

N-Channel Enhancement Mode Power MOSFET

CS20N65A

MAIN CHARACTERISTICS

I_D	20A
V_{DSS}	650V
$R_{DS(on)-max}$ (@ $V_{GS}=10V$)	0.5 Ω
Q_G -typ	58nC

FEATURES

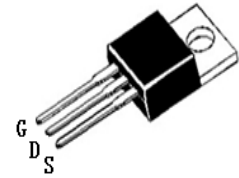
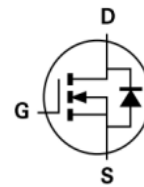
- Fast Switching
- Low ON Resistance
- Low Gate Charge
- 100% Single Pulse avalanche energy Test

APPLICATIONS

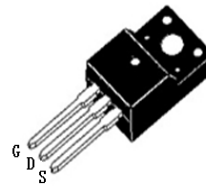
- Power switch circuit of adaptor and charger.

MECHANICAL DATA

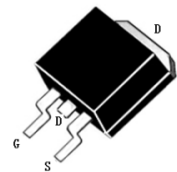
- Case: Molded plastic
- Mounting Position: Any
- Molded Plastic: UL Flammability Classification Rating 94V-0
- Lead free in compliance with EU RoHS 2011/65/EU directive
- Solder bath temperature 275 $^{\circ}$ C maximum,10s per JESD 22-B106



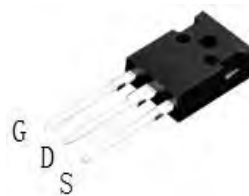
CS20N65A1/TO-220AB



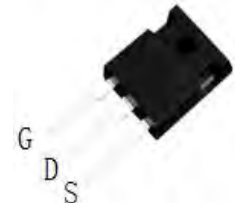
CS20N65A2/TO-220F



CS20N65A3/TO-263



CS20N65A6/TO-247



CS20N65A7/TO-247S

Marking on the body



MAKING:

X X X X X X

Assembly code (e.g : AB,CD,.....)

Material -Code
(H:No halogen A:ordinary)

Week - code (WW:01~52)

Year - code
(Y: Last digit of year & A:2012,B:2013...)

Ordering information

Part Number	Package	Unit Weight	Base Quantity	Delivery mode
CS20N65A1	TO-220AB	0.07oz(1.96g)	50 pcs / tube	1Kpcs/box 5Kpcs/carton
CS20N65A2	TO-220F	0.06oz(1.74g)	50 pcs / tube	1Kpcs/box 5Kpcs/carton
CS20N65A3	TO-263	0.04oz(1.16g)	50 pcs / tube	1Kpcs/box 5Kpcs/carton
CS20N65A3-R	TO-263	0.04oz(1.16g)	800 pcs / reel	800pcs/box 4Kpcs/carton
CS20N65A6	TO-247	0.209oz(5.93g)	30 pcs / tube	600pcs/box 2.4Kpcs/carton
CS20N65A7	TO-247S	0.158oz(4.48g)	30 pcs / tube	600pcs/box 2.4Kpcs/carton

CS20N65A

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

Characteristics	Symbol	Value			Unit
		220AB/263	220F	247/247S	
Drain-Source Voltage	V_{DS}	650			V
Gate-Source Voltage	V_{GS}	± 30			V
Continue Drain Current	I_D	20			A
Pulsed Drain Current (Note1)	I_{DM}	80			A
Power Dissipation	P_D	250	45	250	W
Single Pulse Avalanche Energy (Note1)	E_{AS}	1200			mJ
Operating Temperature Range	T_J	150			$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150			$^{\circ}\text{C}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.5	2.78	0.5	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	40	62.5	40	$^{\circ}\text{C/W}$

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

Electrical Characteristics at $T_c=25^{\circ}\text{C}$ unless otherwise specified

