# N-Channel Enhancement Mode Power MOSFET

Description

The 630A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

- V_{DS} 200V
- I_D (at V_{GS} = 10V)   11A
- $R_{DS(ON)}$ (at V_{GS} = 10V)   <   250mΩ
- $R_{DS(ON)}$ (at V_{GS} = 4.5V)   <   300mΩ
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters
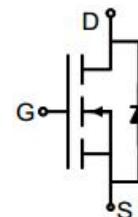
Schematic diagram
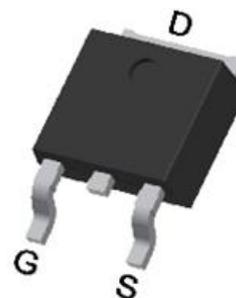
TO-252

Ordering Information

Device	Package	Marking	Packaging
630A	TO-252	630A	2500pcs/Reel

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	200	V
Continuous Drain Current		I_D	11	A
Pulsed Drain Current	(note1)	I_{DM}	44	A
Gate-Source Voltage		V_{GS}	±20	V
Power Dissipation		P_D	83	W
Single pulse avalanche energy	（note2）	E_{AS}	320	mJ
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 To 150	ºC

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	60	ºC/W
Maximum Junction-to-Case	R_{thJC}	1.5	ºC/W

Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250µA	200	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 200V, V_{GS} = 0V	--	--	1	µA
Gate-Source Leakage	I_{GSS}	V_{GS} = $\pm$20V	--	--	$\pm$100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	1.0	1.6	2.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 4.5A	--	210	250	mΩ
		V_{GS} = 4.5V, I_D = 4.5A	--	230	300	
Forward Transconductance	g_{FS}	V_{GS} = 5V, I_D = 4.5A	--	9.2	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 100V, f = 1.0MHz	--	510	--	pF
Output Capacitance	C_{oss}		--	44	--	
Reverse Transfer Capacitance	C_{rss}		--	11	--	
Total Gate Charge	Q_g	V_{DD} = 100V, I_D = 4.5A, V_{GS} = 10V	--	12	--	nC
Gate-Source Charge	Q_{gs}		--	2	--	
Gate-Drain Charge	Q_{gd}		--	4	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 100V, I_D = 4.5A, R_G = 10Ω	--	10.3	--	ns
Turn-on Rise Time	t_r		--	10.7	--	
Turn-off Delay Time	$t_{d(off)}$		--	29	--	
Turn-off Fall Time	t_f		--	11	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	11	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 4.5A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Qrr	I_F = 4.5A, V_{GS} = 0V di/dt=100A/us	--	663	--	nC
Reverse Recovery Time	Trr		--	201	--	ns

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. EAS condition : Tj=25℃ ,VDD=50V,VGS=10V,L=0.5mH,Rg=25Ω

