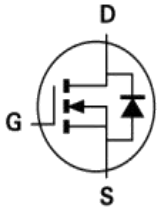
CS13N45A

N-Channel Enhancement Mode Power MOSFET

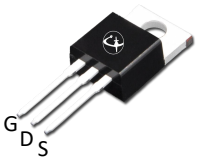
MAIN CHARACTERISTICS

I_D	13A
V_{DSS}	450V
R_{DSON}-typ （@VGS=10V Tc=25°C）	0.39Ω

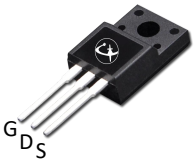


FEATURES

- Proprietary New Planar Technology
- Low Gate Charge Minimize Switching Loss



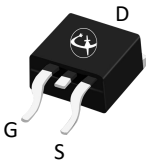
TO-220AB



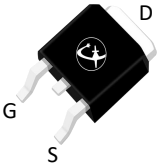
TO-220F

APPLICATIONS

- Ballast and Lighting
- DC-AC Inverter
- Other Applications



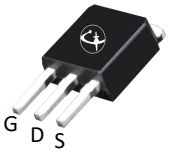
TO-263



TO-252

MECHANICAL DATA

- Case: Molded plastic
- Mounting Position: Any
- Molded Plastic: UL Flammability Classification Rating 94V-0
- Lead free in compliance with EU RoHS 2011/65/EU directive
- Solder bath temperature 275℃ maximum,10s per JESD 22-B106



TO-251

Product specification classification

Part Number	Package	Mode Name	Pack
CS13N45A1	TO-220AB	CS13N45A	Tube
CS13N45A2	TO-220F(0.5mm)	CS13N45A	Tube
CS13N45A3	TO-263	CS13N45A	Tube
CS13N45A3-R	TO-263	CS13N45A	Tape
CS13N45A4	TO-251	CS13N45A	Tube
CS13N45A5-R	TO-252	CS13N45A	Tape

CS13N45A

N-Channel Enhancement Mode Power MOSFET

Maximum Ratings at Tc=25°C unless otherwise specified

Parameter	Symbol	Value			Unit
		220AB/263	220F	251/252	
Drain-Source Voltage	V_{DS}	450			V
Gate-Source Voltage	V_{GS}	±30			V
Continue Drain Current	I_D	13			A
Pulsed Drain Current (Note1)	I_{DM}	52			A
Power Dissipation	P_D	140	45	140	W
Single Pulse Avalanche Energy (Note1)	E_{AS}	538			mJ
Operating Temperature Range	T_J	150			°C
Storage Temperature Range	T_{STG}	-55 to +150			°C
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.89	2.7	0.89	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62	100	62	°C/W

Note1:Pulse test: 300 μs pulse width, 2 % duty cycle

Electrical Characteristics at Tc=25°C unless otherwise specified

Parameter	Test Condition	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS} = 0 V,I_D = 250 μA	BV_{DSS}	450	-	-	V
Drain-Source Leakage Current	V_{DS} = 450 V, V_{GS} = 0 V	I_{DSS}	-	-	1	μA
Gate Leakage Current	V_{GS} = ± 30 V, V_{DS} = 0 V	I_{GSS}	-	-	±100	nA
Gate-Source Threshold Voltage	V_{DS} = V_{GS} , I_D = 250 μA	$V_{GS(th)}$	2	-	4	V
Drain-Source On-State Resistance	V_{GS} = 10 V, I_D = 5.5 A	$R_{DS(on)}$	-	0.39	0.5	Ω
Forward Transconductance	V_{DS} = 15 V, I_D = 10 A	gfs	-	12	-	S
Input Capacitance	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	-	1410	-	pF
Output Capacitance		C_{oss}	-	7.3	-	pF
Reverse Transfer Capacitance		C_{rss}	-	130	-	pF
Turn-on Delay Time(Note2)	I_D = 11 A, V_{DD} = 200 V, R_G= 12Ω	$t_{d(ON)}$	-	18	-	ns
Rise Time(Note2)		t_r	-	12	-	ns
Turn-Off Delay Time(Note2)		$t_{d(OFF)}$	-	35	-	ns
Fall Time(Note2)		t_f	-	15	-	ns
Total Gate Charge(Note2)	I_D = 11 A, V_{DD} = 200 V, V_{GS} = 10 V	Q_G	-	25	-	nC
Gate to Source Charge(Note2)		Q_{GS}	-	6.7	-	nC
Gate to Drain Charge(Note2)		Q_{GD}	-	7.9	-	nC

