

Feature

- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

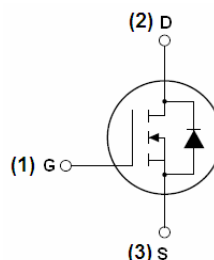


Product Summary

V_{DS}	200	V
$R_{DS(on), Typ @ V_{GS}=10\text{ V}}$	0.12	Ω
I_D	18	A

Application

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS) Power
- Factor Correction (PFC)



Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted			
Parameter	Symbol	Value	Unit
		TO-220	
Drain-Source Voltage ($V_{GS} = 0\text{V}$)	V_{DSS}	200	V
Continuous Drain Current	I_D	18	A
Pulsed Drain Current (note1)	I_{DM}	72	A
Gate-Source Voltage	V_{GSS}	± 20	V
Single Pulse Avalanche Energy (note2)	E_{AS}	262.7	mJ
Avalanche Current (note1)	I_{AS}	7.3	A
Repetitive Avalanche Energy (note1)	E_{AR}	157.62	mJ
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	104	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150	$^\circ\text{C}$

Thermal Resistance			
Parameter	Symbol	Value	Unit
		TO-220	
Thermal Resistance, Junction-to-Case	R_{thJC}	1.2	K/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	60	

Specifications T _J = 25°C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
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, T _J = 25°C	--	--	1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2.0	--	4.0	V
Drain-Source On-Resistance (Note3)	R _{DS(on)}	V _{GS} = 10V, I _D = 9A	--	0.12	0.15	Ω
Dynamic						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 25V, f = 1.0MHz	--	1200	--	pF
Output Capacitance	C _{oss}		--	161	--	
Reverse Transfer Capacitance	C _{rss}		--	70	--	
Total Gate Charge	Q _g	V _{DD} 160V, I _D = 18A, V _{GS} = 10V	--	38	--	nC
Gate-Source Charge	Q _{gs}		--	6	--	
Gate-Drain Charge	Q _{gd}		--	16	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 100V, I _D =18A, R _G = 25 Ω	--	40	--	ns
Turn-on Rise Time	t _r		--	33	--	
Turn-off Delay Time	t _{d(off)}		--	166	--	
Turn-off Fall Time	t _f		--	60	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25 °C	--	--	18	A
Pulsed Diode Forward Current	I _{SM}		--	--	72	
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 9A, V _{GS} = 0V	--	--	1.4	V
Reverse Recovery Time	t _{rr}	V _{GS} = 0V, I _S = 18A, di _F /dt =100A /μs	--	182	--	ns
Reverse Recovery Charge	Q _{rr}		--	1.29	--	μC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $I_{AS} = 15A, V_{DD} = 50V, R_G = 25\Omega$, Starting $T_J = 25^{\circ}\text{C}$
3. Pulse Test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 1\%$

Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

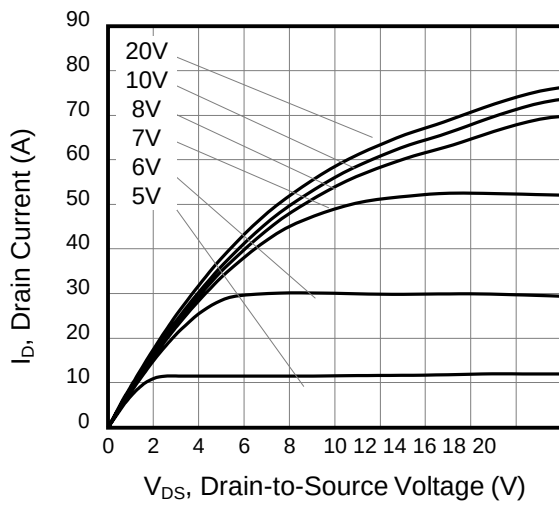


Figure 2. Body Diode Forward Voltage

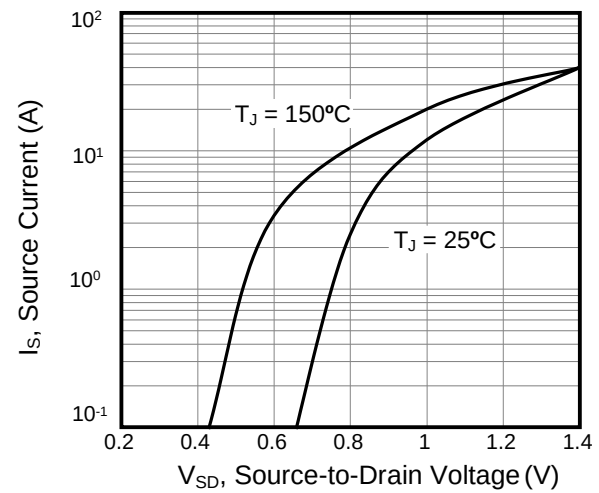


Figure 3. Drain Current vs. Temperature

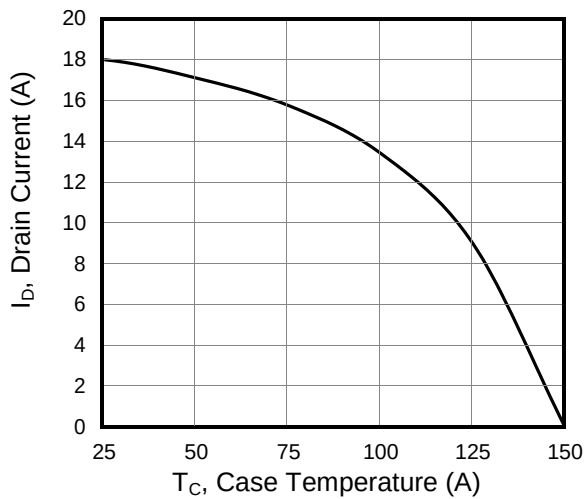


Figure 4. BV_{DSS} Variation vs. Temperature

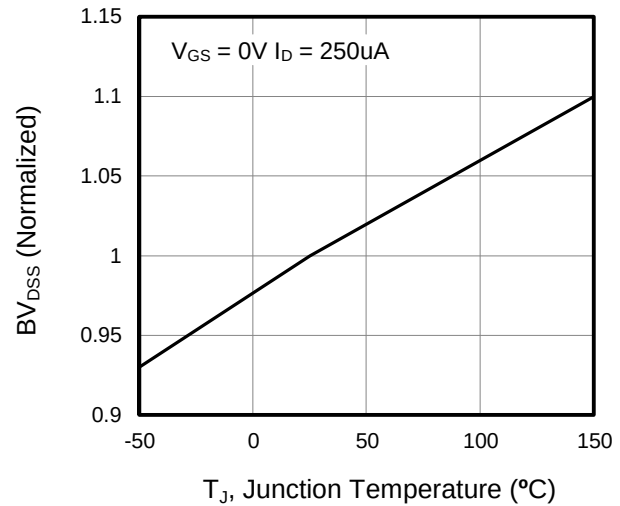


Figure 5. Transfer Characteristics

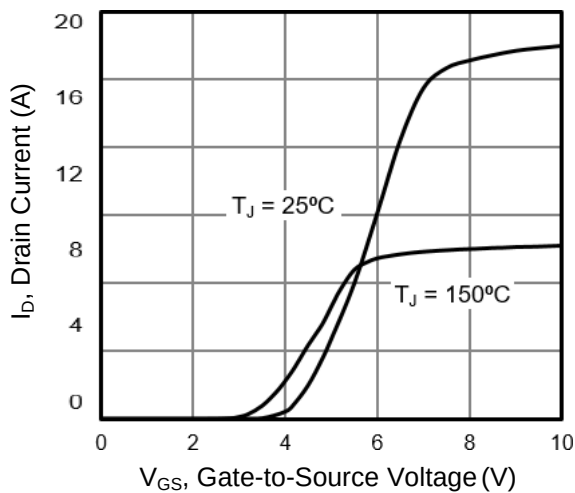
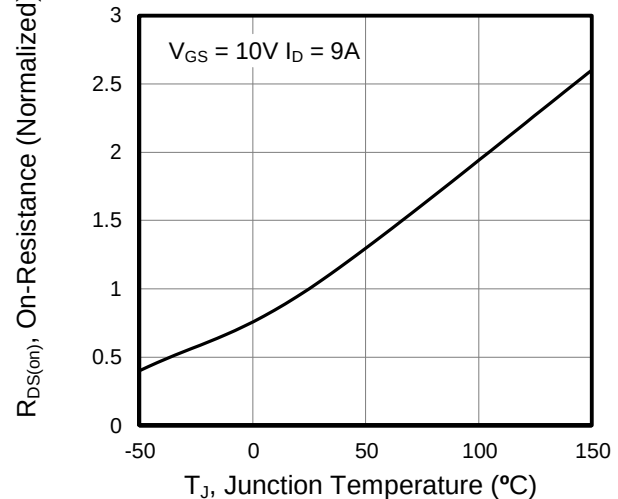


