

Features

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

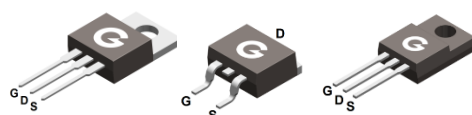
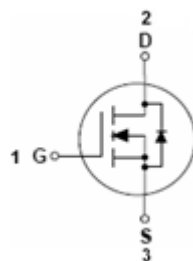
HF

APPLICATIONS

- PFC power supply stages
- Solar inverter
- Telecom
- Server
- UPS

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
SJM65R190	TO-220AB	50 pcs / Tube	SJM65R190
SJM65R190B	TO-263	50 pcs / Tube or 800 pcs / Tape & Reel	SJM65R190B
SJM65R190F	ITO-220AB	50 pcs / Tube	SJM65R190F

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

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DS}	650	V
Gate-to-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current ($T_c = 25^\circ\text{C}$)	I_D	21	A
Continuous Drain Current ($T_c = 100^\circ\text{C}$)		13	A
Pulsed Drain Current ($t_p = 10\mu\text{s}$, $T_c = 25^\circ\text{C}$)	I_{DM}	84	A
Single Pulse Avalanche Energy ^{*2}	E_{AS}	400	mJ
Power Dissipation (TO-220AB, $T_c = 25^\circ\text{C}$)	P_D	208	W
Power Dissipation (TO-263, $T_c = 25^\circ\text{C}$)		208	W
Power Dissipation (ITO-220AB, $T_c = 25^\circ\text{C}$)		36	W
Operating Junction Temperature Range	T_J	$-55 \sim +150$	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	$-55 \sim +150$	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case (TO-220AB, TO-263)	$R_{\theta JC}$	-	0.5	0.6	$^{\circ}\text{C/W}$
Thermal Resistance Junction-to-Case (ITO-220AB)		-	2.9	3.5	$^{\circ}\text{C/W}$
Thermal Resistance Junction-to-Air (TO-220AB, TO-263)	$R_{\theta JA}$	-	-	62	$^{\circ}\text{C/W}$
Thermal Resistance Junction-to-Air (ITO-220AB)		-	-	75	$^{\circ}\text{C/W}$

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 = 250μA	650	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 650V, 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 = 10A	-	0.15	0.19	Ω
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.5	3.0	4.5	V
R _G	Gate Resistance	V _{GS} = 0V, f = 1MHz	-	8.1	-	Ω
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V	-	1292	-	pF
C _{OSS}	Output Capacitance	V _{DS} = 40V	-	107	-	
C _{RSS}	Reverse Transfer Capacitance	f = 250kHz	-	0.7	-	
Switching Characteristics						
t _{d(ON)}	Turn-on Delay Time *3	V _{DD} = 400V	-	15	-	ns
t _r	Turn-on Rise Time *3	V _{GS} = 10V	-	11	-	
t _{d(OFF)}	Turn-Off Delay Time *3	I _D = 8.5A	-	71	-	
t _f	Turn-Off Fall Time *3	R _G = 10Ω	-	11	-	
Q _G	Total Gate-Charge	V _{DD} = 520V	-	35	-	nC
Q _{GS}	Gate to Source Charge	V _{GS} = 10V	-	7.5	-	
Q _{GD}	Gate to Drain (Miller) Charge	I _D = 11A	-	18	-	
Source-Drain Diode Characteristics						
V _{SD}	Diode Forward Voltage *1	I _{SD} = 10A, V _{GS} = 0V	-	0.84	1.2	V
t _{rr}	Reverse Recovery Time	I _F = 10A, V _R = 400V	-	310	-	ns
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μs	-	3.8	-	μC

Notes:

- The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
- The E_{AS} data shows Max. rating. The test condition is $V_{DD} = 100\text{V}, V_{GS} = 15\text{V}, L = 50\text{mH}$
- Guaranteed by design, not subject to production

