



CS150N04 A8

General Description:

CS150N04 A8, the silicon N-channel Enhanced VDMOSFETs, is obtained by advanced trench Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency. The package form is TO-220AB, which accords with the RoHS standard.

Features:

- 1 Fast Switching
- 1 Low ON Resistance($R_{DS(on)} \leq 4.5m\Omega$ Type 4m Ω)
- 1 High Power and Current Handling Capability
- 1 Low Reverse transfer Capacitances(Typical:480pF)
- 1 100% Single Pulse avalanche energy Test

Applications:

UPS, Inverter, Lighting.

Absolute ($T_c = 25^\circ\text{C}$ unless otherwise specified):

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	40	V
I_D	Continuous Drain Current	150	A
	Continuous Drain Current $T_c = 100^\circ\text{C}$	90	A
I_{DM}^{a1}	Pulsed Drain Current	600	A
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}^{a2}	Single Pulse Avalanche Energy	100	mJ
dv/dt^{a3}	Peak Diode Recovery dv/dt	15	V/ns
P_D	Power Dissipation	150	W
	Derating Factor above 25°C	1.2	W/ $^\circ\text{C}$
T_J, T_{stg}	Operating Junction and Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_L	Maximum Temperature for Soldering	300	$^\circ\text{C}$

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case	0.83	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Junction-to-Ambient	100	$^\circ\text{C}/\text{W}$

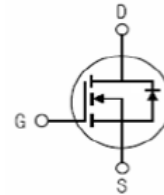
V_{DSS}	40	V
I_D	150	A
$P_D (T_c=25^\circ\text{C})$	100	W
$R_{DS(ON)Typ}$	4	m Ω

TO-220AB



1. Gate 2. Drain 3. Source

Inner Equivalent Principium Chart





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Electrical Characteristics (Tc= 25℃ unless otherwise specified):

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min	Typ.	Max.	
V _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	40	--	--	V
ΔV _{DSS} / ΔT _J	vdss Temperature Coefficient	ID=250uA,Reference25℃	--	0.035	--	V/℃
I _{DSS}	Drain to Source Leakage Current	V _{DS} = 40V, V _{GS} = 0V,T _a = 25℃	--	--	1	μA
		V _{DS} =32V, V _{GS} = 0V,T _a = 150℃	--	--	500	
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} =+30V	--	--	100	nA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} =-30V	--	--	-100	nA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =10V,I _D =50A	--	4	4.5	mΩ
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.0		3.5	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =50A	--	320	--	S
Pulse width tp≤300μs, δ ≤2%						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R _g	Gate resistance	V _{GS} =0V, f = 1.0MHz	--	1	--	Ω
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = 25V f = 1.0MHz	--	8900	--	pF
C _{oss}	Output Capacitance		--	550	--	
C _{rss}	Reverse Transfer Capacitance		--	480	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	I _D =150A V _{DD} = 30V V _{GS} = 10V R _G = 10Ω	--	48	--	ns
t _r	Rise Time		--	88	--	
t _{d(OFF)}	Turn-Off Delay Time		--	170	--	
t _f	Fall Time		--	62	--	
Q _g	Total Gate Charge	I _D =20A V _{DD} =32V V _{GS} = 10V	--	160		nC
Q _{gs}	Gate to Source Charge		--	42	--	
Q _{gd}	Gate to Drain (“Miller”)Charge		--	33	--	



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Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	150	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	600	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=50A,$	--	--	0.96	V
t_{rr}	Reverse Recovery Time	$I_S=20A, T_J = 25^{\circ}C$	--	84	--	ns
Q_{rr}	Reverse Recovery Charge	$dI_F/dt=100A/us, V_{GS}=0V$	--	75	--	nC
Pulse width $t_p \leq 300\mu s, \delta \leq 2\%$						

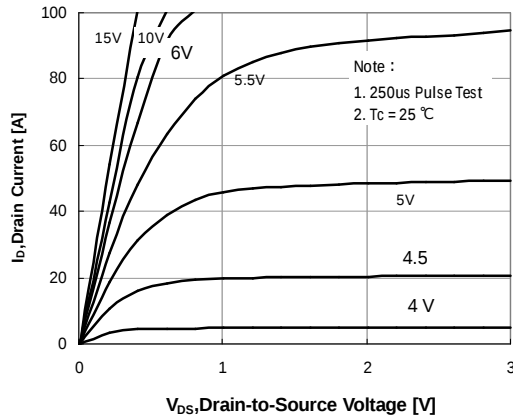
^{a1}: Repetitive rating; pulse width limited by maximum junction temperature