Figure 6. On-Resistance vs. Temperature



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Capacitance

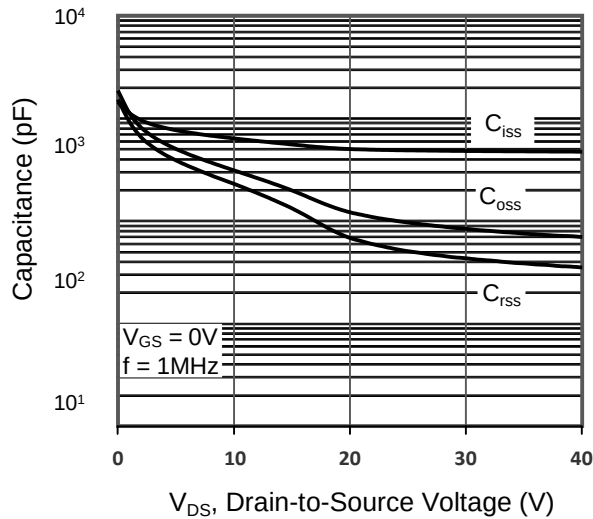
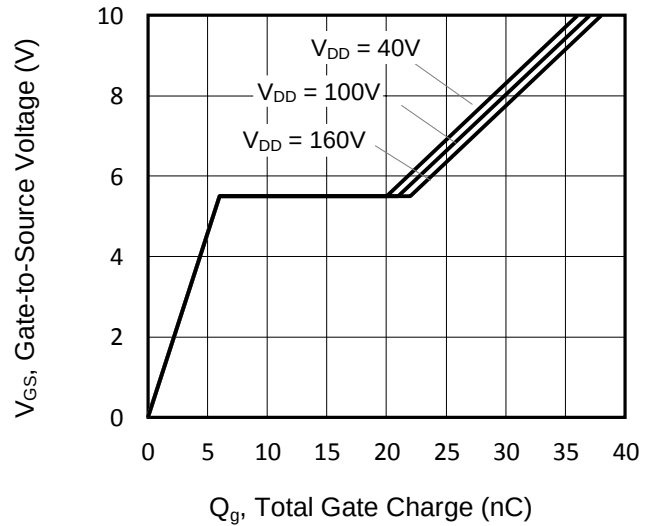
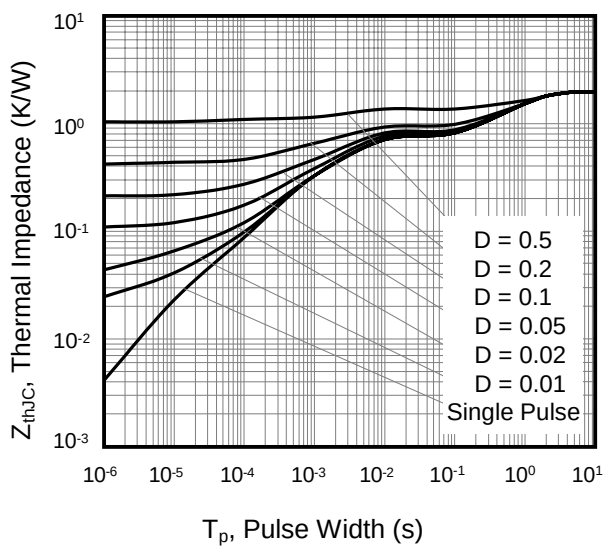


