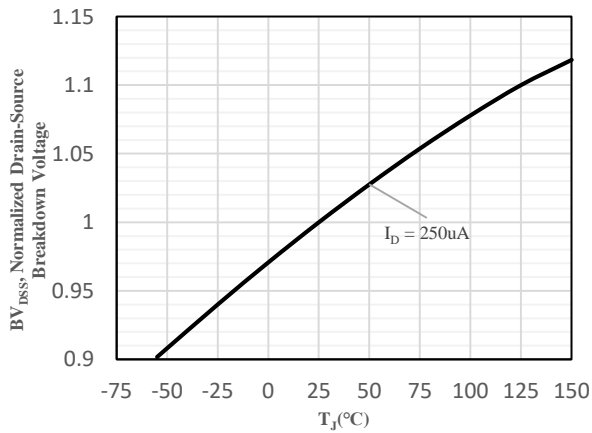


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

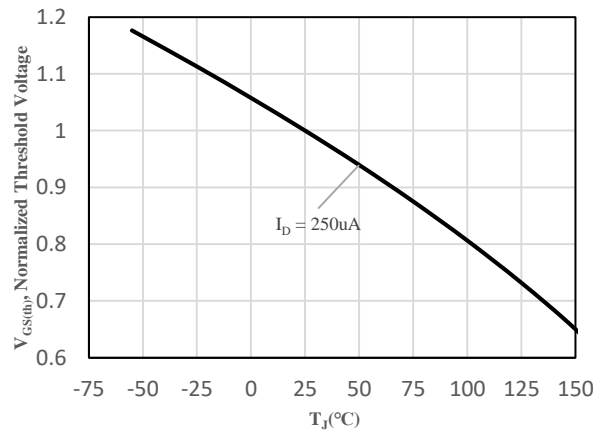


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

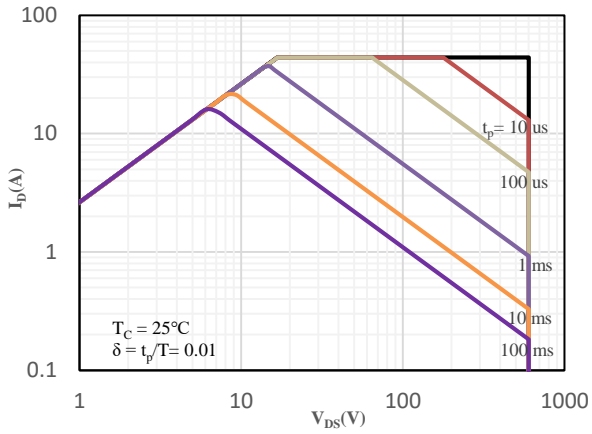


Fig 13 Safe Operation Area (TO-220AB / TO-263)

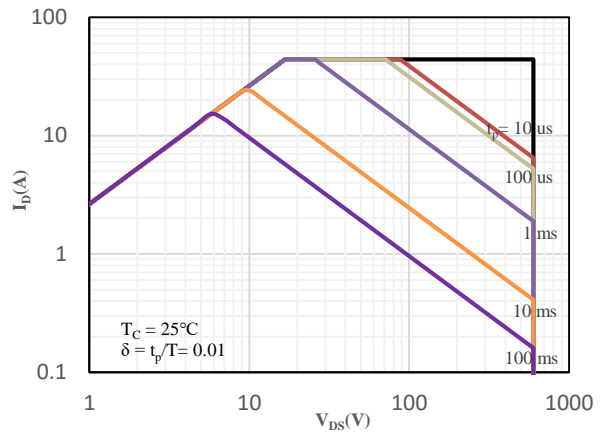


Fig 14 Safe Operation Area (ITO-220AB)

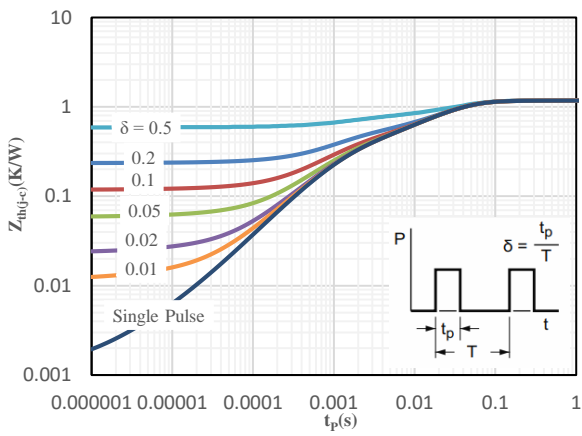


Fig 15 Maximum transient thermal impedance (TO-220AB / TO-263)