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

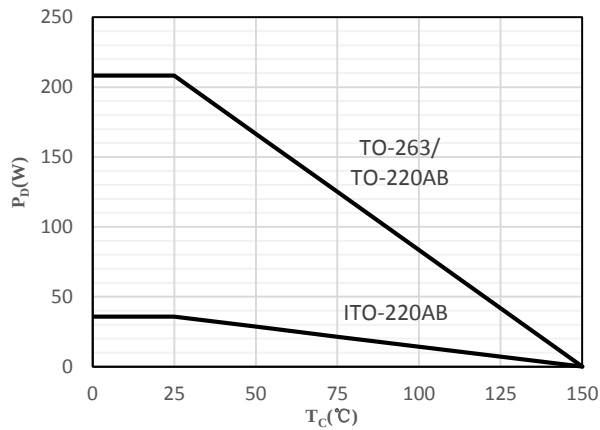


Fig 1 Power Dissipation

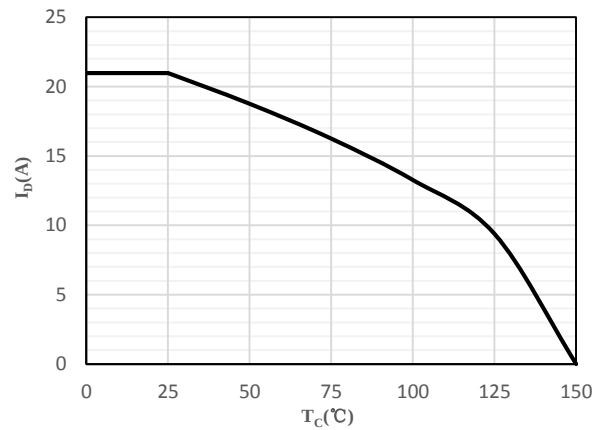


Fig 2 Drain Current

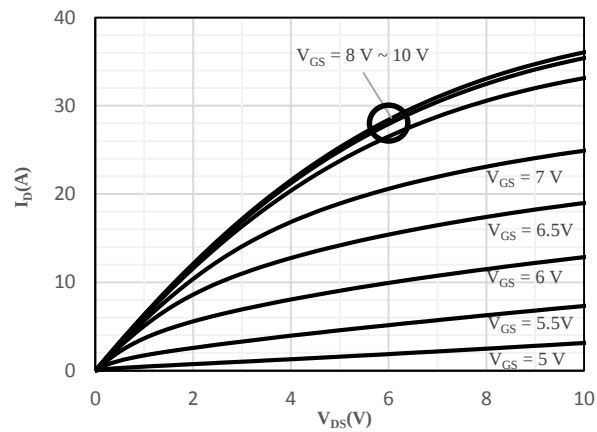


Fig 3 Typical Output Characteristics

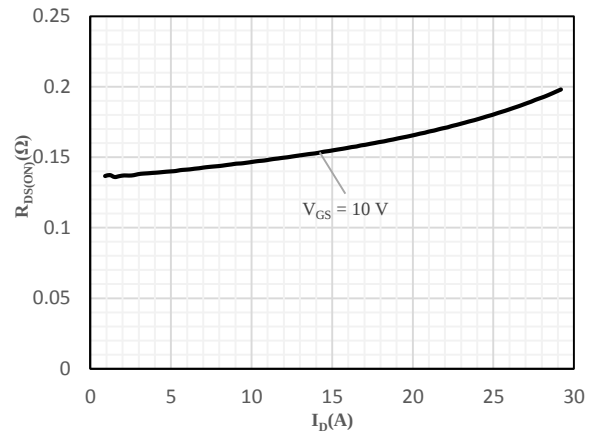


Fig 4 On-Resistance vs. Drain Current
and Gate Voltage

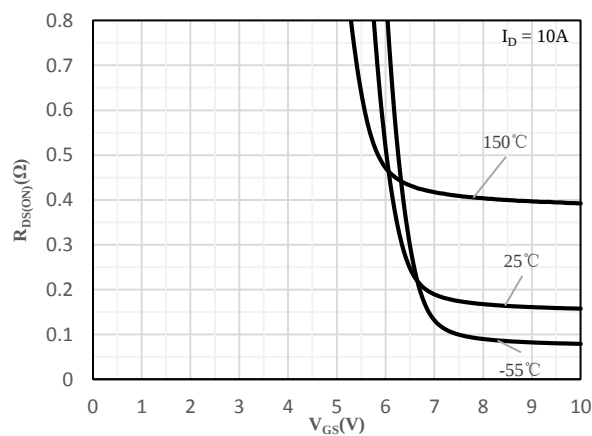