Characteristics	Test Condition	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	BV_{DSS}	650	-	-	V
Drain-Source Leakage Current	$V_{DS} = 650\text{ V}, V_{GS} = 0\text{ V}$	I_{DSS}	-	-	1	μA
Gate Leakage Current	$V_{GS} = \pm 30\text{ V}, V_{DS} = 0\text{ V}$	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	$V_{GS(th)}$	2	-	4	V
Drain-Source On-State Resistance	$V_{GS} = 10\text{ V}, I_D = 10\text{ A}$	$R_{DS(on)}$	-	-	0.5	Ω
Forward Transconductance	$V_{DS} = 15\text{ V}, I_D = 10\text{ A}$	g_{fs}	-	18	-	S
Input Capacitance	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	C_{iss}	-	2980	-	pF
Output Capacitance		C_{oss}	-	320	-	pF
Reverse Transfer Capacitance		C_{rss}	-	20	-	pF
Turn-on Delay Time(Note2)	$I_D = 20\text{ A}, V_{DD} = 250\text{ V}, R_G = 10\text{ }\Omega$	$t_{d(ON)}$	-	36	-	ns
Rise Time(Note2)		t_r	-	75	-	ns
Turn-Off Delay Time(Note2)		$t_{d(OFF)}$	-	79	-	ns
Fall Time(Note2)		t_f	-	59	-	ns
Total Gate Charge(Note2)	$I_D = 20\text{ A}, V_{DD} = 400\text{ V}, V_{GS} = 10\text{ V}$	Q_G	-	58	-	nC
Gate to Source Charge(Note2)		Q_{GS}	-	14	-	nC
Gate to Drain Charge(Note2)		Q_{GD}	-	23	-	nC

