

Description

This is 150V 58A N-channel Enhancement Mode Power mosfet in a TO-220 plastic package.

Uses generation power trench MOSFET technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance. This device is well suited for high efficiency fast switching applications.

Features

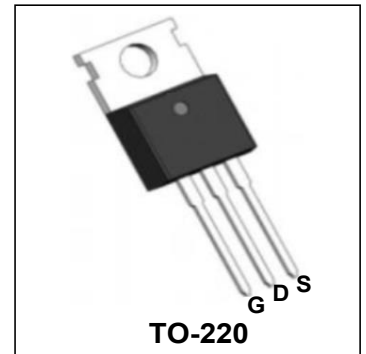
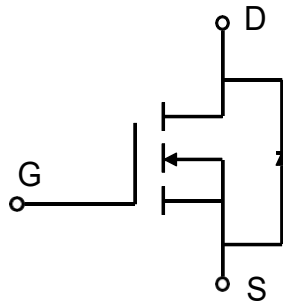
- $V_{DS} = 150V$, $I_D = 59A$ (Silicon Limited) $R_{DS(on)} < 19.8m\Omega$ @ $V_{GS} = 10V$
- RoHs and Halogen-Free Compliant
- Low Gate Charge
- 100% EAS Guaranteed

Applications

- Hard switching and high speed circuit
- DC/DC converters
- Synchronous rectification in SMPS

V_{DS}	$R_{DS(on)}$	I_D
150 V	19.8 m Ω	58 A

Equivalent Circuit & Pinning



Absolute Maximum Ratings(Ta=25°C)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	150	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current ¹ (Silicon Limited)	TC=25°C	I_D	58	A
	TC=100°C		40	
Pulsed Drain Current ²		I_{DM}	175	A
Single Pulse Avalanche Energy ³		E_{AS}	156.8	mJ
Avalanche Current		I_{AS}	28	A
Total Power Dissipation ⁴	TC=25°C	P_D	104	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics(Ta=25°C)

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ¹	$R_{\theta JA}$	47	°C/W
Thermal Resistance from Junction-to-Case ¹	$R_{\theta JC}$	1.2	°C/W

Electrical Characteristics(Ta=25°C)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	150	-	-	V
Gate-Body Leakage Current		I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
Zero Gate Voltage Drain Current	$T_J=25^{\circ}C$	I_{DSS}	$V_{DS} = 150V, V_{GS} = 0V$	-	-	1	μA
	$T_J=100^{\circ}C$			-	-	100	
Gate-Threshold Voltage		$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
Drain-Source on-Resistance ²		$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	-	16.5	19.8	m Ω
Forward Transconductance ²		g_{fs}	$V_{DS} = 5V, I_D = 20A$	-	56	-	S
Dynamic Characteristics							
Input Capacitance		C_{iss}	$V_{DS} = 75V, V_{GS} = 0V,$ $f = 1MHz$	-	2150	-	pF
Output Capacitance		C_{oss}		-	145	-	
Reverse Transfer Capacitance		C_{rss}		-	12	-	
Switching Characteristics							
Gate Resistance		R_g	$V_{GS} = 0V, V_{DS} = 0V,$ $f = 1MHz$	-	2.2	-	Ω
Total Gate Charge		Q_g	$V_{GS} = 10V, V_{DS} = 75V,$ $I_D = 20A$	-	28	-	nC
Gate-Source Charge		Q_{gs}		-	12.2	-	
Gate-Drain Charge		Q_{gd}		-	4.5	-	
Turn-on Delay Time		$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 75V,$ $R_G = 10\Omega, I_D = 20A$	-	10.2	-	nS
Rise Time		t_r		-	8.8	-	
Turn-off Delay Time		$t_{d(off)}$		-	16	-	
Fall Time		t_f		-	10	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ²		V_{SD}	$I_S = 1A, V_{GS} = 0V$	-	-	1	V
Continuous Source Current ^{1,5}		I_S	$V_G = V_D = 0V$, Force Current	-	-	58	A
Reverse Recovery Time		t_{rr}	$V_R = 75V, I_F = 20A,$ $di_F/dt = 100A/\mu s$	-	59	-	ns
Reverse Recovery Charge		Q_{rr}		-	118	-	nC

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is $V_{DD} = 25V, V_{GS} = 10V, L = 0.4mH, I_{AS} = 28A$
4. The power dissipation is limited by 175°C junction temperature
5. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