3. Identical low side and high side switch with identical R_G

Gate Charge Test Circuit

Switch Time Test Circuit

EAS Test Circuit

Typical Characteristics T_J = 25℃, unless otherwise noted

### Figure 1. Output Characteristics
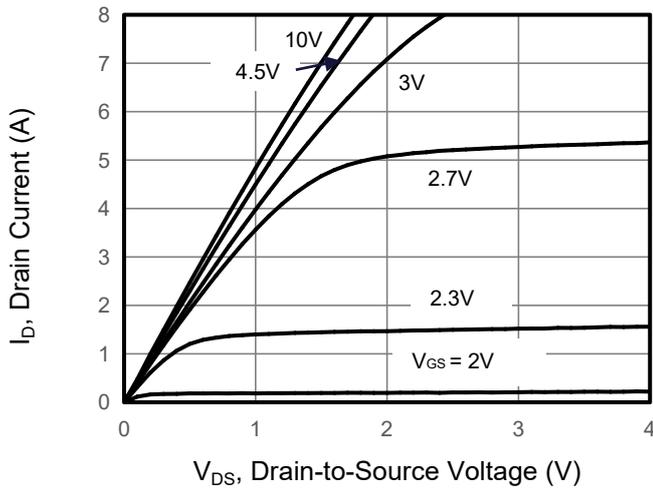

Figure 2. Transfer Characteristics
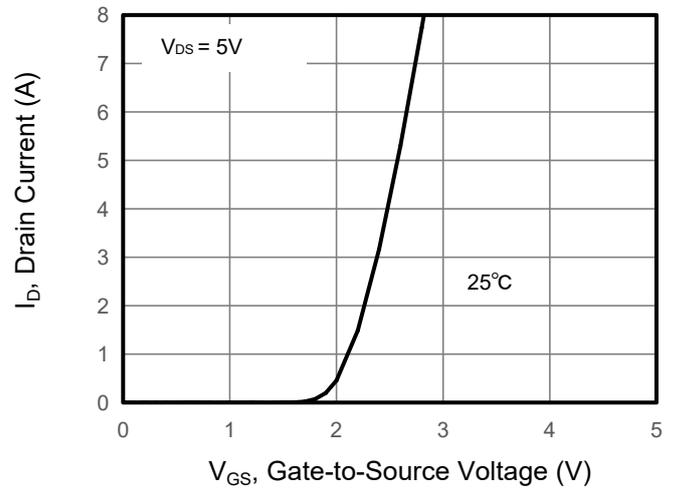

Figure 3. Drain Source On Resistance
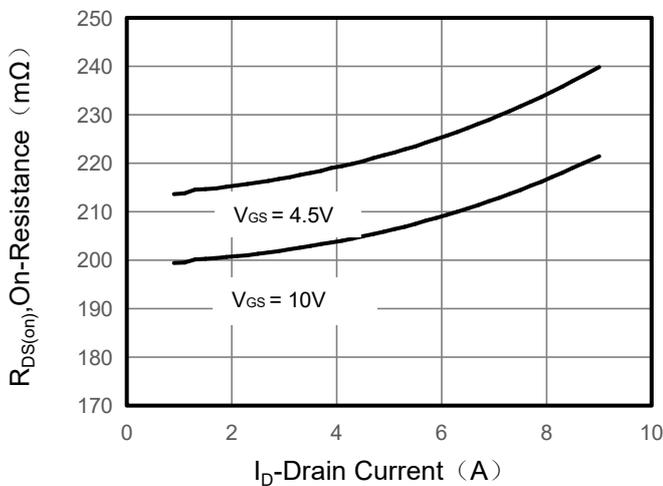

### Figure 4. Gate Charge
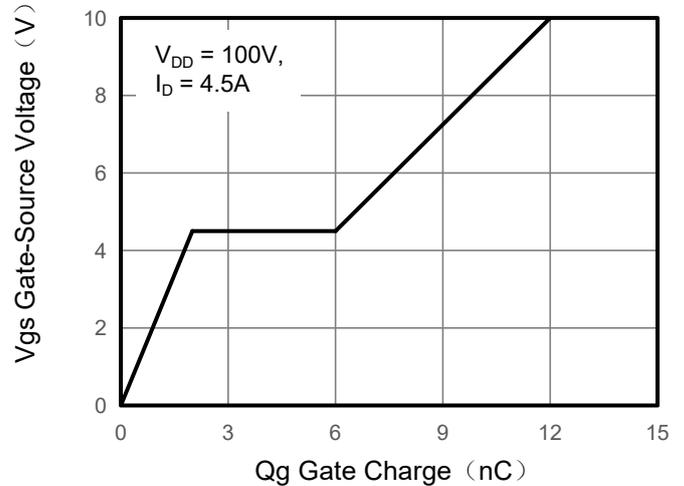
Figure 5. Capacitance
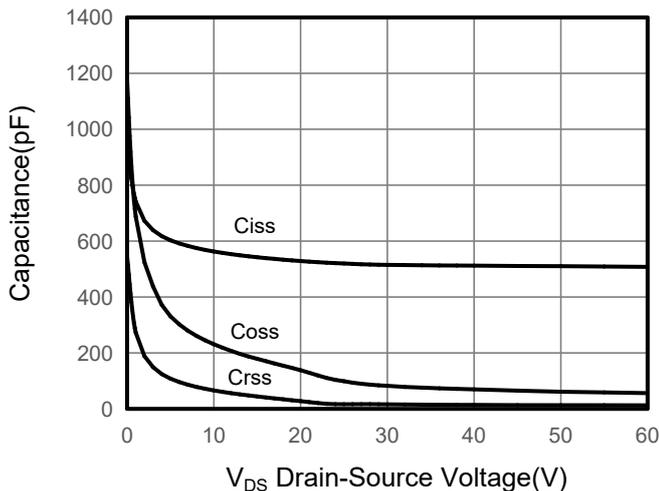
Figure 6. Source-Drain Diode Forward
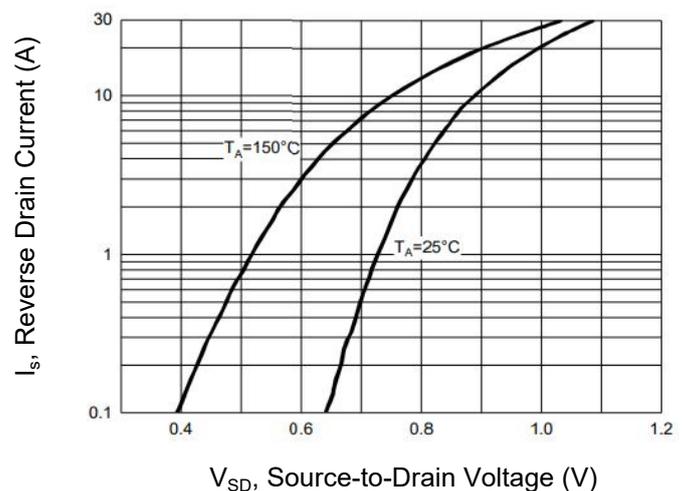
Typical Characteristics T_J = 25**°**C, unless otherwise noted