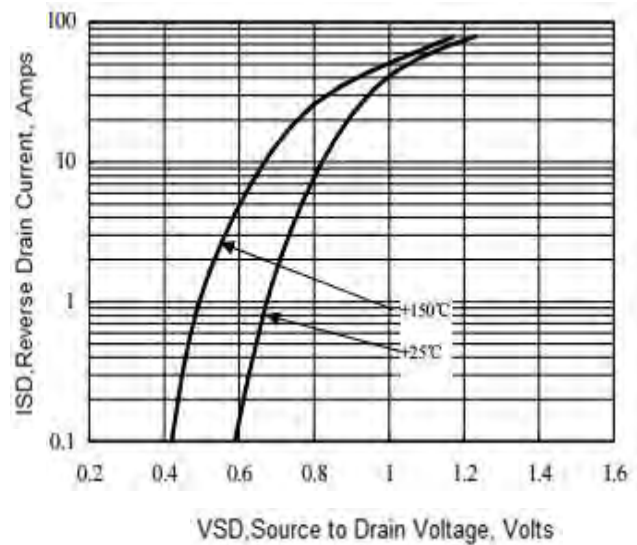
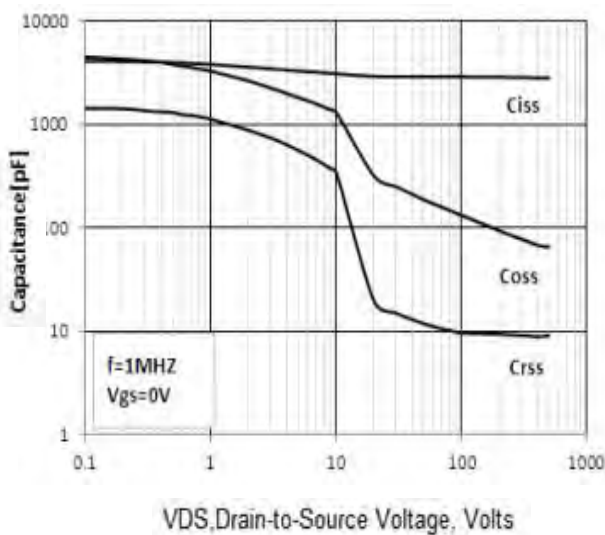
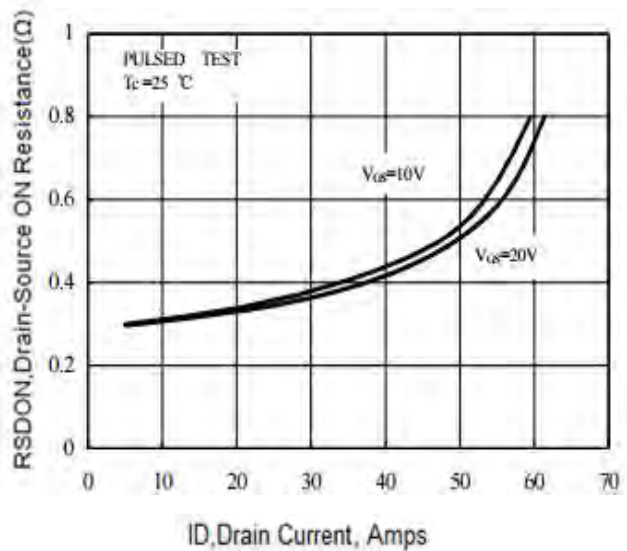
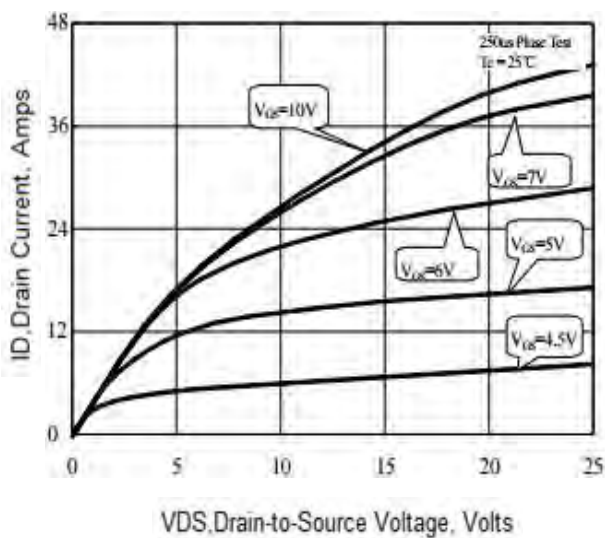
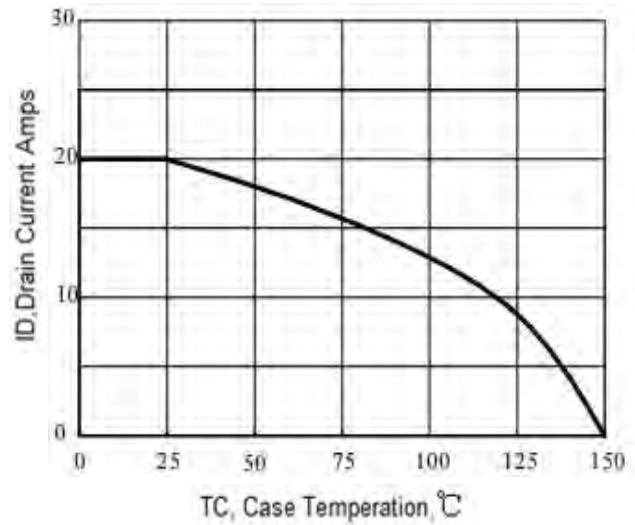
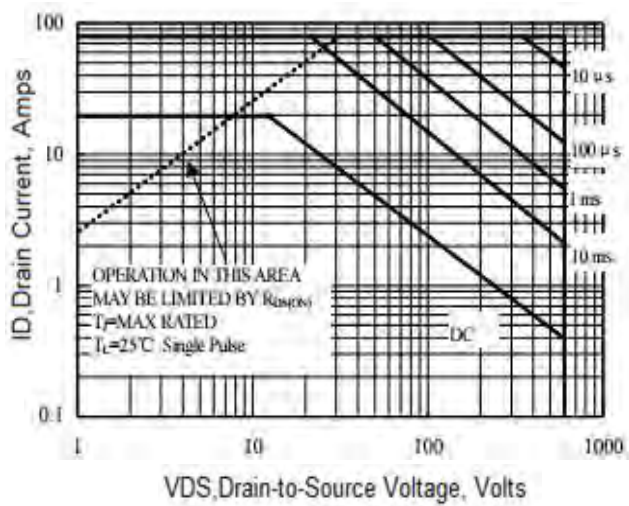
Source-Drain Diode Characteristics at $T_a=25^{\circ}\text{C}$ unless otherwise specified