Fig 5 On-Resistance vs. Gate-Source Voltage

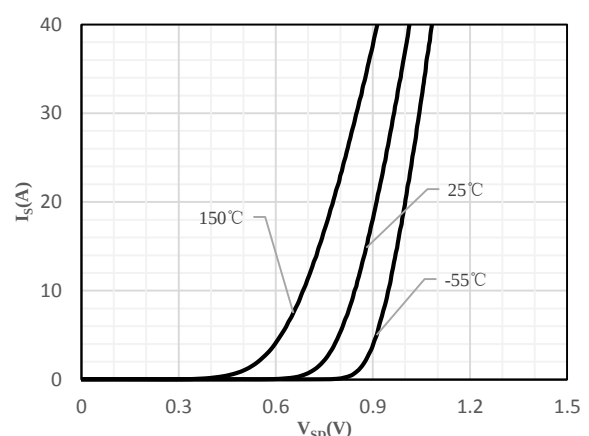


Fig 6 Body-Diode Characteristics

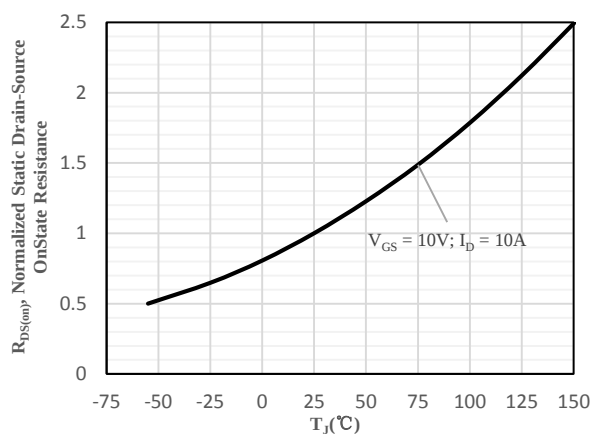


Fig 7 Normalized On-Resistance vs. Junction Temperature

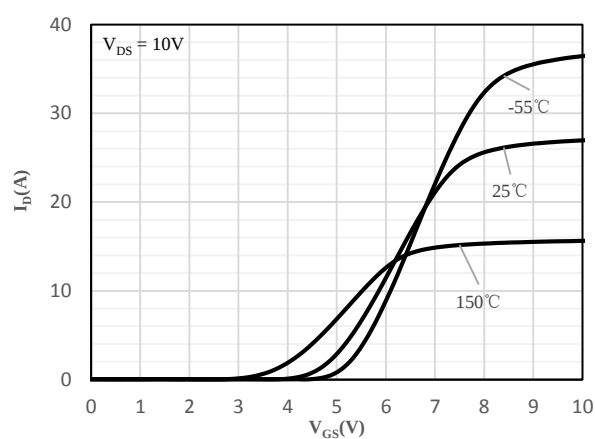


Fig 8 Transfer Characteristics

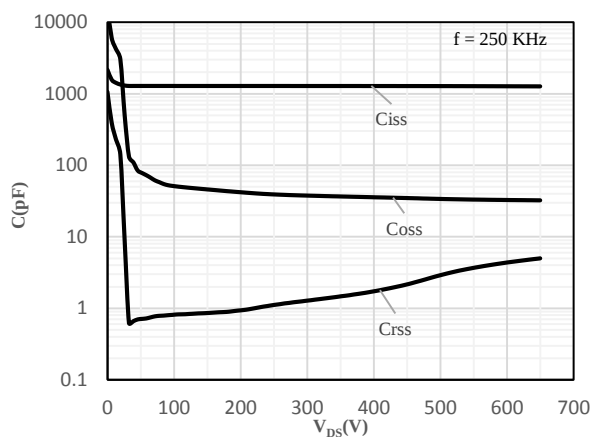


Fig 9 Capacitance Characteristics

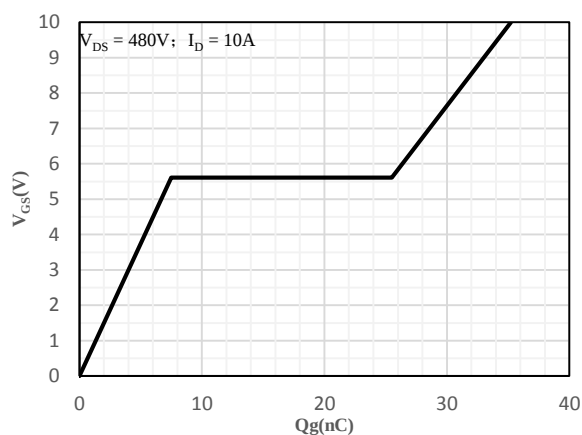


