

Descriptions

This is N-channel Enhancement Mode Power MOSFET in a TO-220 Plastic Package.

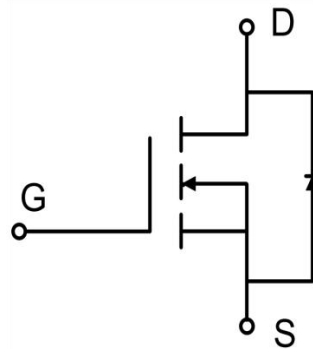
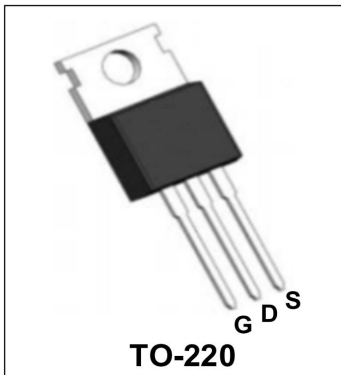
Features

- $V_{DS} = 100V$, $I_D = 15.8A$
- $R_{DS(on)} < 100m\Omega$ @ $V_{GS} = 10V$
- $R_{DS(on)} < 110m\Omega$ @ $V_{GS} = 4.5V$
- RoHs and Halogen-Free Compliant
- Low Gate Charge
- 100% EAS Guaranteed

Applications

- Power Management Switches
- DC/DC Converters

Pinning



Marking

See Marking Instructions

Absolute Maximum Ratings(Ta=25°C)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C=25^{\circ}\text{C}$	I_D	15.8	A
	$T_C=100^{\circ}\text{C}$		10	
Pulsed Drain Current ¹		I_{DM}	63.2	A
Single Pulse Avalanche Energy ²		E_{AS}	3.2	mJ
Total Power Dissipation	$T_C=25^{\circ}\text{C}$	P_D	44.6	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^{\circ}\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ³	$R_{\theta JA}$	49	$^{\circ}\text{C/W}$
Thermal Resistance from Junction-to-Case	$R_{\theta JC}$	2.8	$^{\circ}\text{C/W}$

Electrical Characteristics (T_J = 25°C, unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	100	-	-	V
Gate-body Leakage Current		I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T _J =25°C	I _{DSS}	V _{DS} = 100V, V _{GS} = 0V	-	-	1	μA
	T _J = 100°C			-	-	100	
Gate-Threshold Voltage		V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.2	-	2.5	V
Drain-Source On-Resistance ⁴		R _{DS(on)}	V _{GS} = 10V, I _D = 5A	-	70	100	mΩ
			V _{GS} = 4.5V, I _D = 3A	-	78	110	
Forward Transconductance ⁴		g _{fs}	V _{DS} = 5V, I _D = 5A	-	14	-	S
Dynamic Characteristics ⁵							
Input Capacitance		C _{iss}	V _{DS} = 50V, V _{GS} =0V, f =1MHz	-	1200	-	pF
Output Capacitance		C _{oss}		-	55	-	
Reverse Transfer Capacitance		C _{rss}		-	40	-	
Gate Resistance		R _g	f =1MHz	-	1.1	-	Ω
Switching Characteristics ⁵							
Total Gate Charge		Q _g	V _{GS} = 10V,V _{DS} = 50V, I _D =5A	-	20.6	-	nC
Gate-Source Charge		Q _{gs}		-	4	-	
Gate-Drain Charge		Q _{gd}		-	3.7	-	
Turn-On Delay Time		t _{d(on)}	V _{GS} =10V, V _{DD} =50V, R _G = 3Ω, I _D = 5A	-	4.7	-	ns
Rise Time		t _r		-	21	-	
Turn-Off Delay Time		t _{d(off)}		-	20	-	
Fall Time		t _f		-	16	-	
Body Diode Reverse Recovery Time		t _{rr}	I _F = 5A, dI _F /dt=100A/μs	-	30	-	ns
Body Diode Reverse Recovery Charge		Q _{rr}		-	97	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴		V _{SD}	I _S = 1A, V _{GS} = 0V	-	-	1.2	V
Continuous Source Current	T _C =25°C	I _S	-	-	-	15.8	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature T_J(MAX)=150°C.
2. The EAS data shows Max. rating . The test condition is V_{DD}=40V, V_{GS}=10V, L=0.1mH, I_{AS}=8A.
3. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