Electrical Characteristic Curve

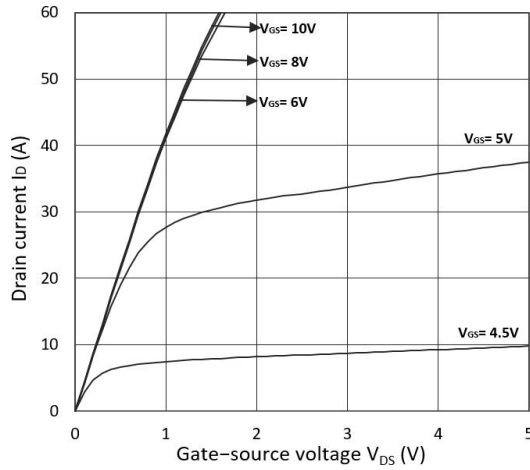


Figure 1. Output Characteristics

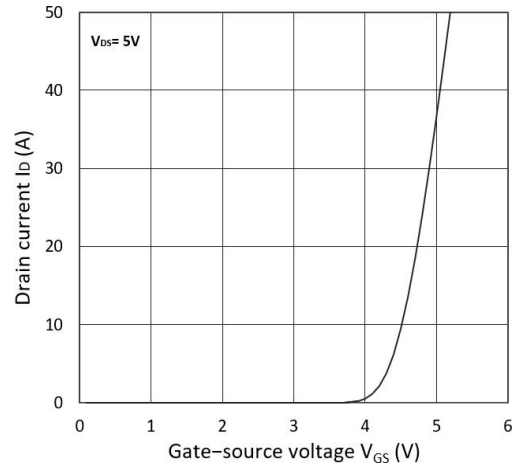


Figure 2. Transfer Characteristics

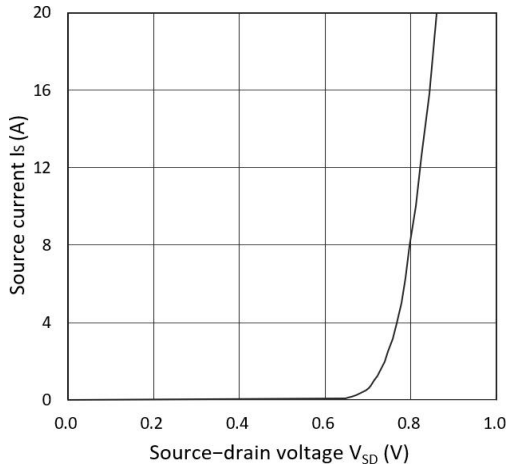


Figure 3. Forward Characteristics of Reverse

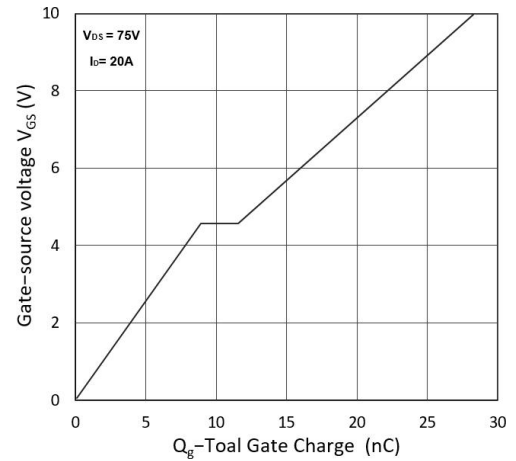


Figure 4. Gate Charge Characteristics

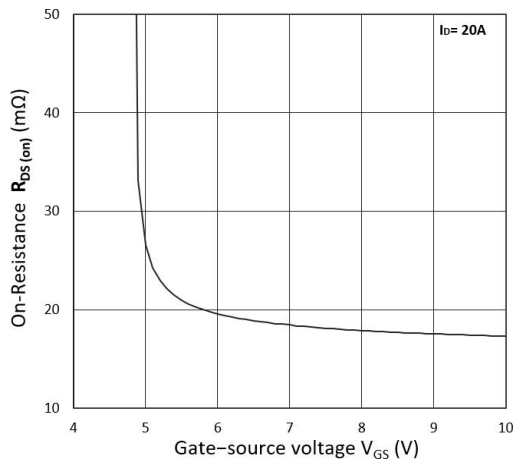


Figure 5. $R_{DS(ON)}$ vs. V_{GS}

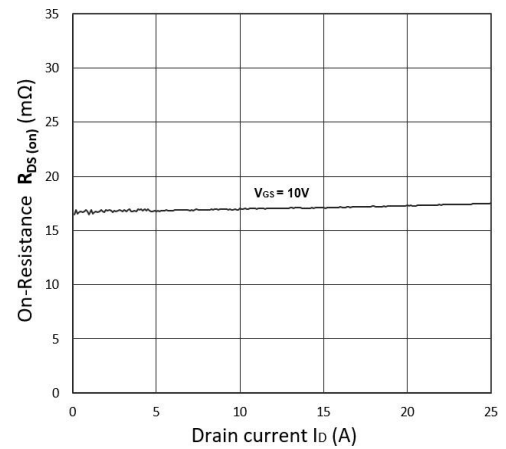