Fig 10 Gate-Charge Characteristics

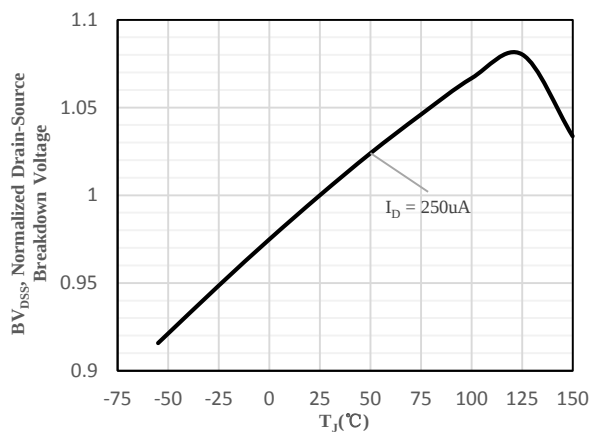


Fig 11 Normalized Breakdown Voltage vs. Junction Temperature

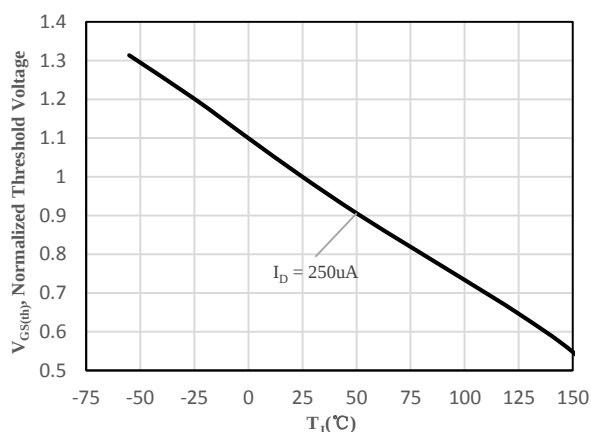


Fig 12 Normalized $V_{GS(th)}$ vs. Junction Temperature

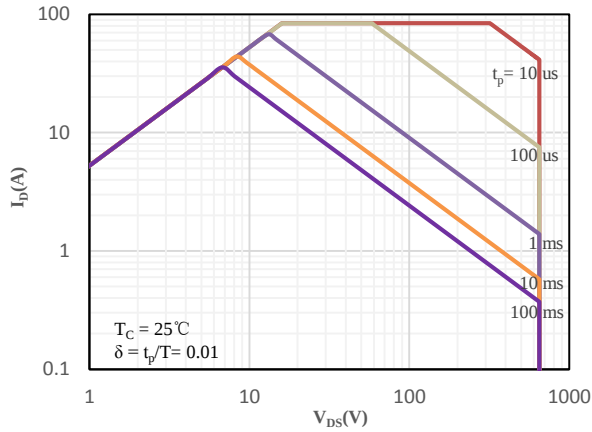


Fig 13 Safe Operation Area (TO-220AB / TO-263)

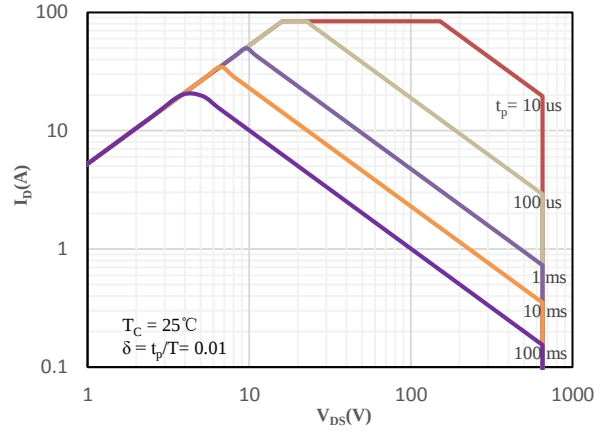


Fig 14 Safe Operation Area (ITO-220AB)

