

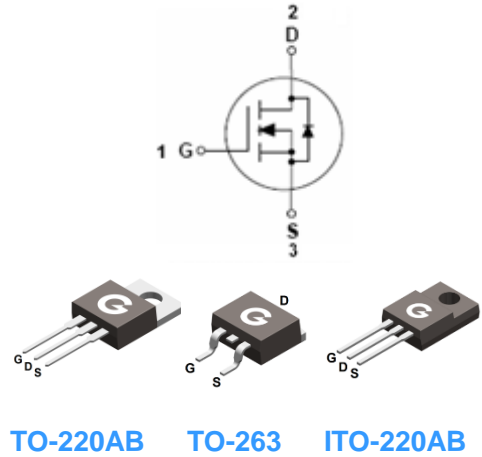
Features

- Low power loss by high speed switching and low on-resistance
- Excellent thermal behavior
- Product validation acc. JEDEC Standard
- RoHS compliant with Halogen-free

HF

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



Ordering Information

Part Number	Package	Shipping Quantity	Marking Code
SJM60R380X	TO-220AB	50 pcs / Tube	SJM60R380X
SJM60R380XB	TO-263	50 pcs / Tube or 800 pcs / Tape & Reel	SJM60R380XB
SJM60R380XF	ITO-220AB	50 pcs / Tube	SJM60R380XF

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}	200	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)		31	W
Operating Junction Temperature Range	T _J	-55 ~ +150	°C
Storage Temperature Range	T _{STG}	-55 ~ +150	°C

Thermal Characteristics

Parameter	Symbol	TO-220AB/TO-263	ITO-220AB	Unit
Thermal Resistance Junction-to-Case	R _{θJC}	1.4	4	°C/W
Thermal Resistance Junction-to-Air	R _{θJA}	62	75	°C/W

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
V_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	600	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 600V, V_{GS} = 0V$	-	-	1	μA
I_{GSS}	Gate-Body Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$	-	-	± 100	nA
On Characteristics						
$R_{DS(ON)}$	Drain-Source On-resistance *1	$V_{GS} = 10V, I_D = 4A$	-	0.33	0.38	Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.5	3.7	4.5	V
R_G	Gate Resistance	$V_{GS} = 0V, f = 1MHz$	-	4.1	-	Ω
Dynamic Characteristics						
C_{ISS}	Input Capacitance	$V_{GS} = 0V$	-	678	-	pF
C_{OSS}	Output Capacitance	$V_{DS} = 40V$	-	158	-	
C_{RSS}	Reverse Transfer Capacitance	$f = 250kHz$	-	2.5	-	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD} = 480V$ $V_{GS} = 15V$ $I_D = 4A$ $R_G = 3.3\Omega$	-	26	-	ns
t_r	Turn-on Rise Time		-	32	-	
$t_{d(OFF)}$	Turn-Off Delay Time		-	41	-	
t_f	Turn-Off Fall Time		-	65	-	
Q_G	Total Gate-Charge	$V_{DD} = 480V$	-	19.6	-	nC
Q_{GS}	Gate to Source Charge	$V_{GS} = 10V$	-	4	-	
Q_{GD}	Gate to Drain (Miller) Charge	$I_D = 4A$	-	10.7	-	
Source-Drain Diode Characteristics						
V_{SD}	Diode Forward Voltage *1	$I_{SD} = 4A, V_{GS} = 0V$	-	0.81	1.2	V
t_{rr}	Reverse Recovery Time	$I_F = 4A, V_R = 100V$	-	230	-	ns
Q_{rr}	Reverse Recovery Charge	$di/dt = 100A/\mu s$	-	2	-	μC

Notes:

- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 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)