Source-Drain Diode Characteristics at Ta=25°C unless otherwise specified

Parameter	Test Condition	Symbol	Min.	Typ.	Max.	Unit
Maximun Body-Diode Continuous Current	Tj=25°C	I_S	-	-	13	A
Maximun Body-Diode Pulsed Current(Note2)		I_{SM}	-	-	52	A
Drain-Source Diode Forward Voltage	I_{SD} = 10 A	V_{SD}	-	-	1.4	V
Reverse Recovery Time(Note2)	I_{SD} = 10 A, V_{GS} = 0 V, dI_F / dt = 100 A/μs	trr	-	334	-	ns
Reverse Recovery Charge(Note2)		Qrr	-	2.1	-	μC

Note2:Pulse test: 300 μs pulse width, 2 % duty cycle

RATINGS AND CHARACTERISTIC CURVES

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

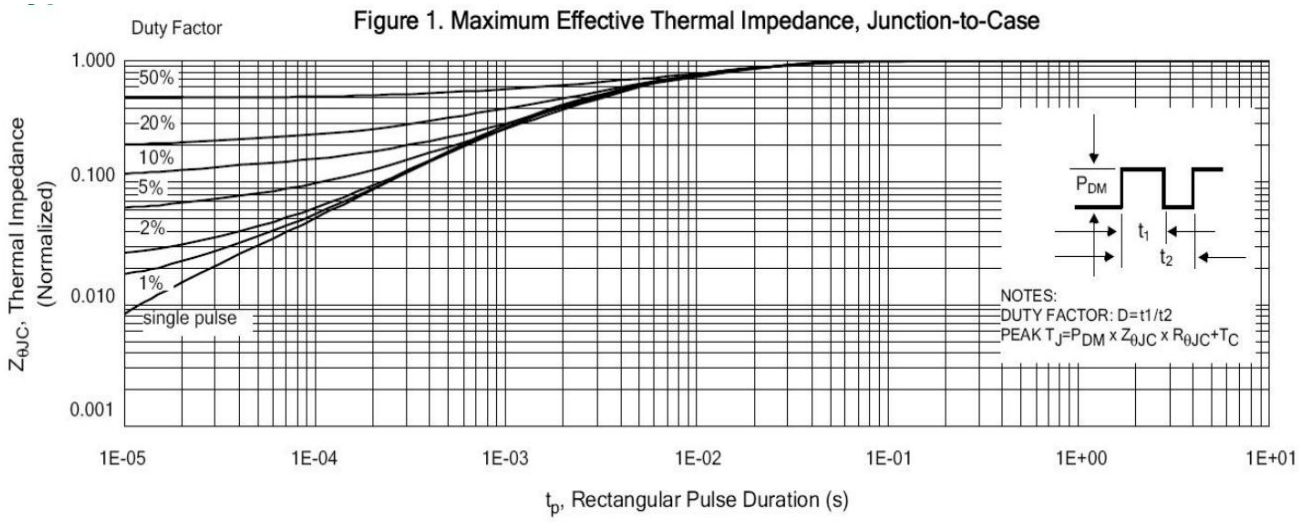


Figure 2. Maximum Power Dissipation vs Case Temperature

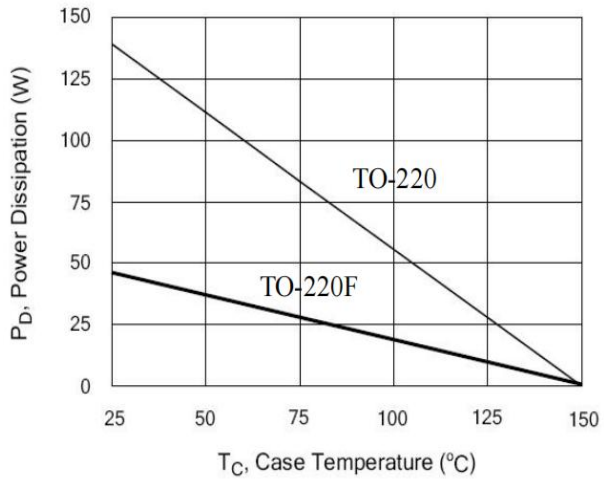


Figure 3 .Maximum Continuous Drain Current vs Tc

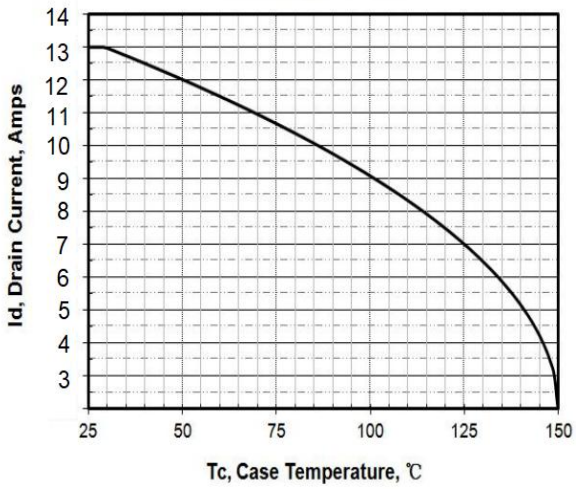


Figure 4. Typical Output Characteristics

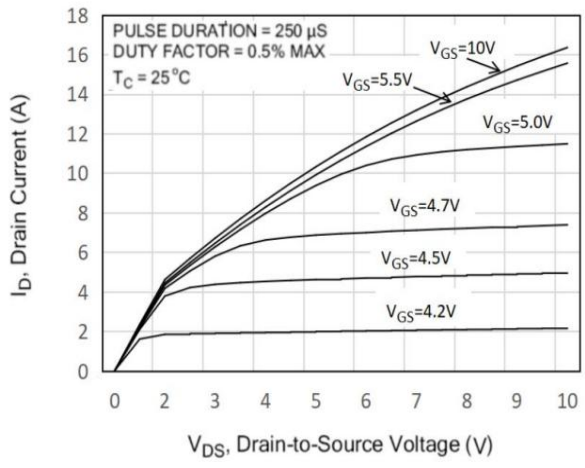
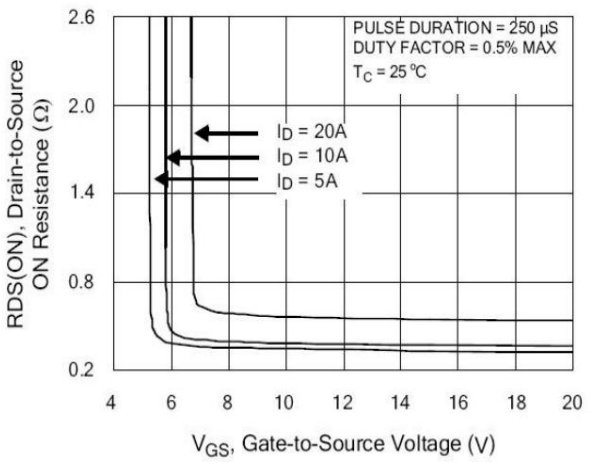


