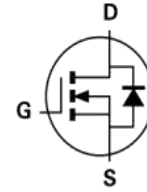


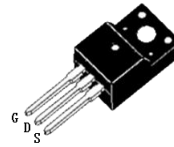
MAIN CHARACTERISTICS

I_D	12A
V_{DSS}	600V
$R_{DS(on)-typ}$ (@ $V_{GS}=10V$)	0.56 Ω

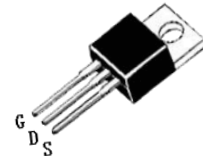


FEATURES

- Advanced Planar Process Technology
- Ultra Low On-Resistance
- Fast Switching
- Good EMI Performance



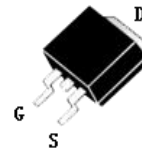
TO-220F



TO-220AB

APPLICATIONS

- Load Switch
- PWM Application
- Power Management



TO-263

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

Product specification classification

Part Number	Package	Mode Name	Pack
CS12N60A2	TO-220F (0.5mm)	CS12N60A	Tube
CS12N60A8	TO-220F (1.3mm)	CS12N60A	Tube
CS12N60A1	TO-220AB	CS12N60A	Tube
CS12N60A3	TO-263	CS12N60A	Tube
CS12N60A3-R	TO-263	CS12N60A	Tape

Maximum Ratings at Tc=25°C unless otherwise specified

Characteristics	Symbol	Value			Unit
		220AB	220F	263	
Drain-Source Voltage	V_{DS}	600			V
Gate-Source Voltage	V_{GS}	±30			V
Continue Drain Current	I_D	12			A
Pulsed Drain Current (Note1)	I_{DM}	48			A
Power Dissipation	P_D	156	28	156	W
Single Pulse Avalanche Energy (Note1)	E_{AS}	537			mJ
Operating Temperature Range	T_J	150			°C
Storage Temperature Range	T_{STG}	-55 to +150			°C
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.8	4.4	0.8	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	64	49	64	°C/W

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

Electrical Characteristics at Tc=25°C unless otherwise specified

Characteristics	Test Condition	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0 V, I_D = 250 \mu A$	BV_{DSS}	600	-	-	V
Drain-Source Leakage Current	$V_{DS} = 600 V, V_{GS} = 0 V$	I_{DSS}	-	-	1	μA
Gate Leakage Current	$V_{GS} = \pm 30 V, V_{DS} = 0 V$	I_{GSS}	-	-	±100	nA
Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250 \mu A$	$V_{GS(th)}$	2	-	4	V
Drain-Source On-State Resistance	$V_{GS} = 10 V, I_D = 6 A$	$R_{DS(on)}$	-	0.56	0.65	Ω
Forward Transconductance	$V_{DS} = 15 V, I_D = 6 A$	gfs	-	12	-	S
Input Capacitance	$V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz$	C_{iss}	-	2107	-	pF
Output Capacitance		C_{oss}	-	180	-	pF
Reverse Transfer Capacitance		C_{rss}	-	21	-	pF
Turn-on Delay Time(Note2)	$I_D = 12 A, V_{DD} = 300 V, R_G = 24 \Omega, V_{GS} = 10 V$	$t_{d(ON)}$	-	31	-	ns
Rise Time(Note2)		t_r	-	40	-	ns
Turn-Off Delay Time(Note2)		$t_{d(OFF)}$	-	135	-	ns
Fall Time(Note2)		t_f	-	49	-	ns
Total Gate Charge(Note2)	$I_D = 12 A, V_{DD} = 300 V, V_{GS} = 10 V$	Q_G	-	45	-	nC
Gate to Source Charge(Note2)		Q_{GS}	-	11.6	-	nC
Gate to Drain Charge(Note2)		Q_{GD}	-	15	-	nC

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

Characteristics	Test Condition	Symbol	Min.	Typ.	Max.	Unit
Maximun Body-Diode Continuous Current		I_S	-	-	12	A
Maximun Body-Diode Pulsed Current(Note2)		I_{SM}	-	-	48	A
Drain-Source Diode Forward Voltage	$I_{SD} = 12 A$	V_{SD}	-	-	1.2	V
Reverse Recovery Time(Note2)	$I_{SD} = 12 A, V_{GS} = 0 V, dl_F / dt = 100 A/\mu s$	trr	-	560	-	ns
Reverse Recovery Charge(Note2)		Qrr	-	5.1	-	μC