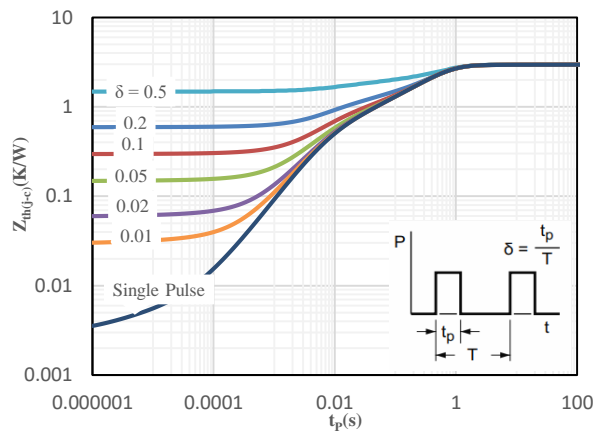
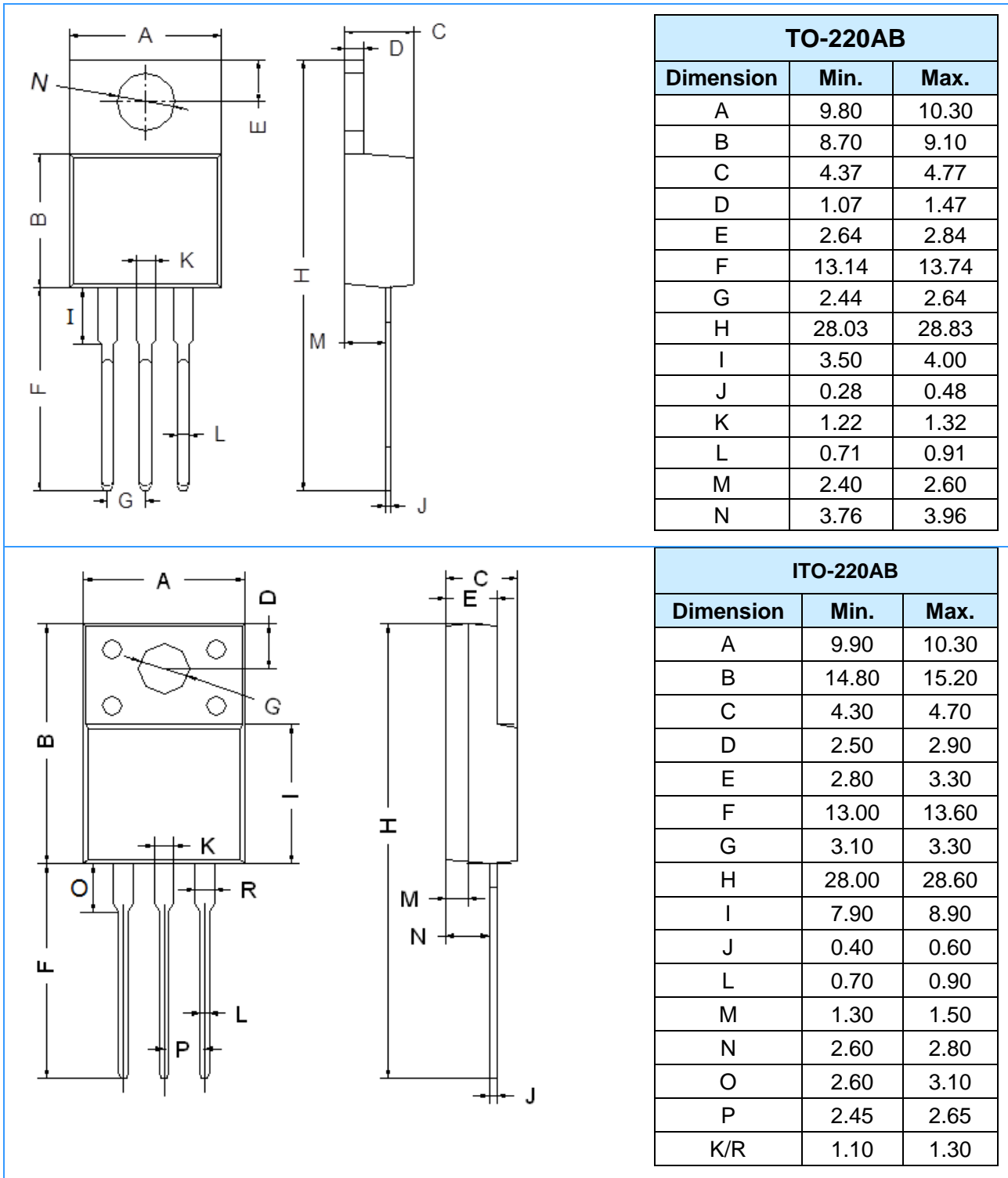
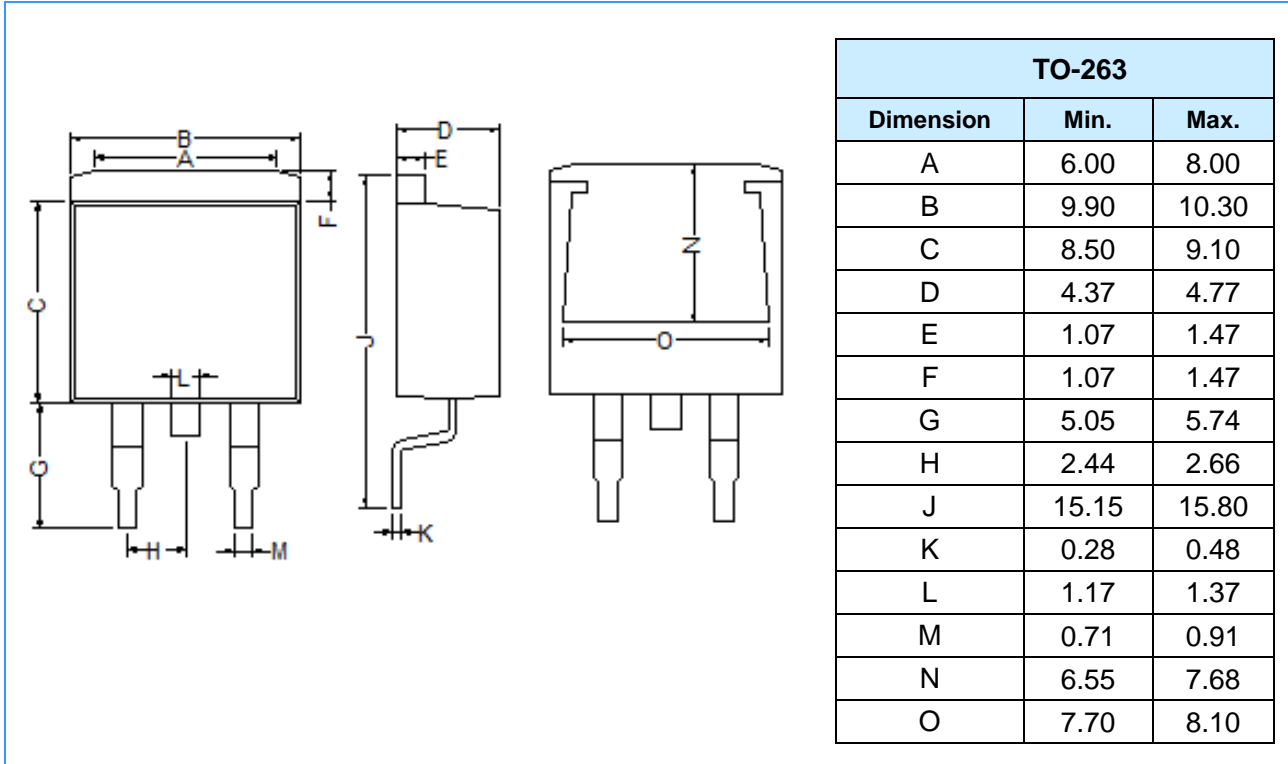


Fig 16 Maximum transient thermal impedance (ITO-220AB)

Package Outline Dimensions (Unit: mm)





Mounting Pad Layout (Unit: mm)