Characteristics	Test Condition	Symbol	Min.	Typ.	Max.	Unit
Maximun Body-Diode Continuous Current		I_S	-	-	20	A
Maximun Body-Diode Pulsed		I_{SM}	-	-	80	A
Drain-Source Diode Forward Voltage	$I_{SD} = 20\text{ A}$	V_{SD}	-	-	1.4	V
Reverse Recovery Time(Note2)	$I_{SD} = 20\text{ A}, V_{GS} = 0\text{ V},$	t_{rr}	-	590	-	ns
Reverse Recovery Charge(Note2)	$di_F / dt = 100\text{ A}/\mu\text{s}$	Q_{rr}	-	6.8	-	μC

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

CS20N65A

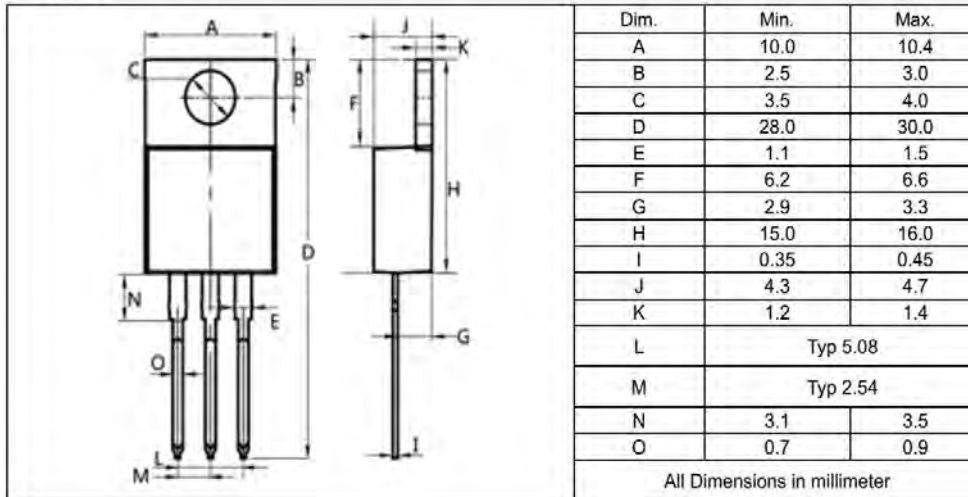
RATINGS AND CHARACTERISTIC CURVES



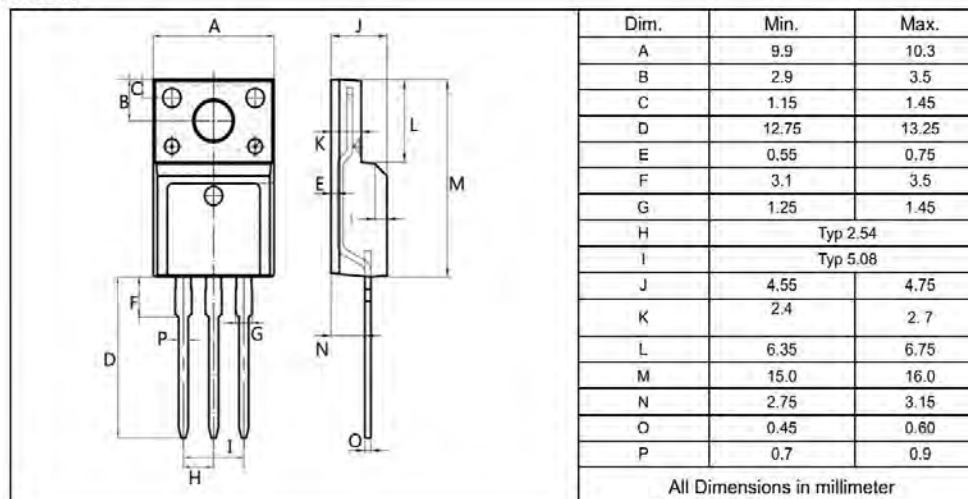
CS20N65A

Package Outline Dimensions millimeters

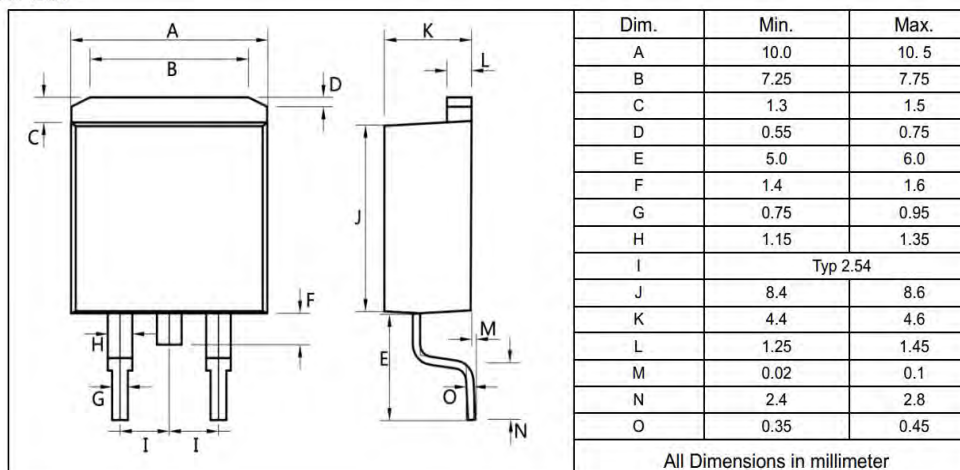
TO-220AB



TO-220F



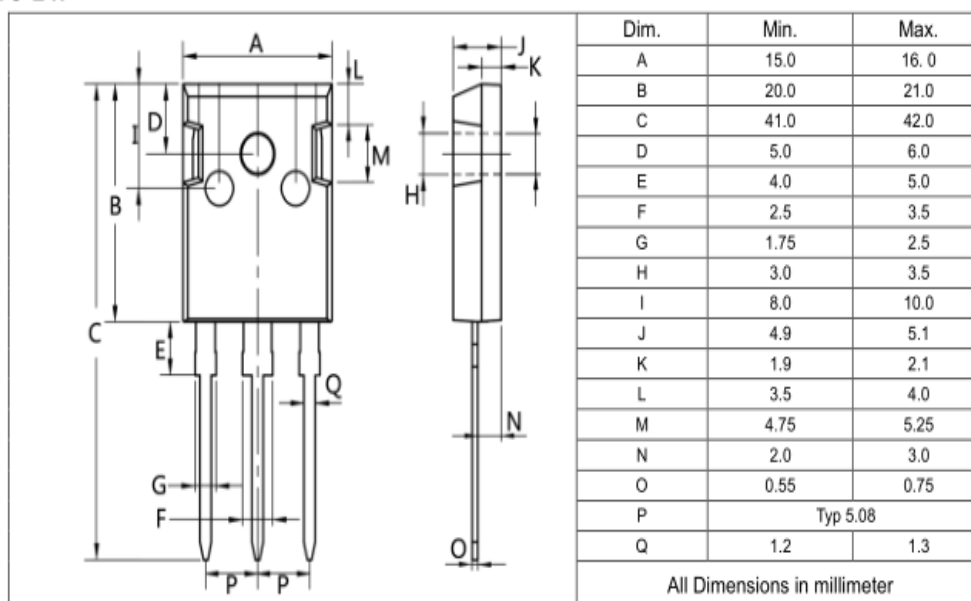
TO-263



CS20N65A

Package Outline Dimensions millimeters

TO-247



TO-247S