^{a2}: $L=0.1mH, I_D=80A, R_g=25\Omega, V_{dd}=50V, Start T_J=25^{\circ}C$

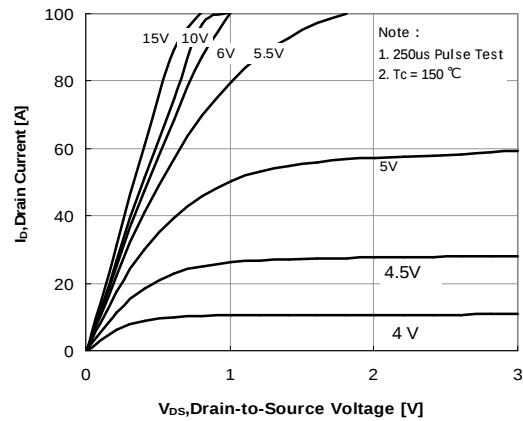
^{a3}: $I_{SD}=5A, di/dt \leq 200A/us, V_{DD} \leq BV_{DS}, Start T_J=25^{\circ}C$

Characteristics Curve:

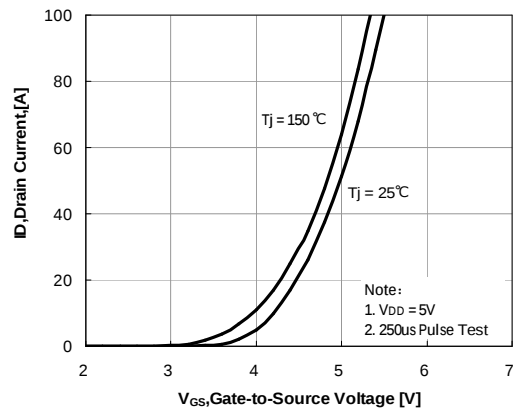
Typical Output Characteristics



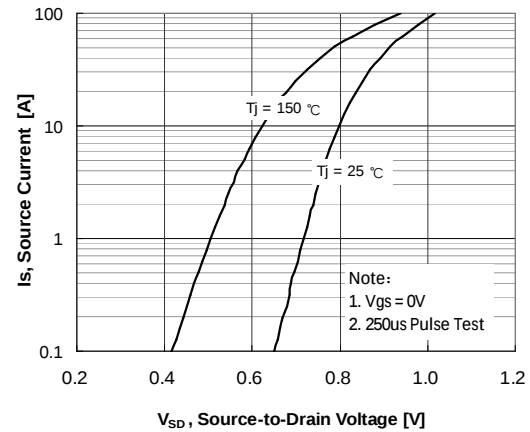
High temperature Output Characteristics



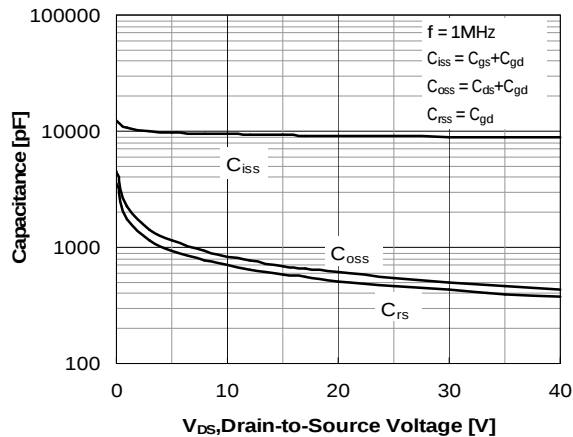