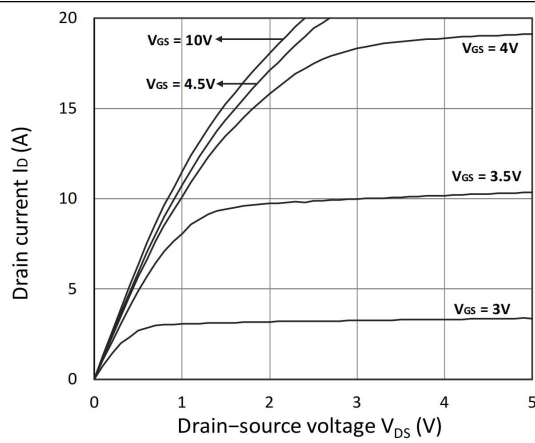


Figure 1. Output Characteristics

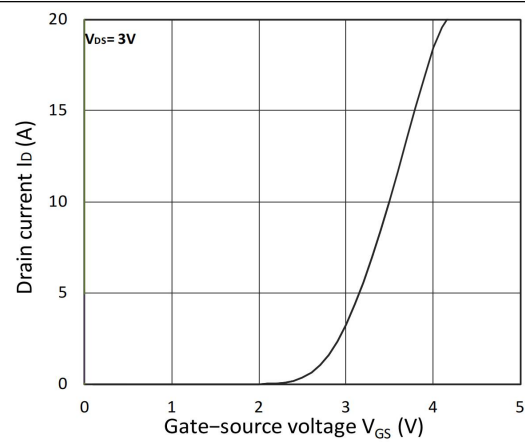


Figure 2. Transfer Characteristics

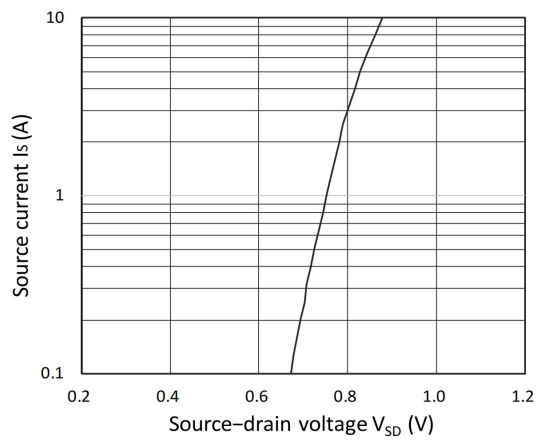
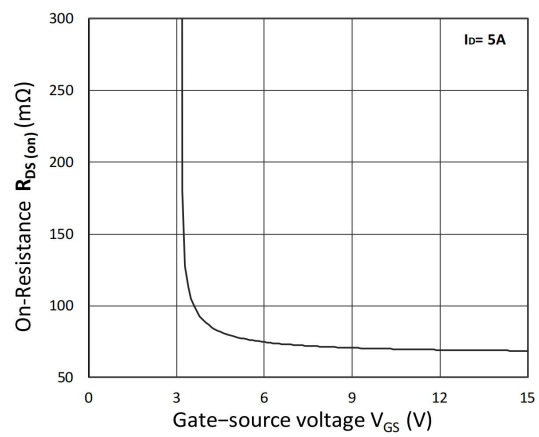
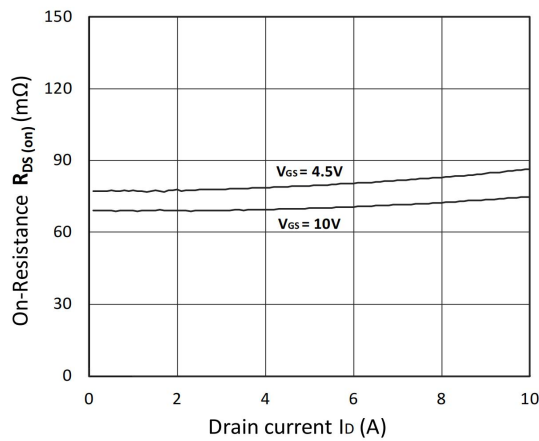
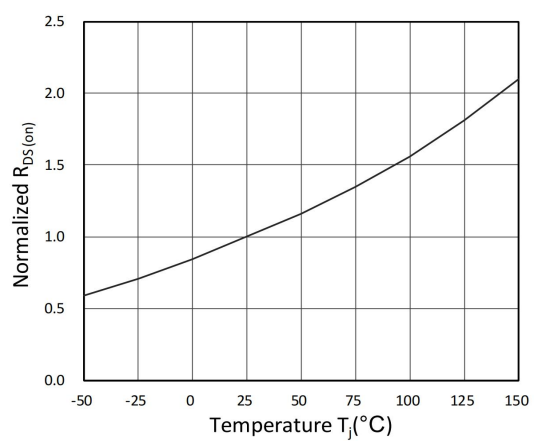