Figure 6. $R_{DS(ON)}$ vs. I_D

Electrical Characteristic Curve

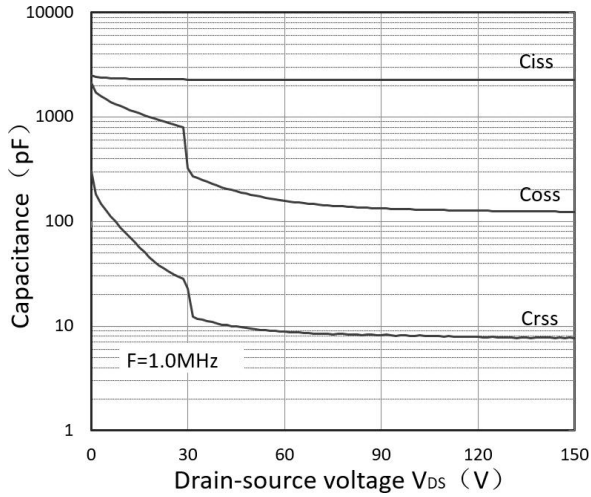


Figure 7. Capacitance Characteristics

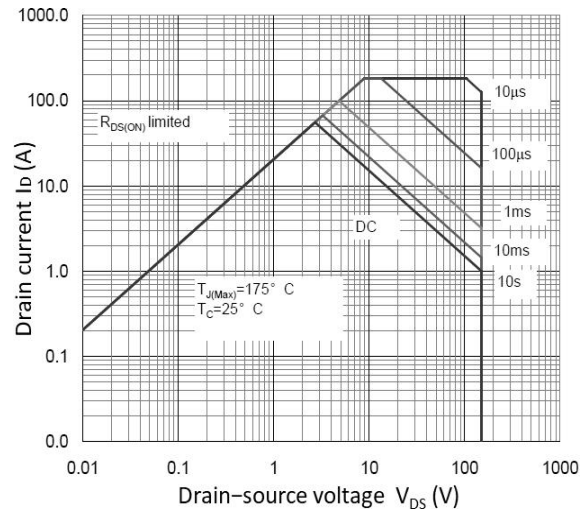


Figure 8. Safe Operating Area

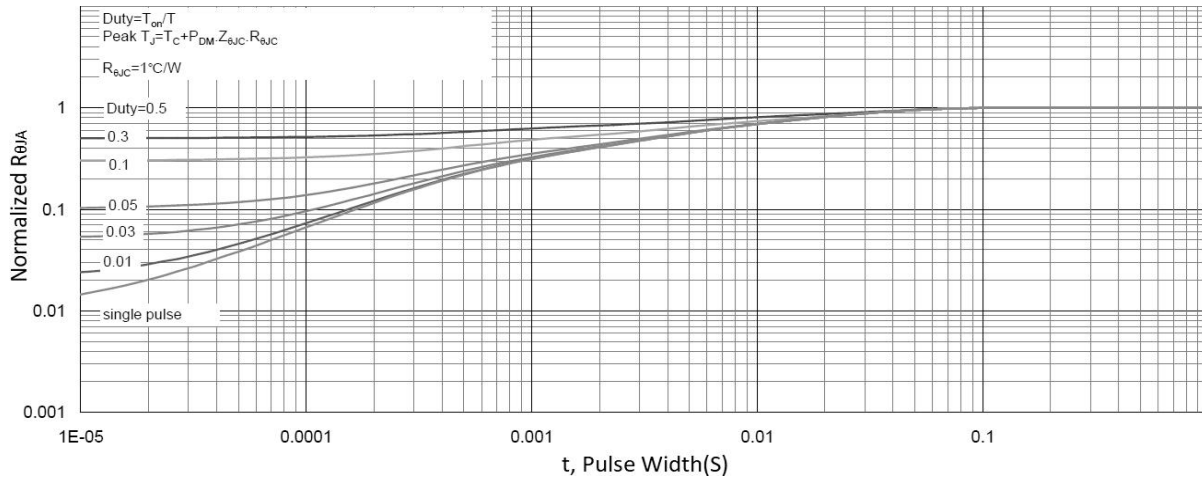


Figure 9. Normalized Maximum Transient Thermal Impedance

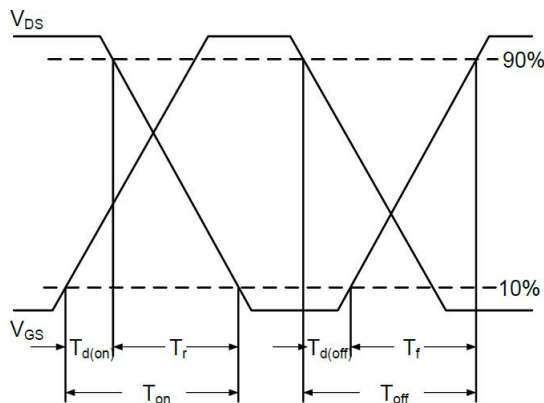


Figure 10. Switching Time Waveform

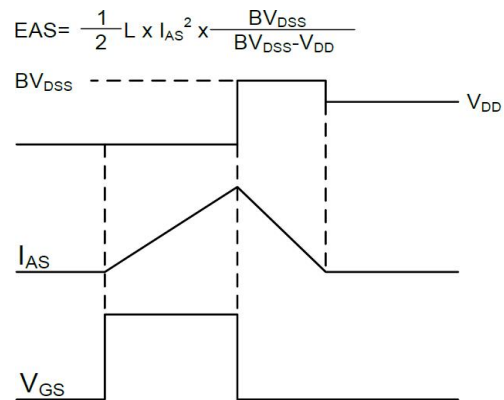
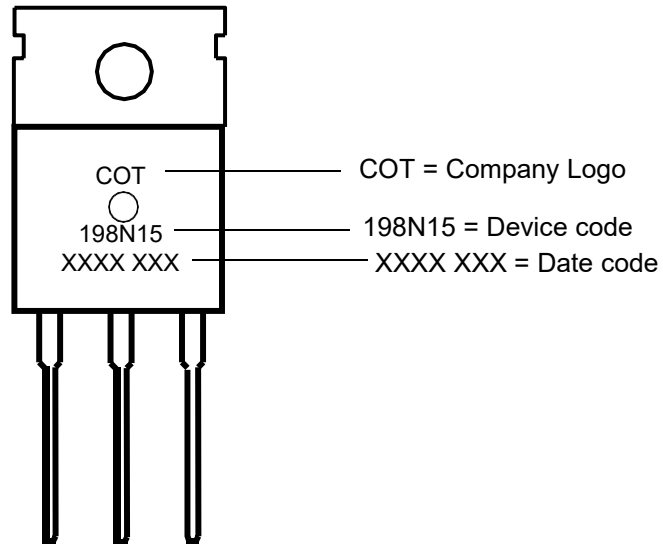