Typical Transfer Characteristics



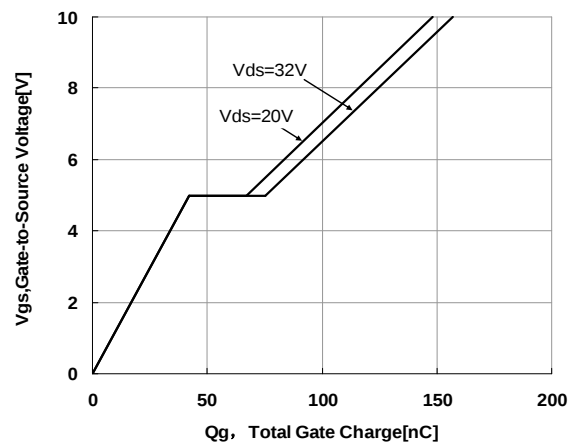
Source -to-Drain Diode Forward Voltage



Capacitance VS Drain-to-Source Voltage



Gate to Source Voltage VS Total Gate Charge

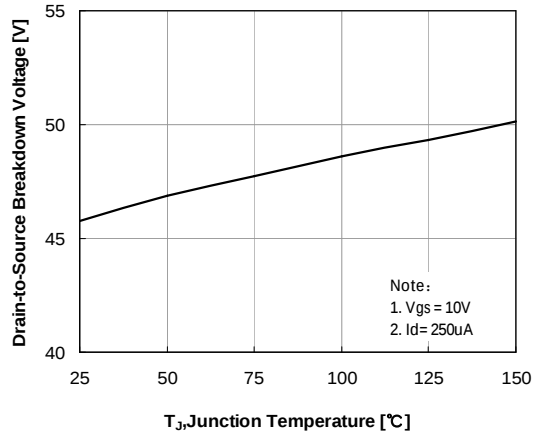




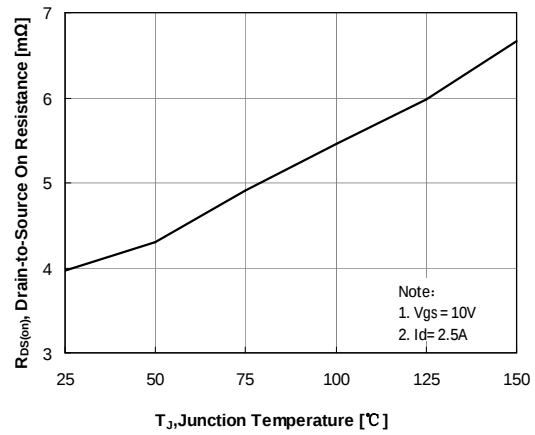
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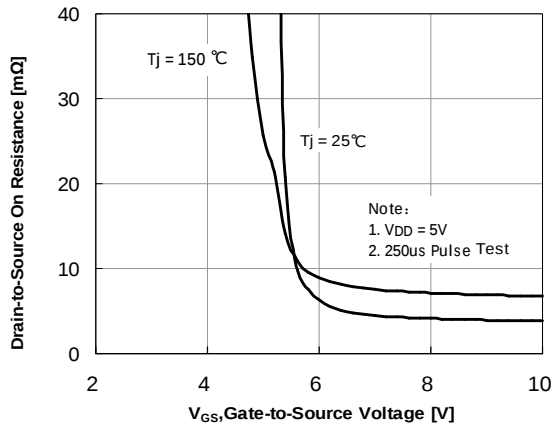
Drain-to-Source breakdown VS Case Temperature