Figure 3. Forward Characteristics of Reverse

Figure 4. $R_{DS(on)}$ vs. V_{GS} Figure 5. $R_{DS(on)}$ vs. I_D Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

Typical Characteristics

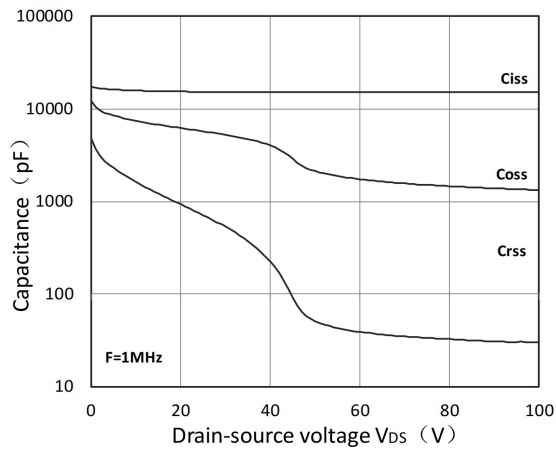


Figure 7. Capacitance Characteristics

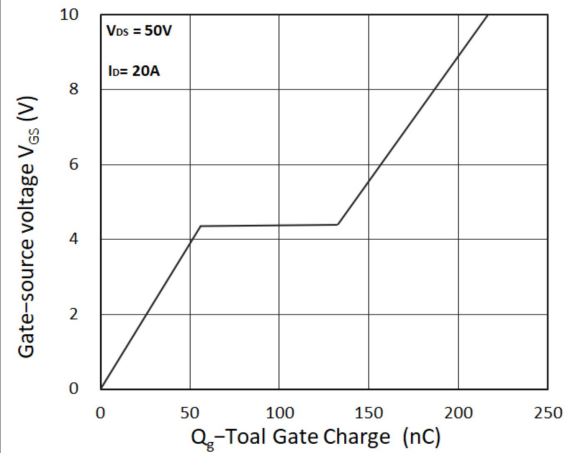


Figure 8. Gate Charge Characteristics

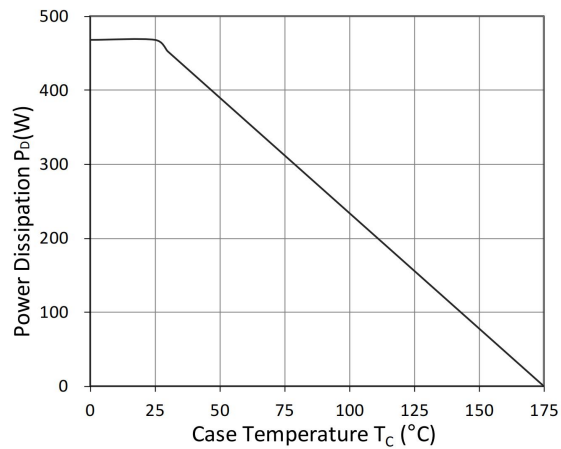


Figure 9. Power Dissipation