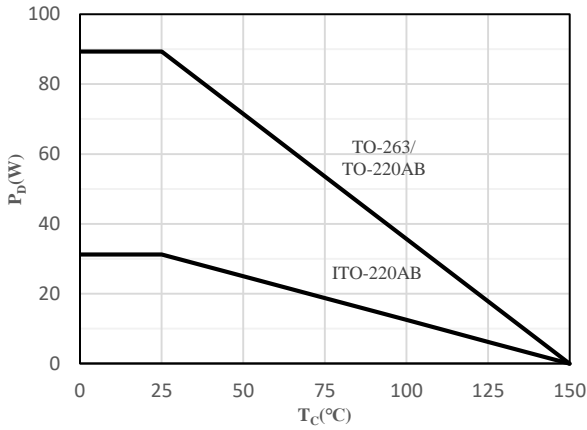


Fig 1 Power Dissipation

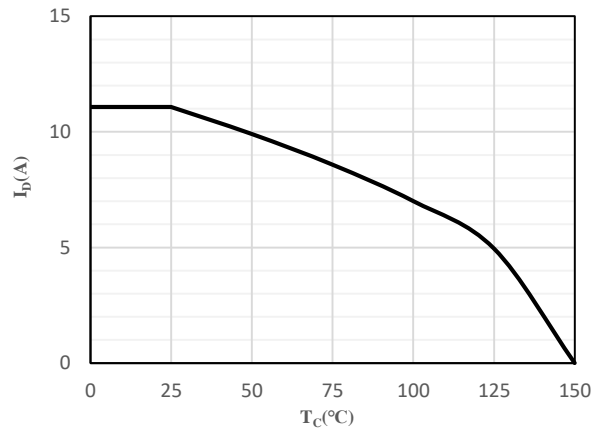


Fig 2 Drain Current

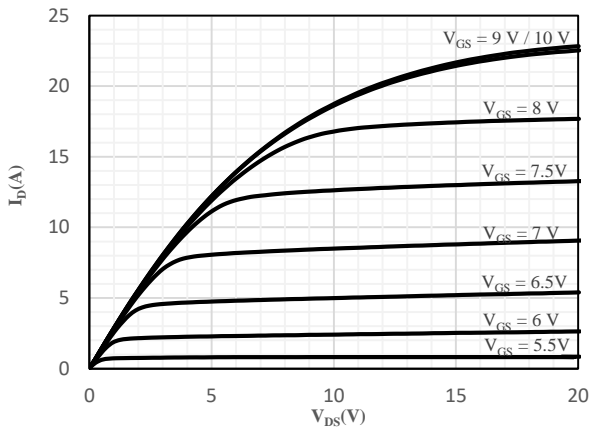


Fig 3 Typical Output Characteristics

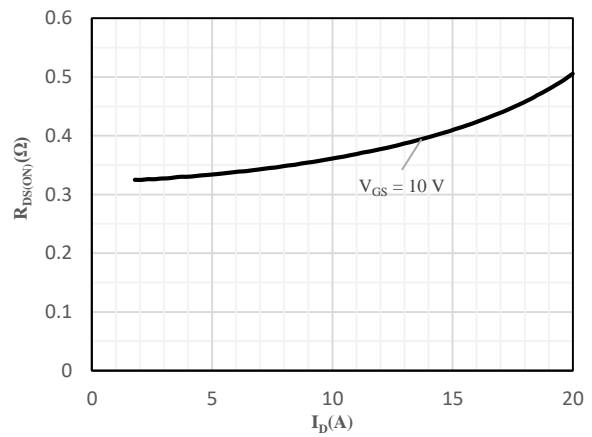


Fig 4 On-Resistance vs. Drain Current and Gate Voltage

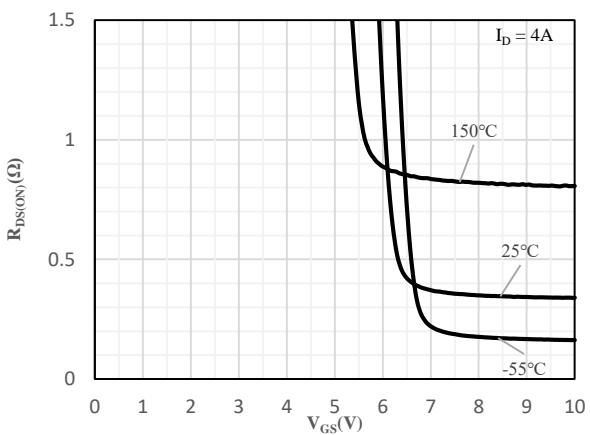


Fig 5 On-Resistance vs. Gate-Source Voltage

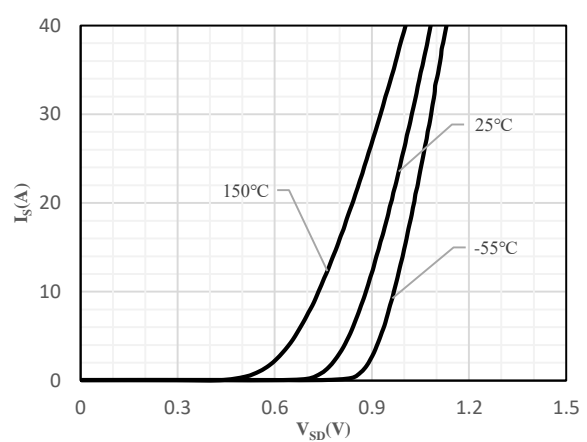