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

RATINGS AND CHARACTERISTIC CURVES

Figure 1: Output Characteristics

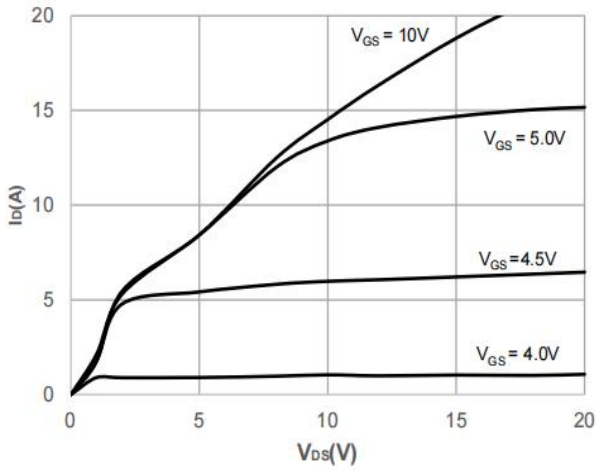


Figure 2: Typical Transfer Characteristics

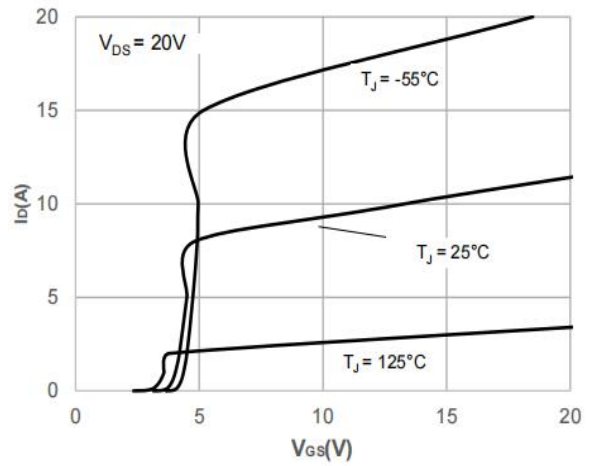


Figure 3: On-resistance vs. Drain Current

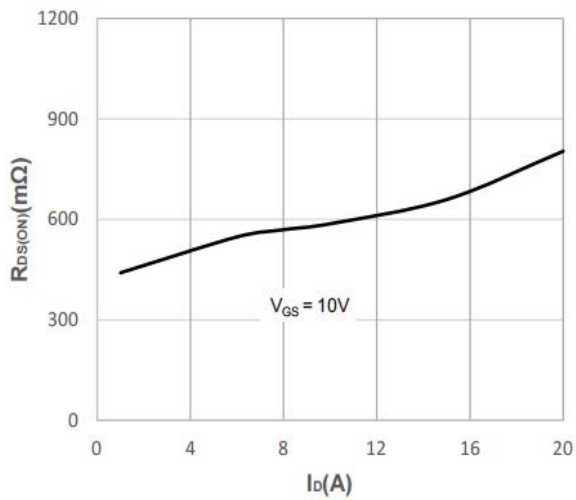


Figure 4: Body Diode Characteristics

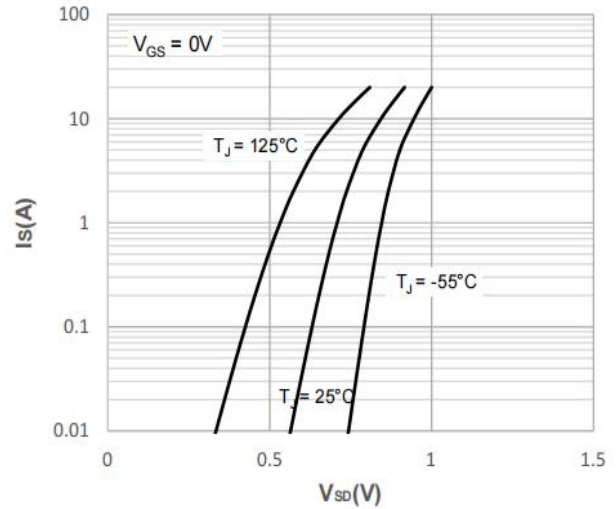


Figure 5: Gate Charge Characteristics

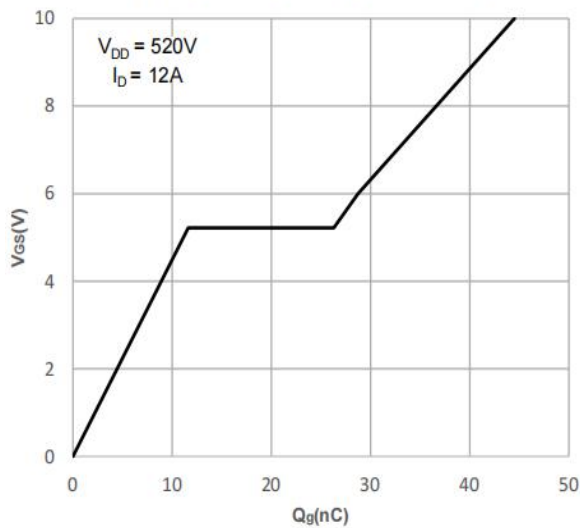
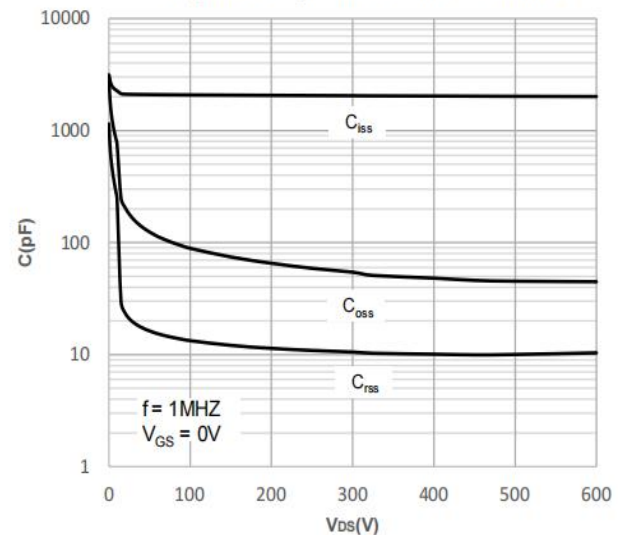