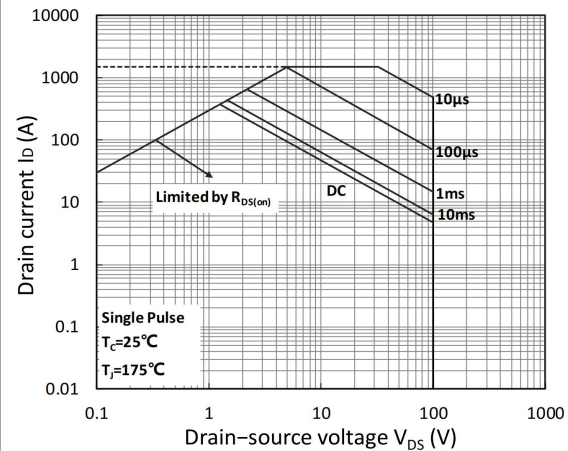


Figure 10. Safe Operating Area

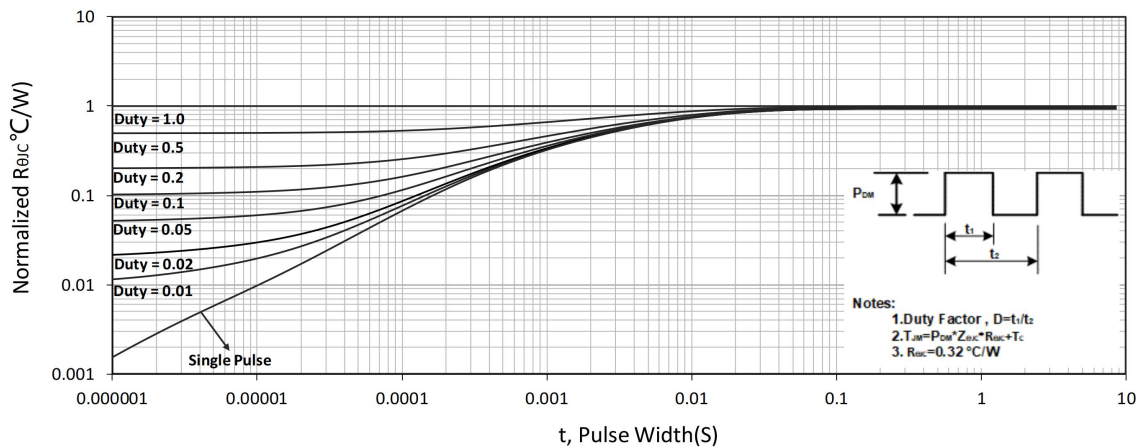


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

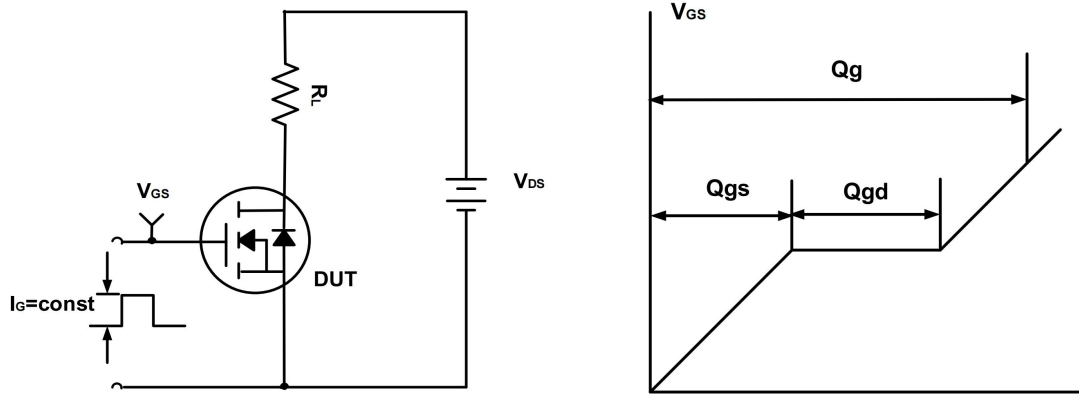


Figure A. Gate Charge Test Circuit & Waveforms

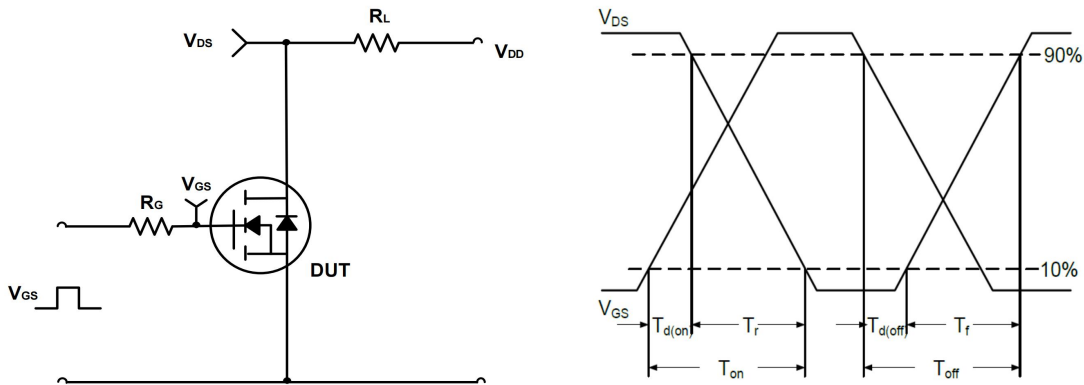


Figure B. Switching Test Circuit & Waveforms

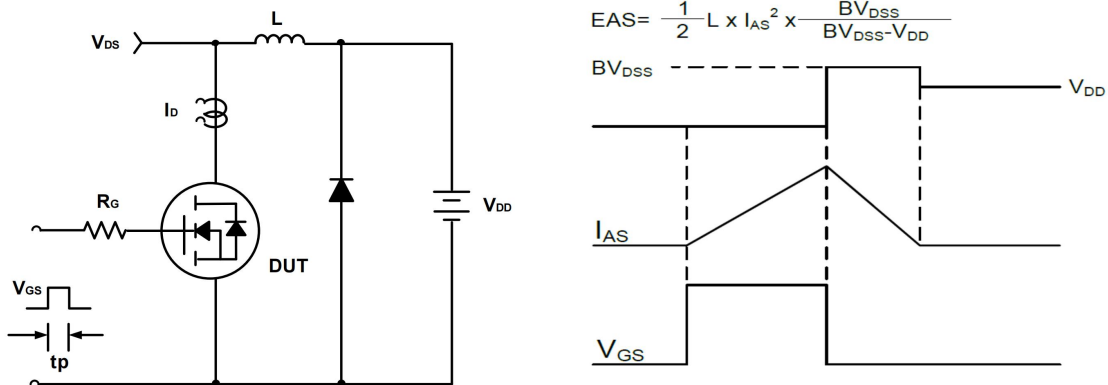