Fig 6 Body-Diode Characteristics

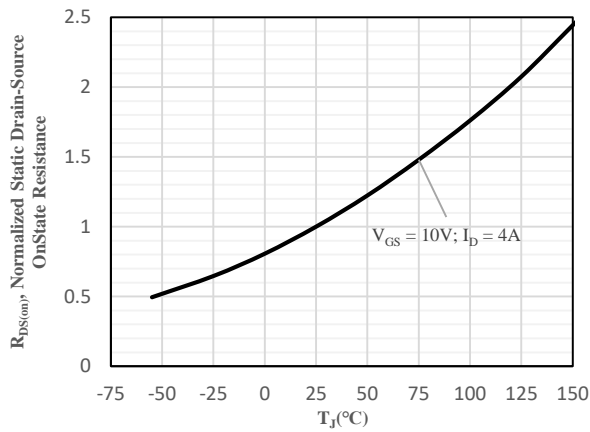


Fig 7 Normalized On-Resistance vs. Junction Temperature

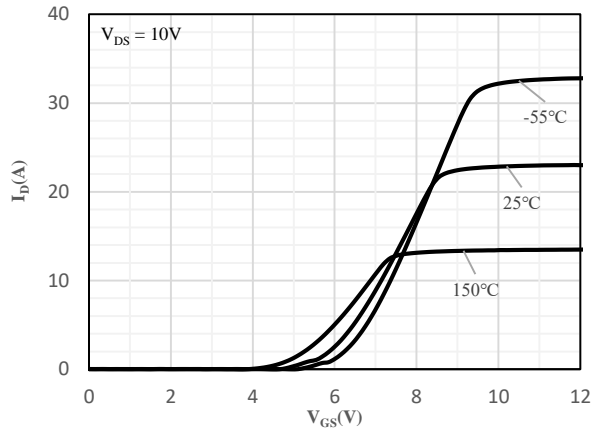


Fig 8 Transfer Characteristics

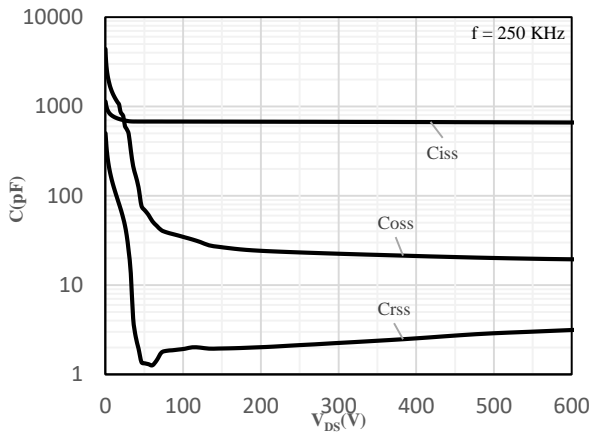


Fig 9 Capacitance Characteristics

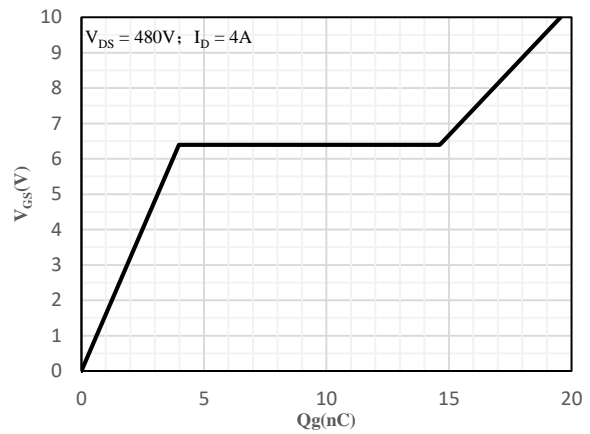


Fig 10 Gate-Charge Characteristics

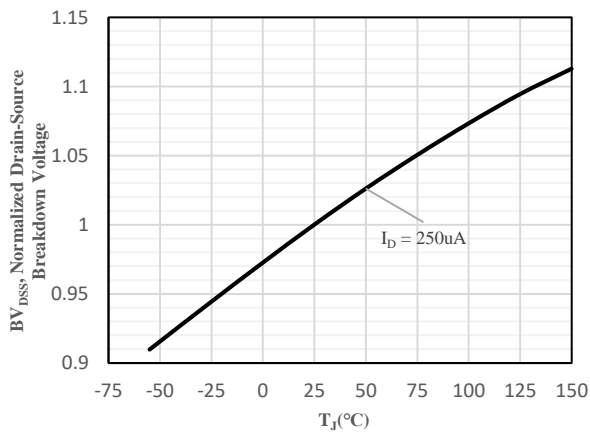