Figure 7. Drain-Source On-Resistance

V_{GS} = 10V,
I_D = 4.5A

$R_{DS(on)}$, (Normalized)

T_J, Junction Temperature (°C)
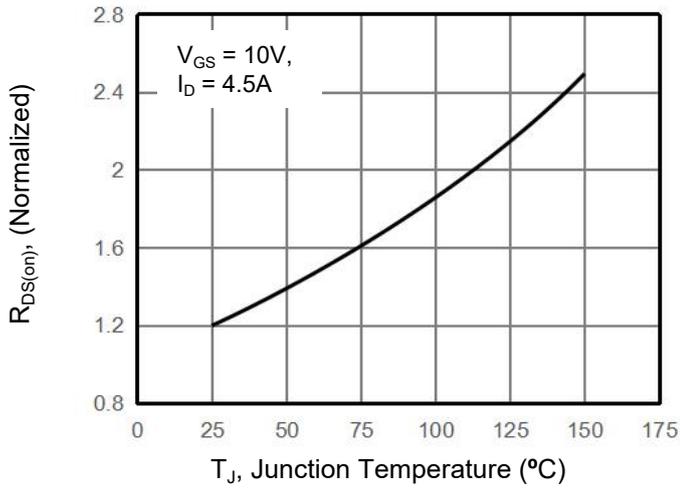
Figure 8. Safe Operation Area

I_D, Drain Current(A)

$R_{DS(ON)}$ limited

10μs
100μs
1ms
10ms
DC

$T_{J(MAX)}$=150°C
T_C=25°C

V_{DS}, Drain-Source Voltage(V)
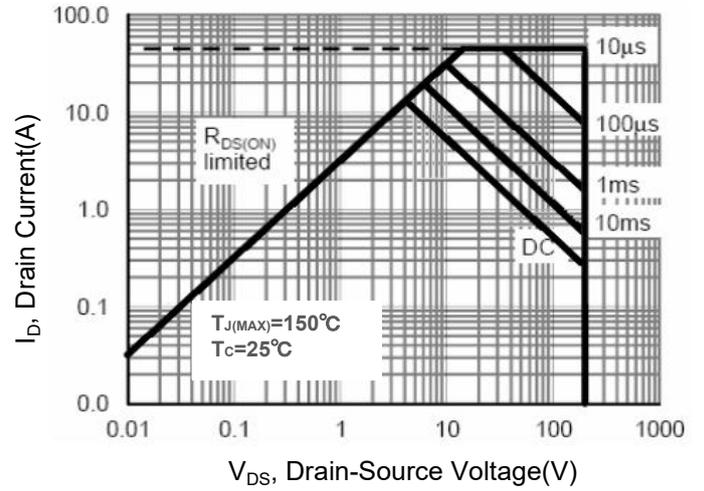
Figure 9. Normalized Maximum Transient Thermal Impedance

Z_{thJC}, Thermal Impedance (°C/W)