Figure 6: Capacitance Characteristics



RATINGS AND CHARACTERISTIC CURVES

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

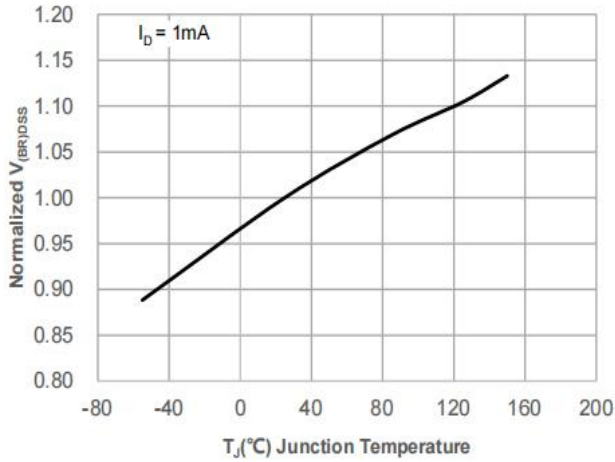


Figure 8: Normalized on Resistance vs. Junction Temperature

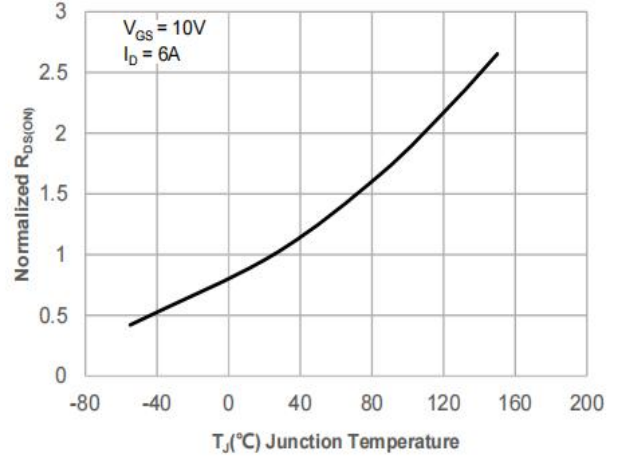


Figure 9: Maximum Safe Operating Area