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

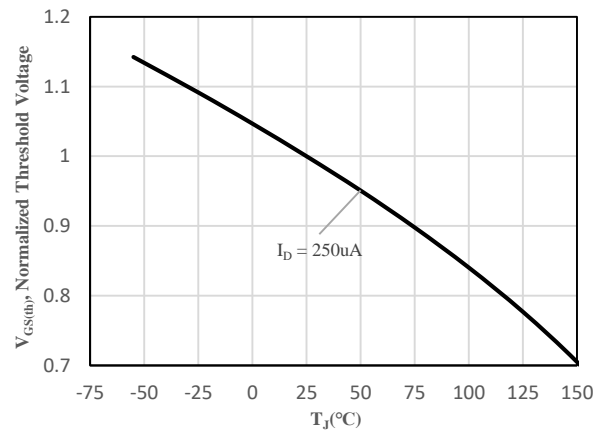


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

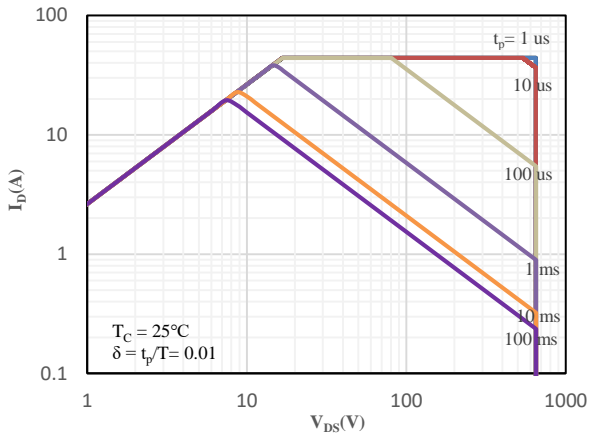


Fig 13 Safe Operation Area (TO-220AB / TO-263)

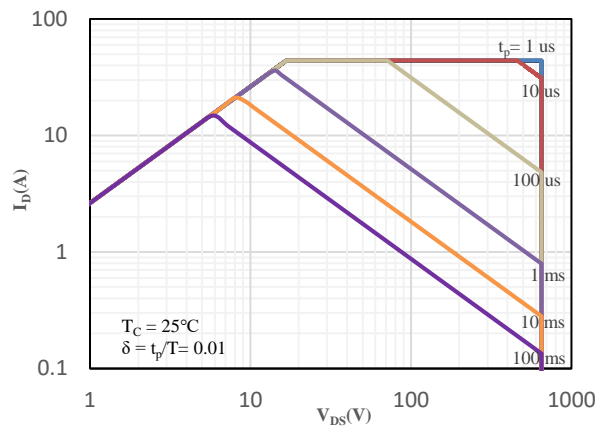


Fig 14 Safe Operation Area (ITO-220AB)

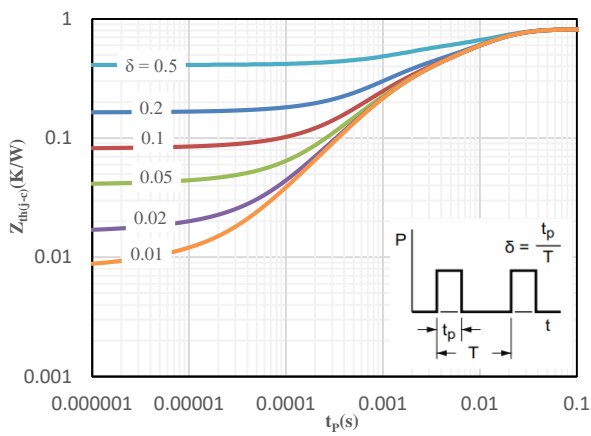


Fig 15 Maximum transient thermal impedance (TO-220AB / TO-263)