Figure5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current



RATINGS AND CHARACTERISTIC CURVES

Figure 6. Peak Current Capability

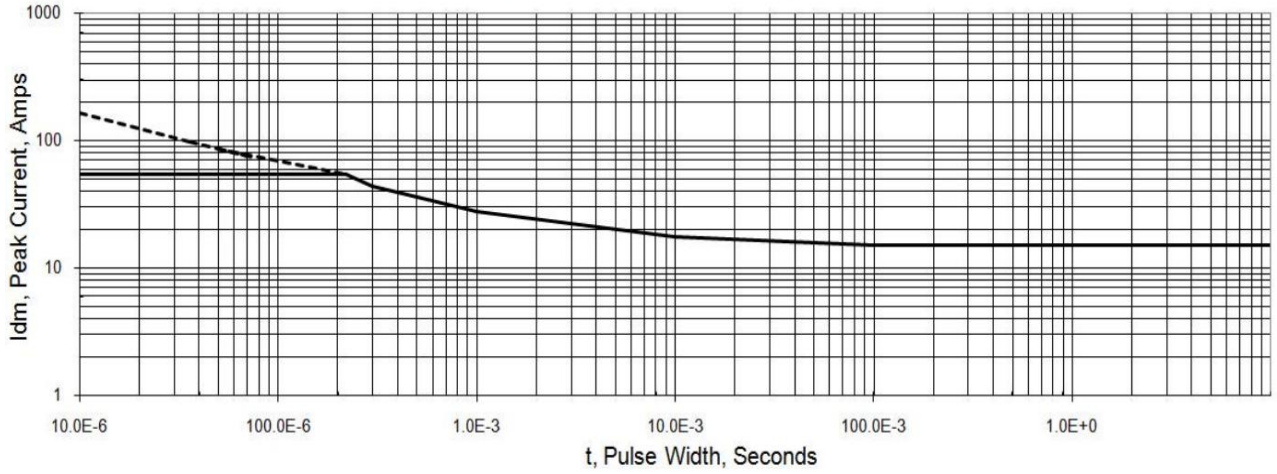


Figure 7. Typical Transfer Characteristics

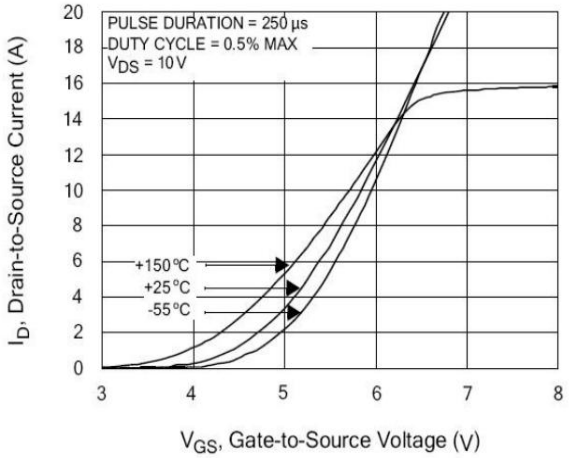


Figure8. Unclamped Inductive Switching Capability

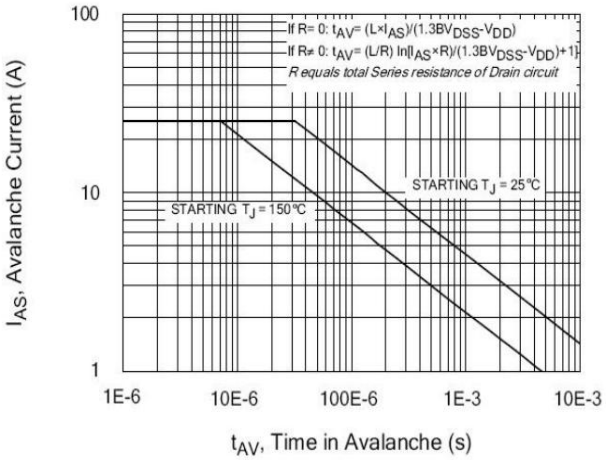


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

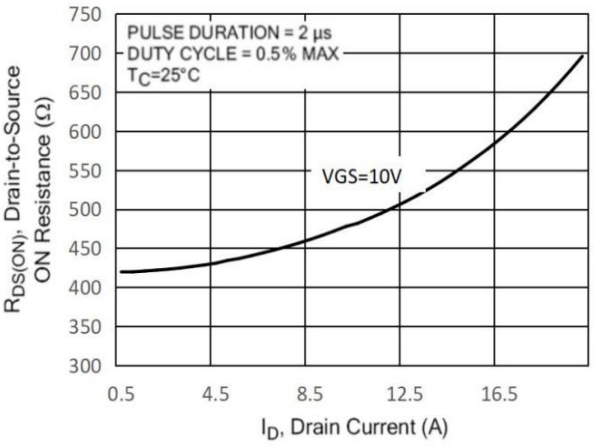
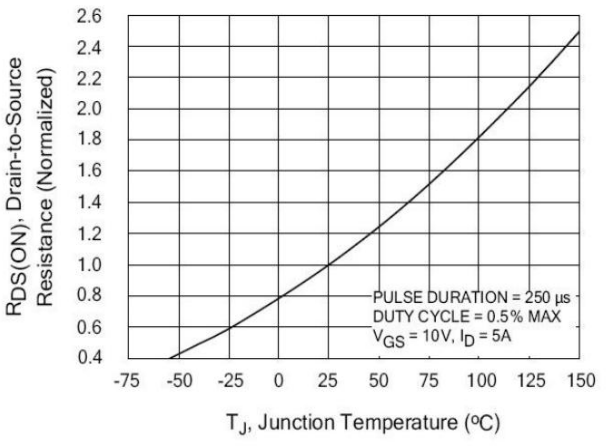