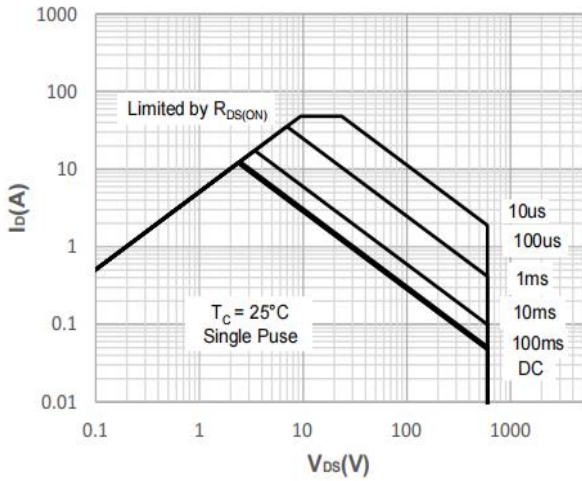


Figure 10: Maximum Continuous Driian Current vs. Case Temperature

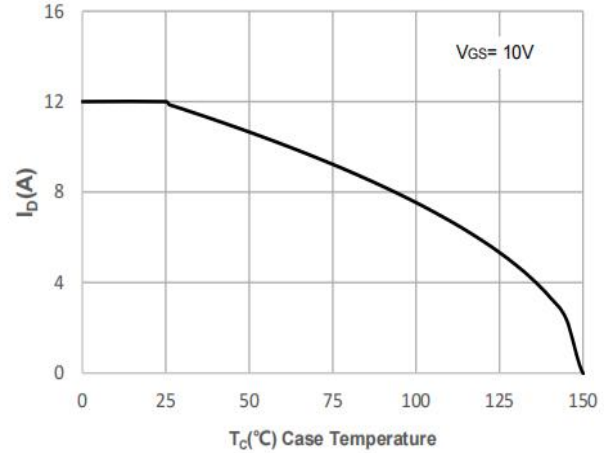


Figure 11: Normalized Maximum Transient Thermal Impedance

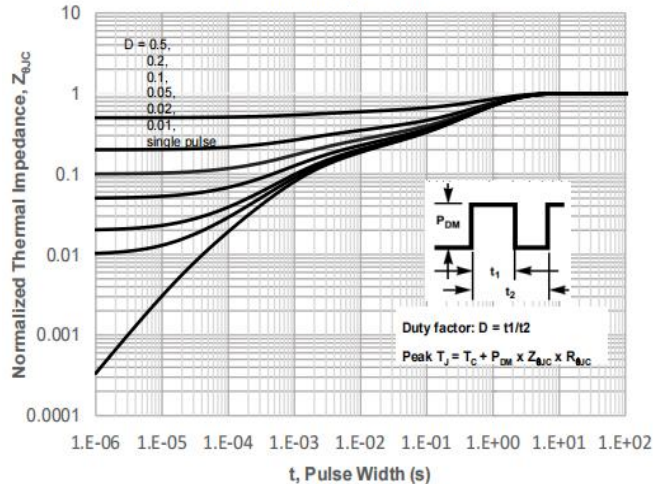
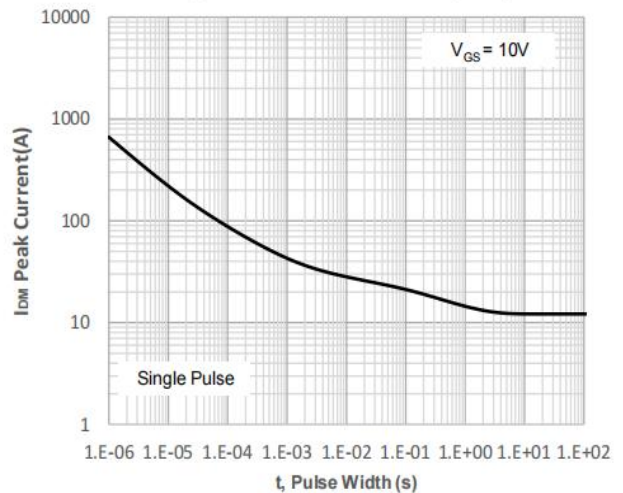
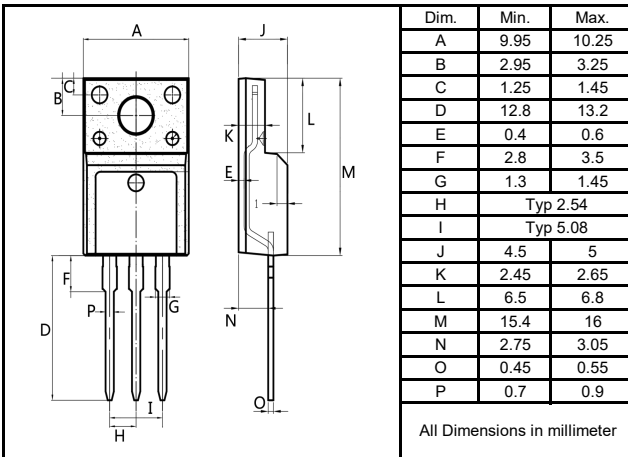