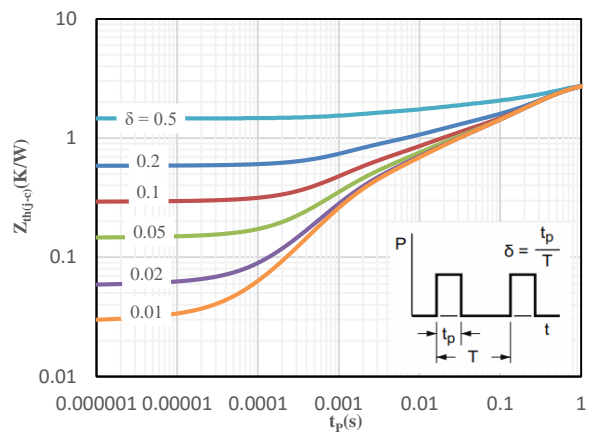
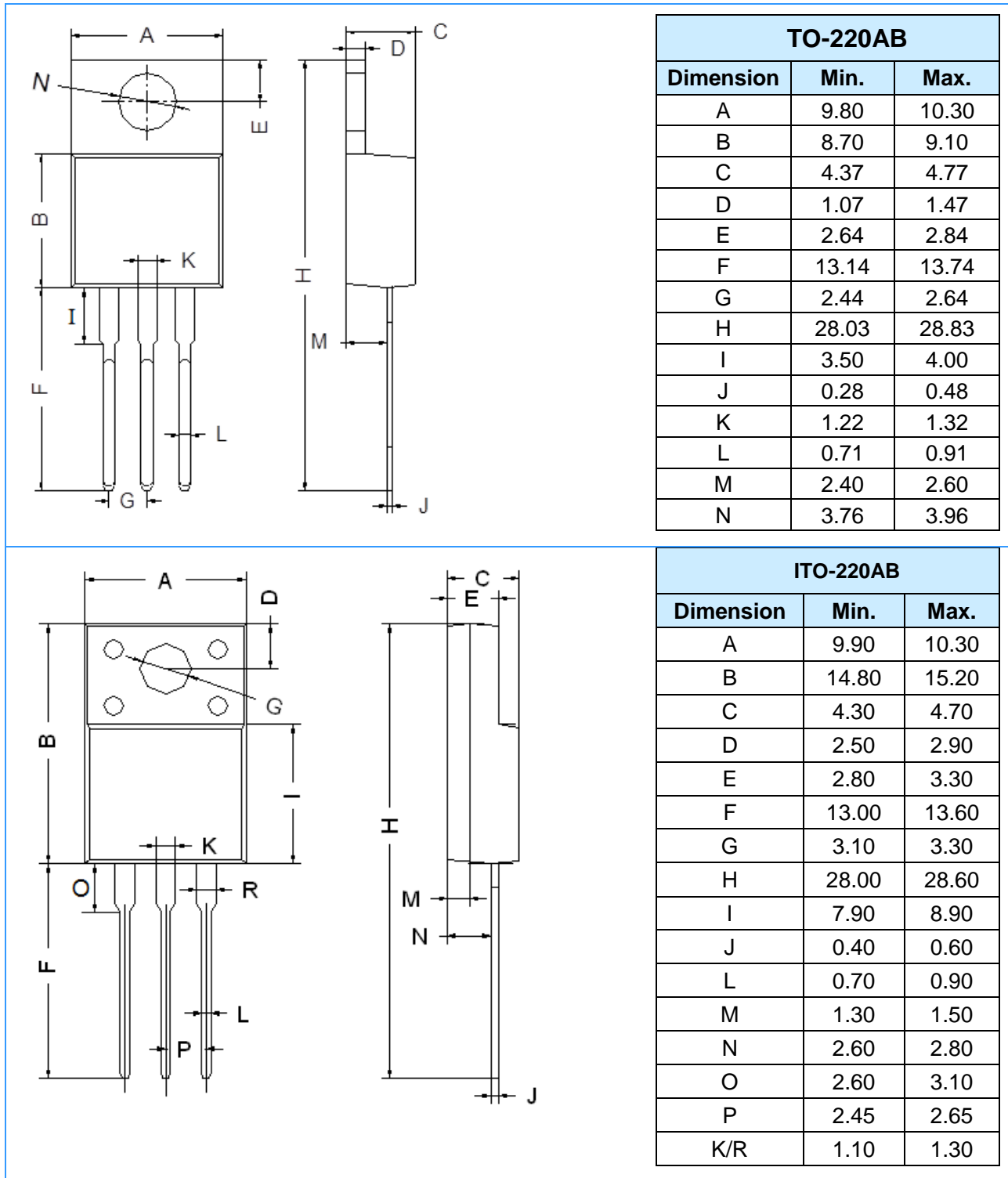
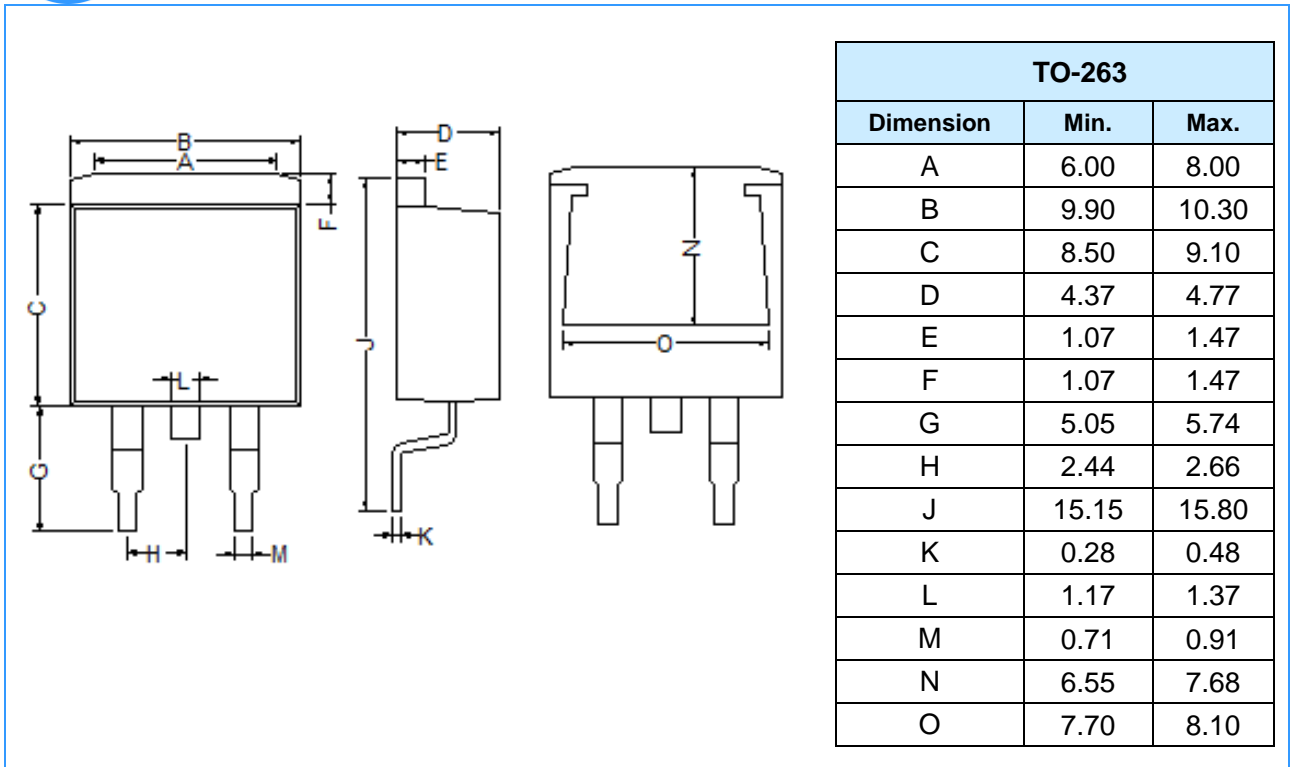


Fig 16 Maximum transient thermal impedance (ITO-220AB)

Package Outline Dimensions (Unit: mm)





Mounting Pad Layout (Unit: mm)