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature



RATINGS AND CHARACTERISTIC CURVES

Figure 11. Typical Breakdown Voltage vs Junction Temperature

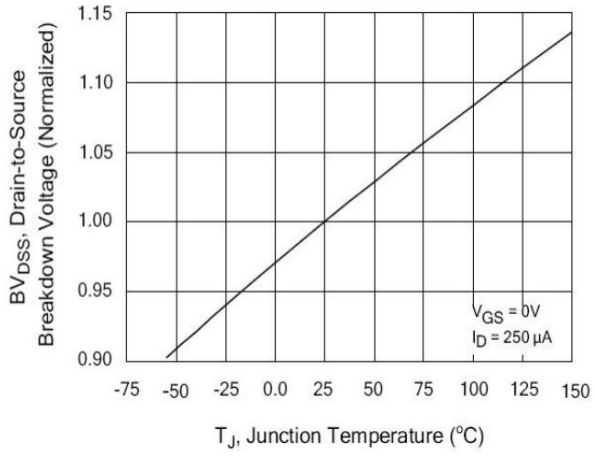


Figure 12. Typical Threshold Voltage vs Junction Temperature

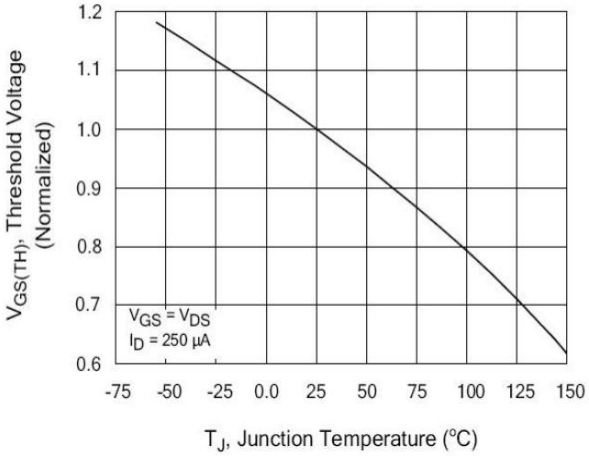


Figure 13 . Maximum Safe Operating Area