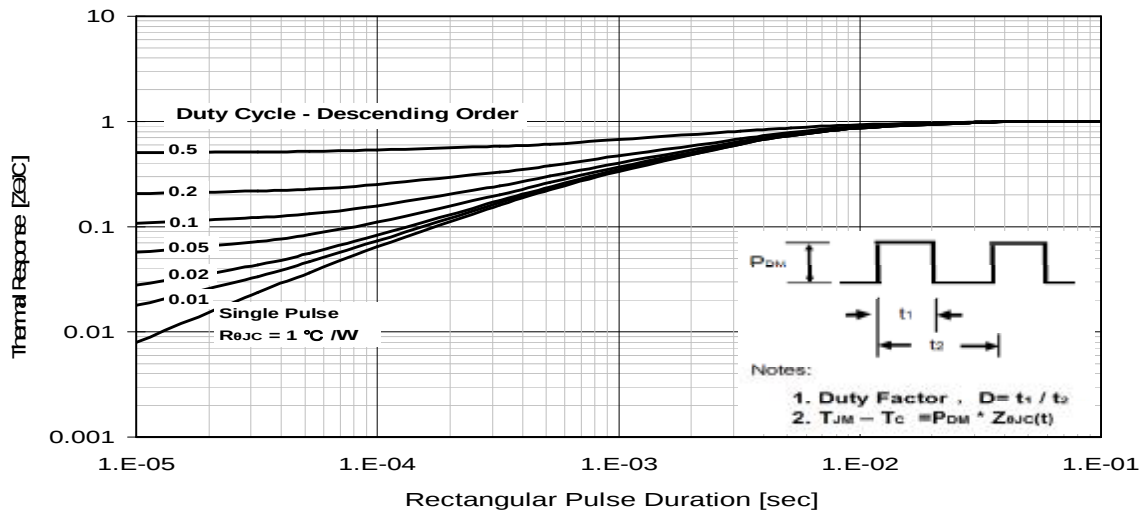
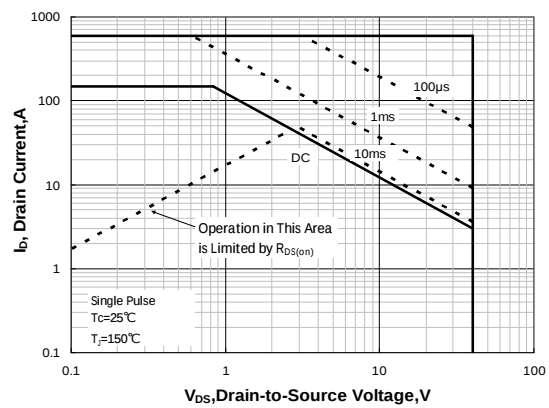
Drain-to-Source On-Resistance VS Case Temperature



Drain-to-Source On-Resistance VS Gate to Source Voltage

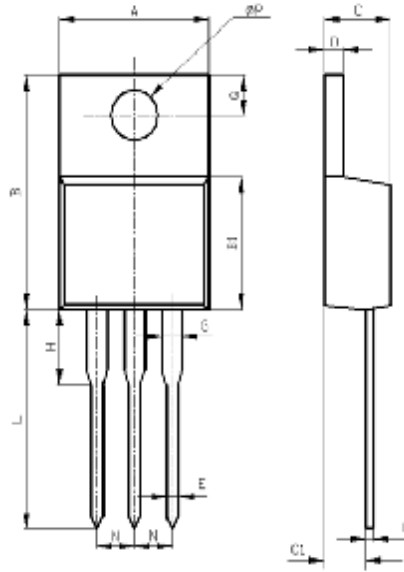


Maximum Forward Bias Safe Operating Area



Maximum Effective Thermal Impedance, Junction to Case

Package Information



Items	Values(mm)	
	MIN	MAX
A	10.00	10.60
B	15.0	16.0
B1	8.90	9.50
C	4.30	4.80
C1	2.30	3.10
D	1.20	1.40
E	0.70	0.90
F	0.30	0.60
G	1.17	1.37
H	3.30	3.80
L	6.40	7.50
	6.70	7.90
	7.20	8.00
	7.50	8.60
	12.7	14.7
N	2.34	2.74
Q	2.40	3.00
Φ P	3.50	3.90

TO-220AB Package

**The name and content of poisonous and harmful material in products**

Part's Name	Hazardous Substance					
	Pb	Hg	Cd	Cr(VI)	PBB	PBDE
Limit	≤0.1%	≤0.1%	≤0.01%	≤0.1%	≤0.1%	≤0.1%
Lead Frame	○	○	○	○	○	○
Molding Compound	○	○	○	○	○	○
Chip	○	○	○	○	○	○
Wire Bonding	○	○	○	○	○	○
Solder	×	○	○	○	○	○
Note	○: means the hazardous material is under the criterion of SJ/T11363-2006. ×: means the hazardous material exceeds the criterion of SJ/T11363-2006. The plumbum element of solder exist in products presently, but within the allowed range of Eurogroup's RoHS.					

Warnings

1. Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. It is suggested to be used under 80 percent of the maximum ratings of the device.
2. When installing the heatsink, please pay attention to the torsional moment and the smoothness of the heatsink.
3. VDMOSFETs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
4. This publication is made by Huajing Microelectronics and subject to regular change without notice.

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