Figure 11. Unclamped Inductive Switching Waveform

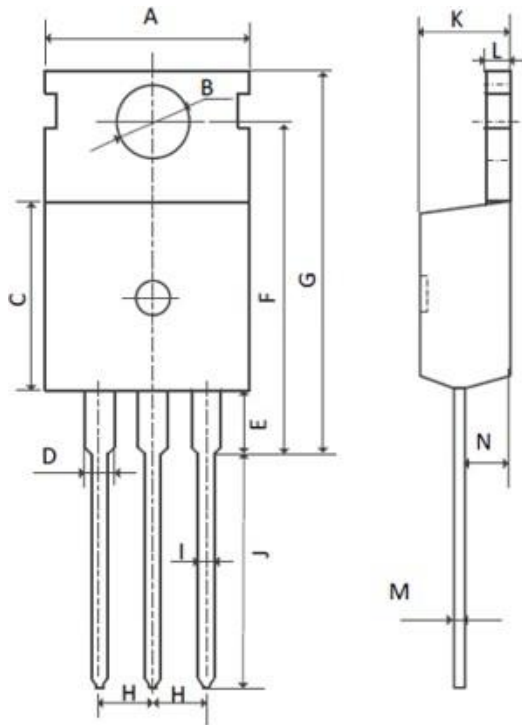
Mechanical Dimensions for TO-220

Marking Information



Part	Package	Marking	Packing method
CT198N15RA	TO-220	198N15	Tube

Outline Drawing – TO-220



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	9.70	10.30
B	3.40	3.80
C	8.80	9.40
D	1.17	1.47
E	2.60	3.40
F	15.10	16.70
G	19.55MAX	
H	2.54REF	
I	0.70	0.95
J	9.35	11.00
K	4.30	4.77
L	1.20	1.45
M	0.40	0.65
N	2.20	2.60