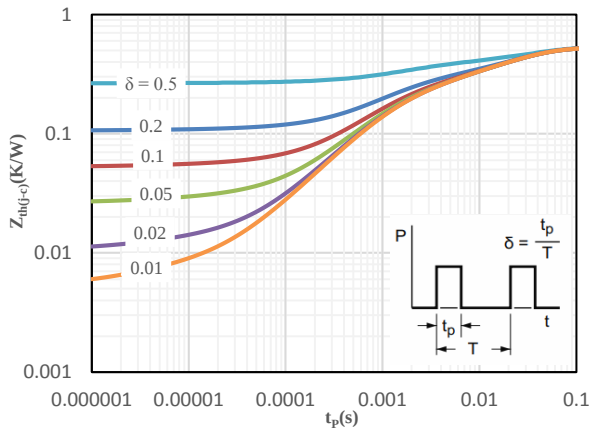


Fig 15 Maximum transient thermal impedance
(TO-220AB / TO-263)

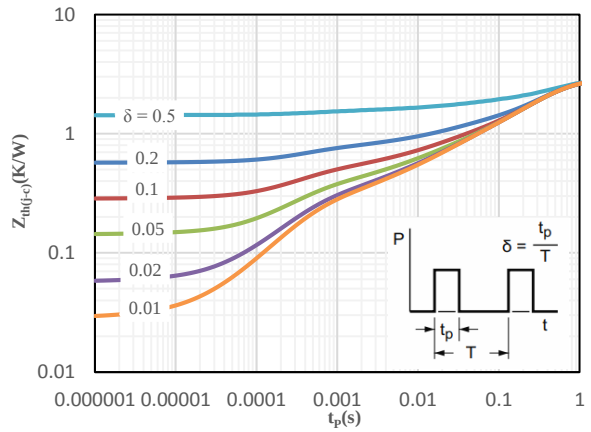
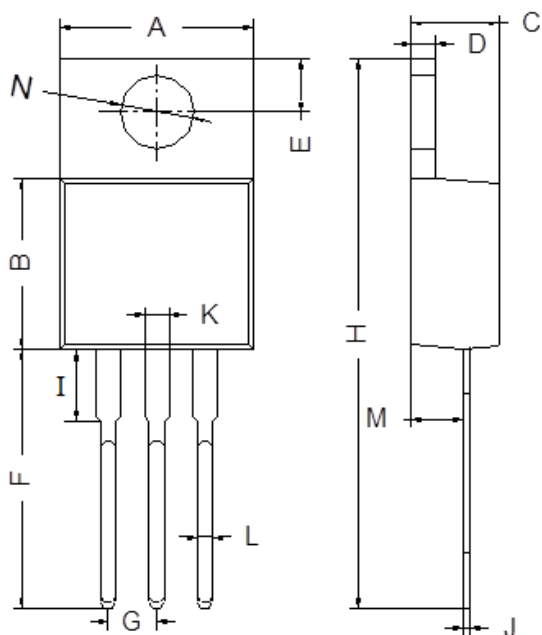
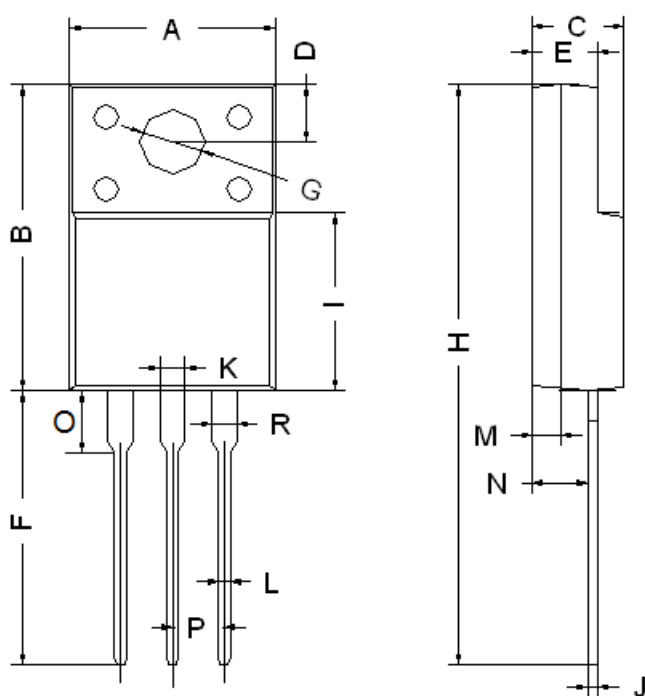