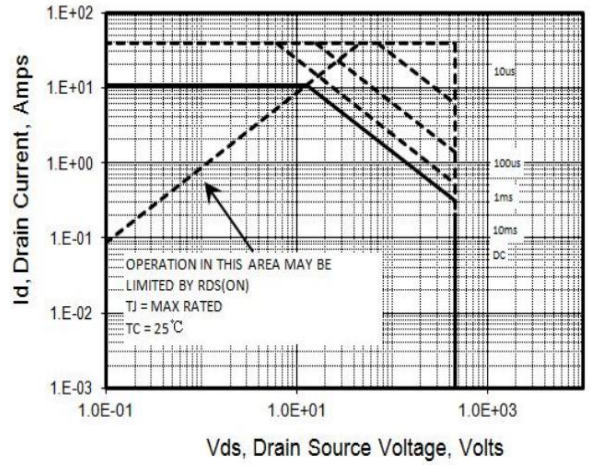


Figure 14. Typical Capacitance vs Drain-to-Source Voltage

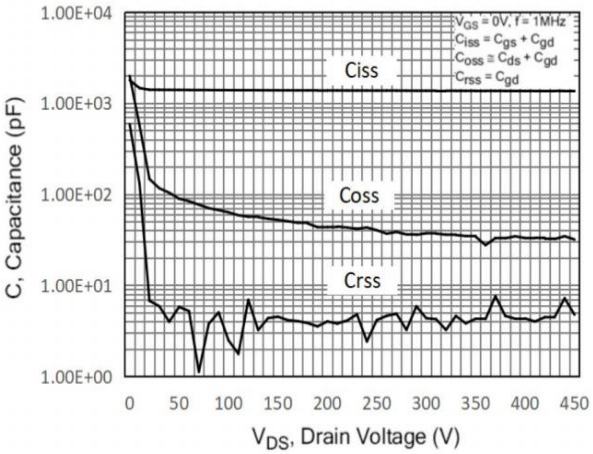


Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

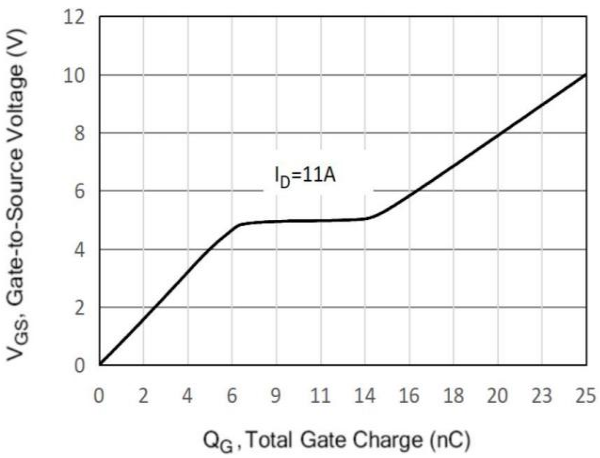
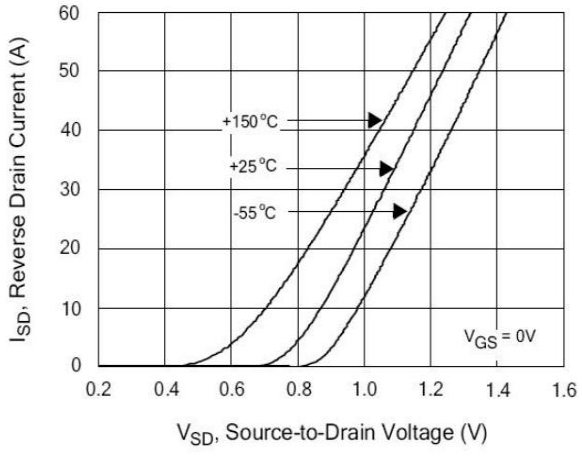
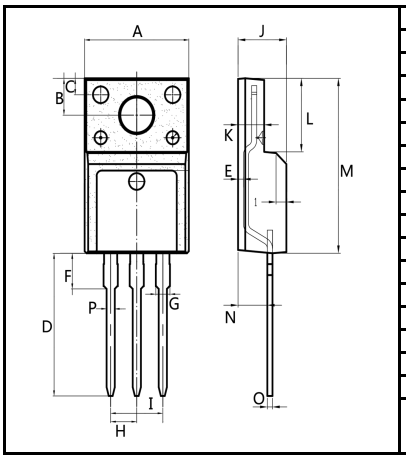