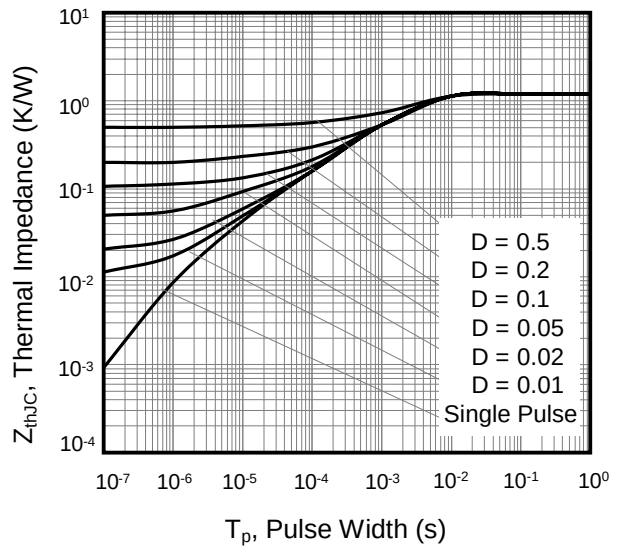
Figure 8. Gate Charge



**Figure 9. Transient Thermal Impedance
TO-220F**



**Figure 10. Transient Thermal Impedance
TO-220**



Test Circuit

Figure A: Gate Charge Test Circuit and Waveform

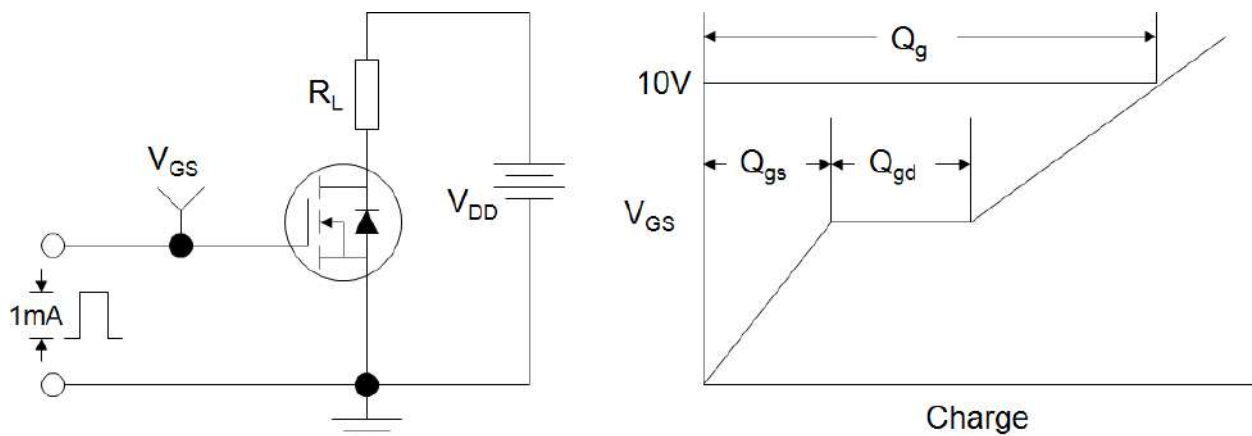


Figure B: Resistive Switching Test Circuit and Waveform

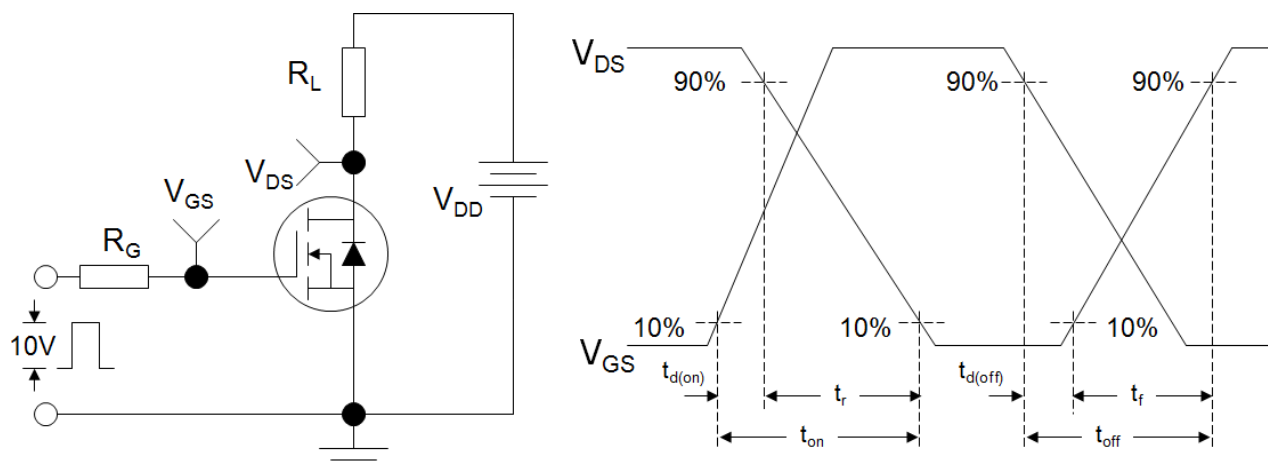
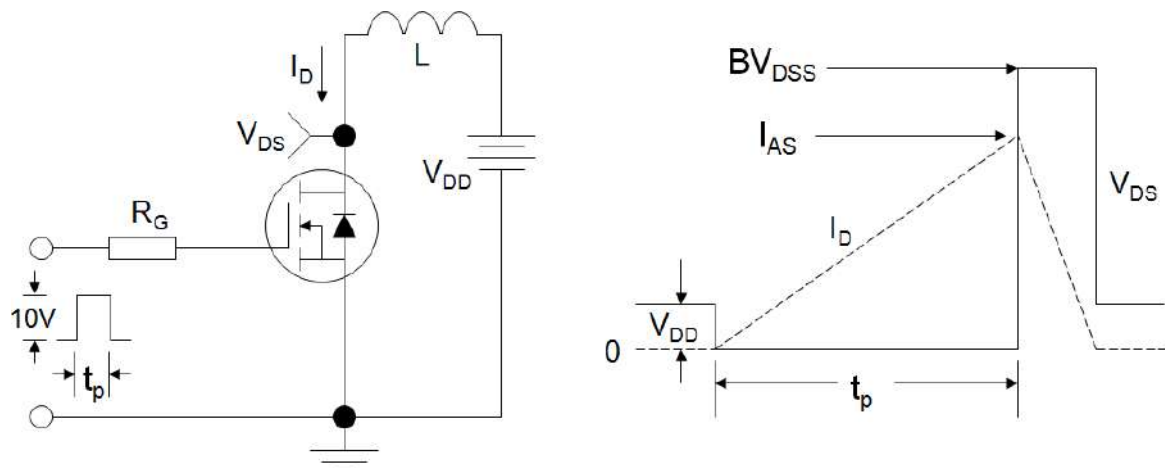
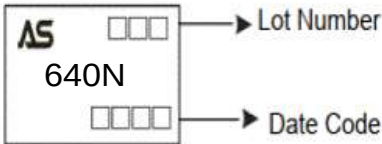


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



Ordering and Marking Information

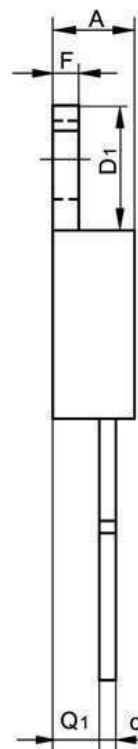
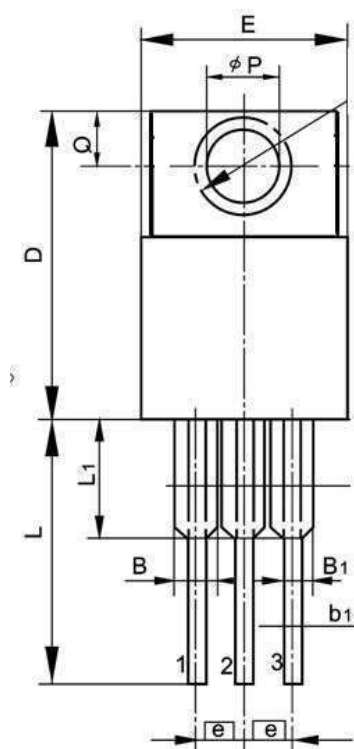
Ordering Device No.	Marking	Package	Packing	Quantity
ASDM640NP-T	640N	TO-220	Tube	50/Tube

PACKAGE	MARKING
TO-220	 The diagram shows a TO-220 package with the following markings: - AS logo 640N - Lot Number (indicated by two empty boxes) - Date Code (indicated by four empty boxes)

TO-220 MECHANICAL DATA

UNIT: mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
A	4.00		4.80	E	9.90		10.70
B	1.20		1.50	e		2.54	
B1	1.00		1.40	F	1.10		1.45
b1	0.65		1.00	L	12.50		14.50
c	0.35		0.75	L1	3.00	3.50	4.00
D	15.00		16.50	Q	2.50		3.00
D1	5.90		6.90	Q1	2.00		3.00
				ϕP	3.60		3.90



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