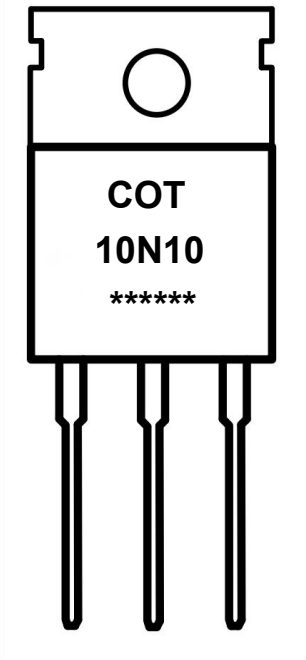


Figure C. Unclamped Inductive Switching Circuit & Waveforms

Marking Information



Note:

COT: Company

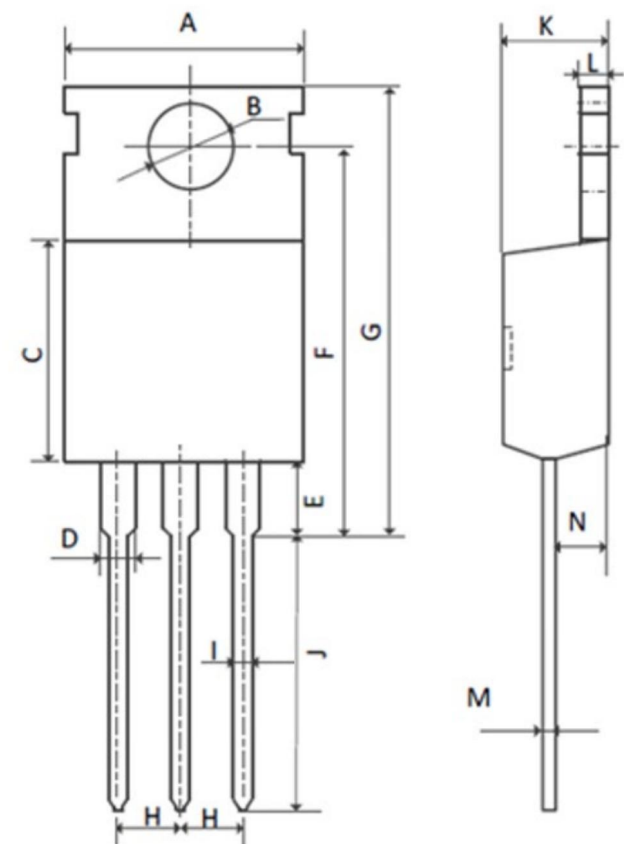
10N10: Product Type.

*****: *: Inner Code * : Year Code **: Week Code **: Lot Code

Ordering Information

Part	Package	Marking	Packing method
CT10N10RA	TO-220	10N10	Tube

Mechanical Dimensions for 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