Figure 16. Typical Body Diode Transfer Characteristics



Package Outline Dimensions millimeters

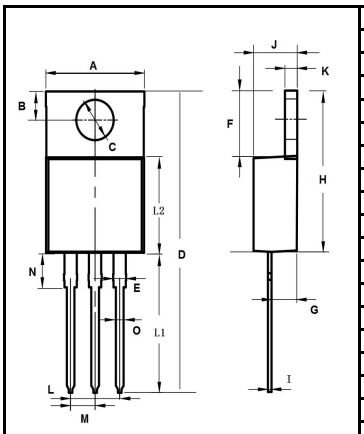
TO-220F



Dim.	Min.	Max.
A	9.95	10.35
B	2.95	3.25
C	1.25	1.45
D	12.8	13.2
E	0.4	0.6
F	2.8	3.5
G	1.3	1.45
H	Typ 2.54	
I	Typ 5.08	
J	4.5	5
K	2.45	2.65
L	6.5	6.8
M	15.4	16
N	2.75	3.05
O	0.45	0.55
P	0.7	0.9

All Dimensions in millimeter

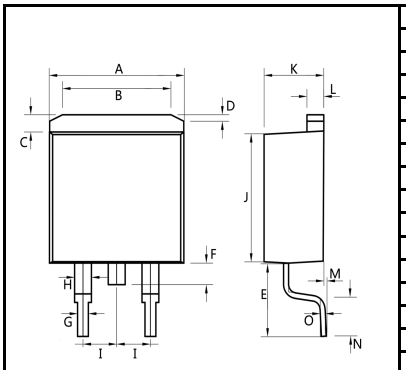
TO-220AB



Dim.	Min.	Max.
A	10.15	10.35
B	2.5	2.95
C	3.7	3.99
D	28.5	29.5
E	1.2	1.4
F	6.2	6.55
G	2.4	2.6
H	15	16
I	0.35	0.42
J	4.3	4.55
K	1.25	1.35
L	Typ5.08	
L1	13	14
L2	8.5	9.5
M	Typ2.54	
N	2.8	3.7
O	0.7	0.9

All Dimensions in millimeter

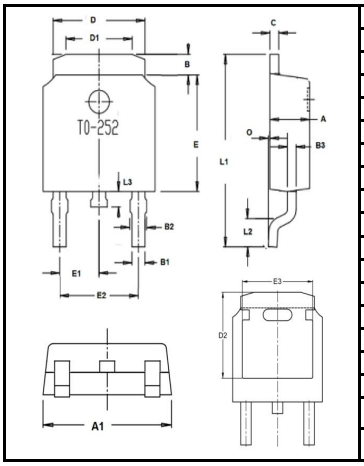
TO-263



Dim.	Min.	Max.
A	10.1	10.35
B	6	8
C	1.2	1.5
D	0.55	1
E	4.3	5.3
F	1.4	1.6
G	0.75	0.85
H	1.2	1.5
I	Typ2.54	
J	8.5	9.5
K	4.3	4.55
L	1.25	1.35
M	0.02	0.23
N	2.2	2.8
O	0.3	0.4