$D=T_{on}/T$
$T_{J,PK}=T_C+P_{DM}\cdot Z_{\theta JC}\cdot R_{\theta JC}$

$R_{\theta JC}$= 1.5°C/W

In descending order
D=0.5, 0.3, 0.1, 0.05, 0.02, 0.01, single pulse

Single Pulse

P_D
T_{on}
T

Pulse Width (s)
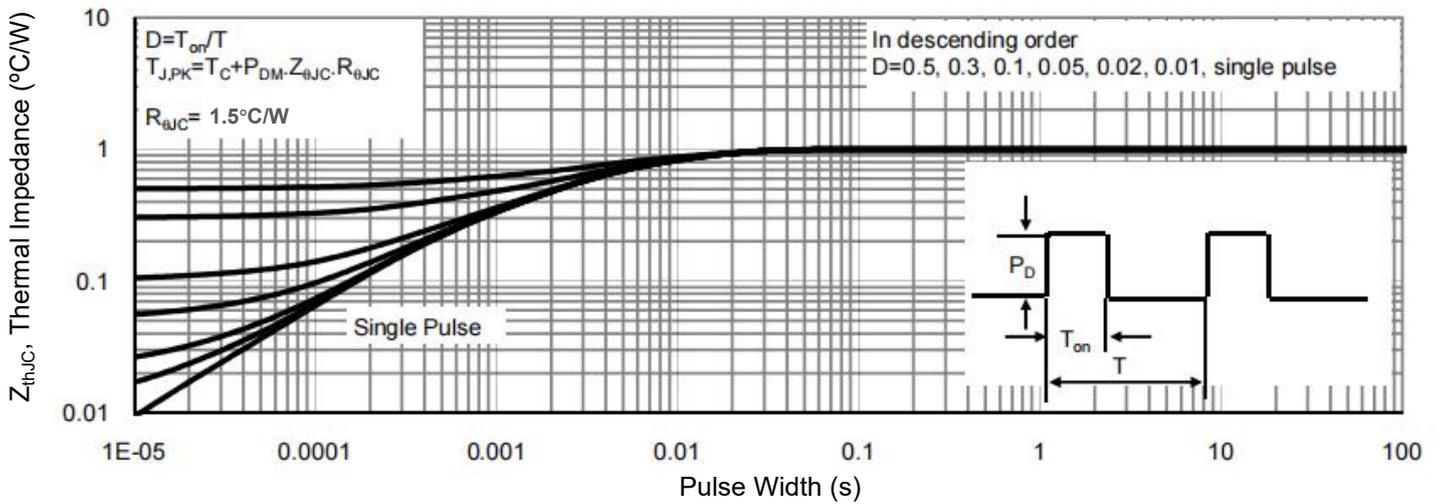
TO-252 Package Information
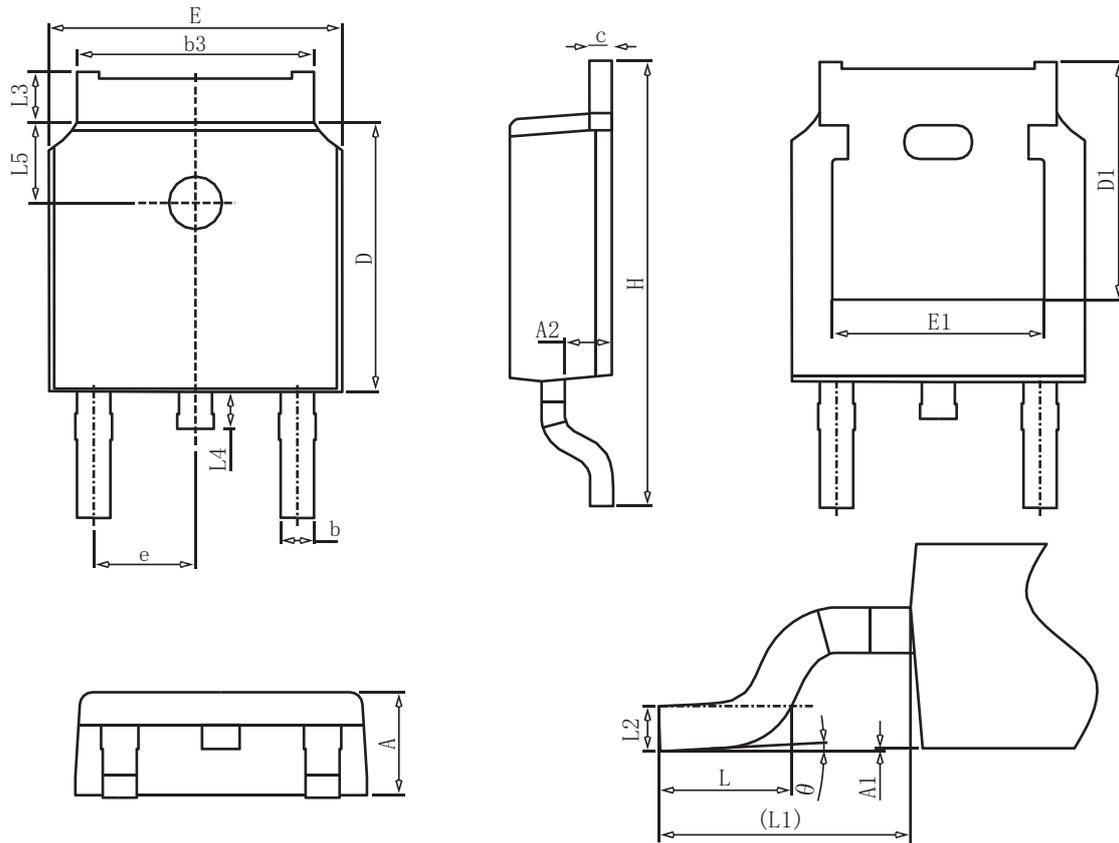
COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A1	0.00	-	0.20
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b3	5.20	5.33	5.50
c	0.43	0.53	0.63
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.80
E1	4.63	-	-
e	2.286BSC		
H	9.40	10.10	10.50
L	1.38	1.50	1.75
L1	2.90REF		
L2	0.51BSC		
L3	0.88	-	1.28
L4	0.50	-	1.00
L5	1.65	1.80	1.95
θ	0°	-	8°