Figure 12: Peak Current Capacity

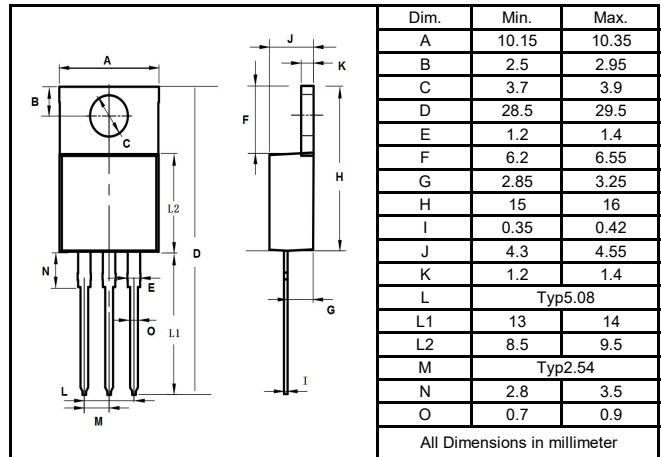


Package Outline Dimensions millimeters

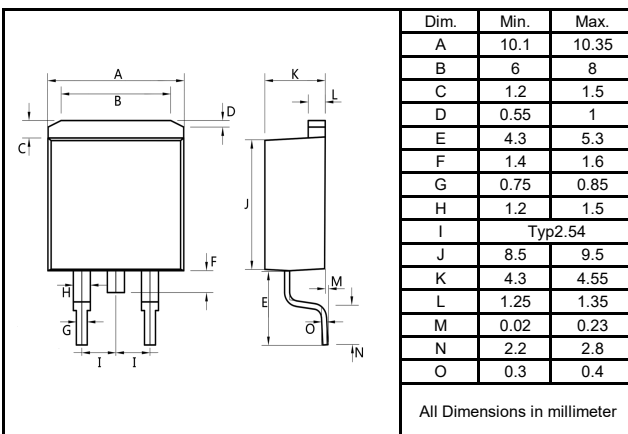
T0-220F



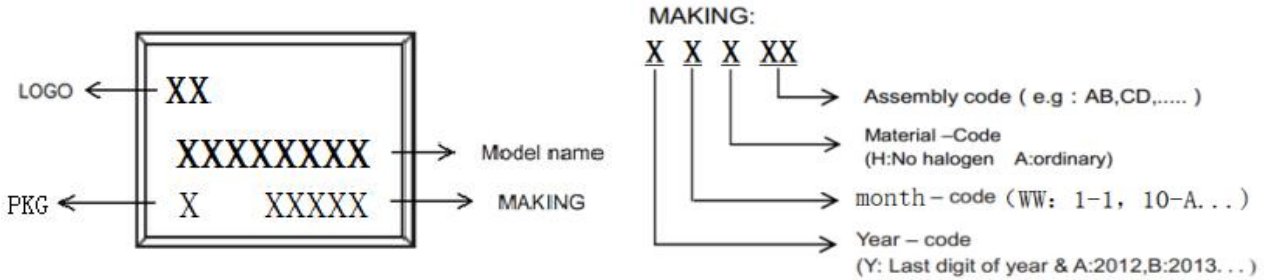
T0-220AB



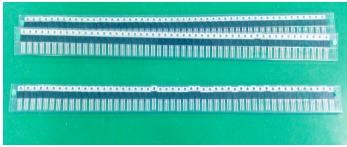





T0-263



Marking on the body



packing instruction

PKG	最小包装	内盒	外箱
TO-220F TO-220AB TO-263			
	50pcs/管	1000pcs/盒	5000pcs/箱
TO-263-R			
	800pcs/盘	1600pcs/盒	8000pcs/箱

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.