Fig 16 Maximum transient thermal impedance
(ITO-220AB)

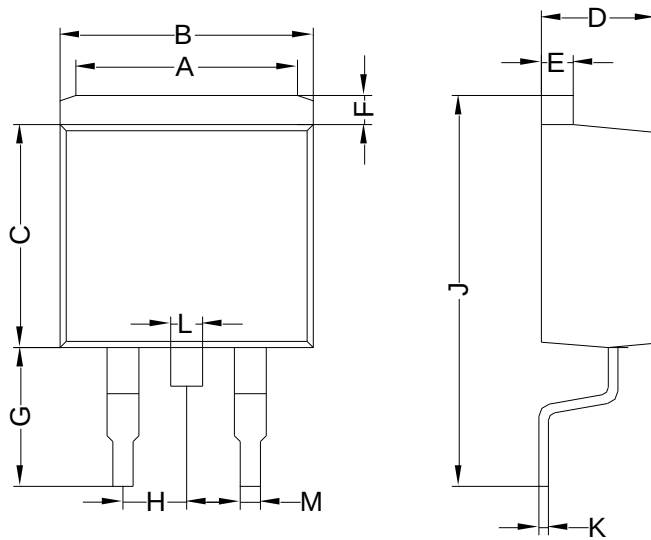
Package Outline Dimensions (Unit: mm)



TO-220AB		
Dimension	Min.	Max.
A	9.80	10.30
B	8.70	9.10
C	4.37	4.77
D	1.07	1.47
E	2.64	2.84
F	13.14	13.74
G	2.44	2.64
H	28.03	28.83
I	3.50	4.00
J	0.28	0.48
K	1.22	1.32
L	0.71	0.91
M	2.40	2.60
N	3.76	3.96



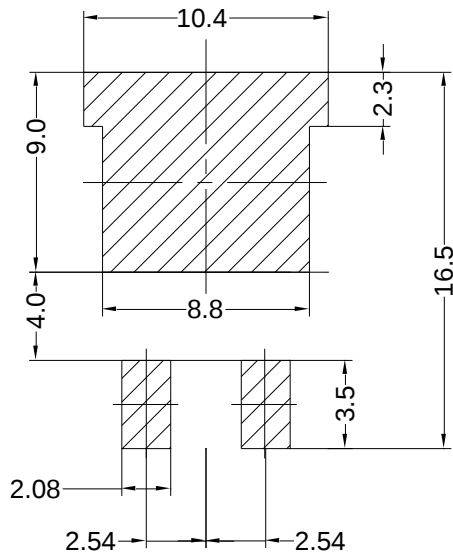
ITO-220AB		
Dimension	Min.	Max.
A	9.90	10.30
B	14.80	15.20
C	4.30	4.70
D	2.50	2.90
E	2.80	3.30
F	13.00	13.60
G	3.10	3.30
H	28.00	28.60
I	7.90	8.90
J	0.40	0.60
L	0.70	0.90
M	1.30	1.50
N	2.60	2.80
O	2.60	3.10
P	2.45	2.65
K/R	1.10	1.30



TO-263		
Dimension	Min.	Max.
A	6.00	8.00
B	9.90	10.30
C	8.50	9.10
D	4.37	4.77
E	1.07	1.47
F	1.07	1.47
G	5.34	5.74
H	2.44	2.64
J	15.30	15.90
K	0.28	0.48
L	1.17	1.37
M	0.71	0.91

Mounting Pad Layout (Unit: mm)

TO-263



IMPORTANT NOTICE

Changzhou Galaxy Century Microelectronics (GME) reserves the right to make changes without further notice to any product information (copyrighted) herein to make corrections, modifications, improvements, or other changes. GME does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights, nor the rights of others.