All Dimensions in millimeter

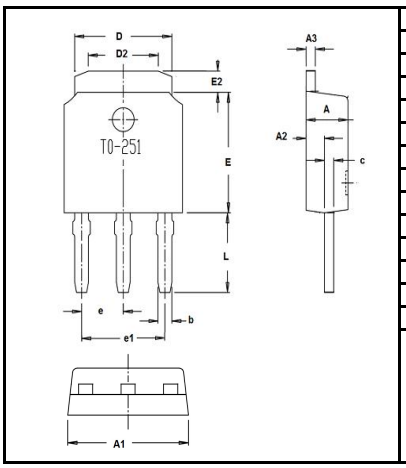
TO-252



Dim.	Min.	Max.
A	2.1	2.5
A1	6.3	6.9
B	0.96	1.42
B1	0.74	0.86
B2	0.74	0.94
C	Typ0.5	
D	5.33	5.53
D1	3.65	4.05
D2	5	5.4
E	6	6.2
E1	Typ2.29	
E2	Typ4.58	
E3	4.6	5
O	0	0.15
L1	9.9	10.5
L2	Typ1.65	
L3	0.6	1

All Dimensions in millimeter

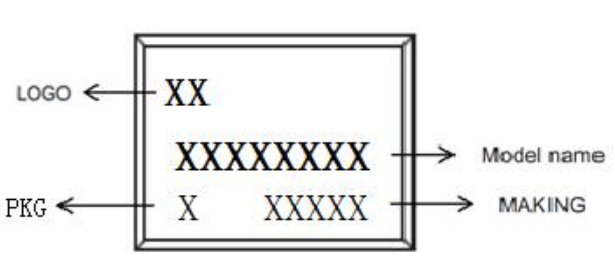
TO-251

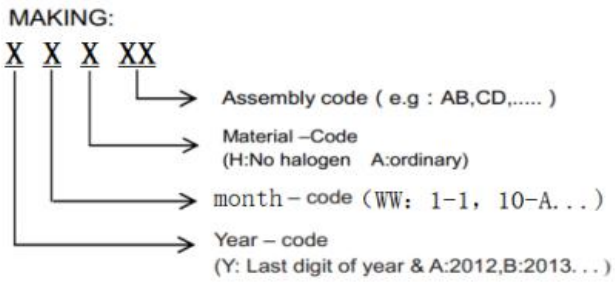


Dim.	Min.	Max.
A	2.1	2.5
A1	6.3	6.9
A2	0.9	1.1
A3	Typ0.5	
b	0.6	0.8
c	0.4	0.5
D	5.3	5.5
D2	3.65	4.05
E	5.8	6.4
E2	0.9	1.4
e	Typ2.29	
e1	Typ4.58	
L	3.7	4.3

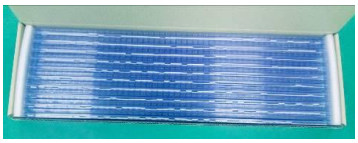
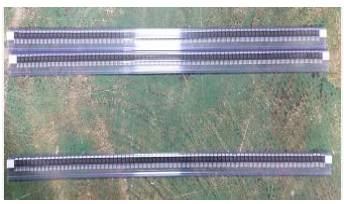
All Dimensions in millimeter

Marking on the body





packing instruction

PKG	Minimal Package	Mini Box	Box
TO-220F TO-220AB TO-263			
	50pcs/pdpe	1000pcs/box	5000pcs/box
TO-252			
	2500pcs/disk	5000pcs/disk	25000pcs/box
TO-263-R			
	800pcs/disk	1600pcs/disk	8000pcs/box
TO-251			
	80pcs/pdpe	4000pcs/box	24000pcs/box

Notice

All product,product specifications and data are subject to change without notice to improve.The right to explain is owned by LINGXUN electronics company.

Confirm that operation temperature is within the specified range described in the product specification. Avoid applying poer exceeding normal rated

poer; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.

LINGXUN electronics shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

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Revision History

Rev	Changes	Date
1.0	First version	2025-7-15