N-Channel 800 V (D-S) Super Junction Power MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (mΩ)(Typ.)	I_D (A)	Q_g (Typ.)
800	150 at V_{GS} = 10 V	18	54 nC

RoHS COMPLIANT

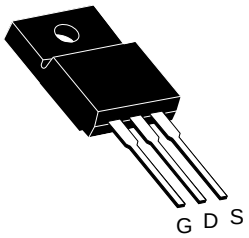
FEATURES

- DT-SJ Power MOSFET
- 100 % Rg and UIS tested
- Low $R_{DS(ON)}$×FOM
- Extremely low switching loss
- Excellent stability and uniformity

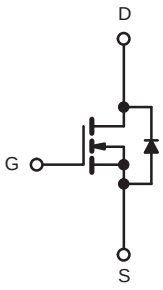
APPLICATIONS

- PC power
- Telecom power
- Server power
- LED Light
- EV Charger

TO-220 FULLPAK



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage(Typ.)		V_{DS}	800	V
Gate-Source Voltage		V_{GS}	± 30	
Continuous Drain Current (T_J = 150 °C)[a]	T_C = 25 °C	I_D	18	A
	T_C = 100 °C		11.4	
Pulsed Drain Current[b]		I_{DM}	39	
Single Avalanche Energy[e]		E_{AS}	245	mJ
Maximum Power Dissipation[c]	T_C = 25 °C	P_D	34	W
	T_C = 100 °C		13.6	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to +150	°C

THERMAL RESISTANCE RATINGS			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount)[d]	R_{thJA}	62	°C/W
Junction-to-Case (Drain)	R_{thJC}	3.67	

Notes

a. Calculated continuous current based on maximum allowablejunction temperature.
b. Repetitive rating; pulse width limited by max. junction temperature.
c. Pd is based on max. junction temperature, using junction-case thermal resistance.
d. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper,in a still air environment with Ta=25 °C.
e. V_{DD}=100 V,V_{GS}=10 V, L=80 mH, starting T_j=25 °C.

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	800	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	2.9	-	3.9	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 30 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 800 V, V_{GS} = 0 V	-	-	10	µA
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 9 A	-	150	200	mΩ
		V_{GS} = 10 V, I_D = 9 A, T_j=150 °C	-	420	-	
Forward Transconductance [a]	g_{fs}	V_{DS} = 50 V, I_D = 9 A	-	15	-	S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 50 V, f = 100 KHz	-	2620	-	pF
Output Capacitance	C_{oss}		-	111	-	
Reverse Transfer Capacitance	C_{rss}		-	4.4	-	
Total Gate Charge [c]	Q_g	V_{DS} = 400 V, V_{GS} = 10 V, I_D = 9 A	-	54	-	nC
Gate-Source Charge [c]	Q_{gs}		-	11	-	
Gate-Drain Charge [c]	Q_{gd}		-	17	-	
Gate Resistance	R_g	f = 1 MHz	-	17.2	-	Ω
Turn-On Delay Time [c]	$t_{d(on)}$	V_{DD} = 400 V, I_D = 9 A, V_{GEN} = 10 V, R_g = 2 Ω	-	28	-	ns
Rise Time [c]	t_r		-	17	-	
Turn-Off Delay Time [c]	$t_{d(off)}$		-	146	-	
Fall Time [c]	t_f		-	18	-	
Drain-Source Body Diode Ratings and Characteristics [b] (T_C = 25 °C)						
Continuous Source Current	I_S	T_C = 25 °C	-	-	18	A
Pulsed Current (t = 100 µs)	I_{SM}		-	-	39	A
Forward Voltage [a]	V_{SD}	I_S = 18 A, V_{GS} = 0 V	-	-	1.3	V
Reverse Recovery Time	t_{rr}	I_S = 9 A, di/dt = 100 A/µs	-	342	-	ns
Reverse Recovery Charge	Q_{rr}		-	5	-	µC
Peak reverse recovery current	I_{rrm}		-	29	-	A

Notes

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)

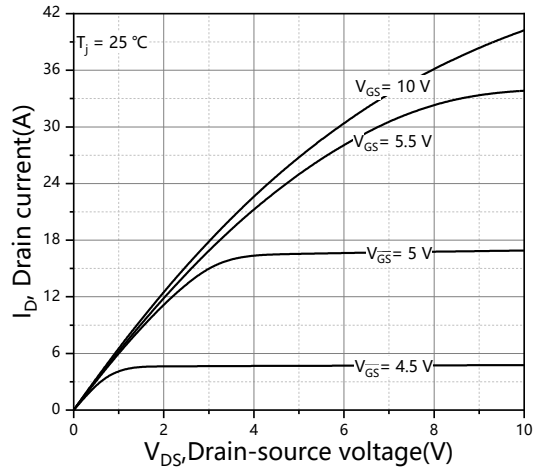


Figure 1. Typ. output characteristics

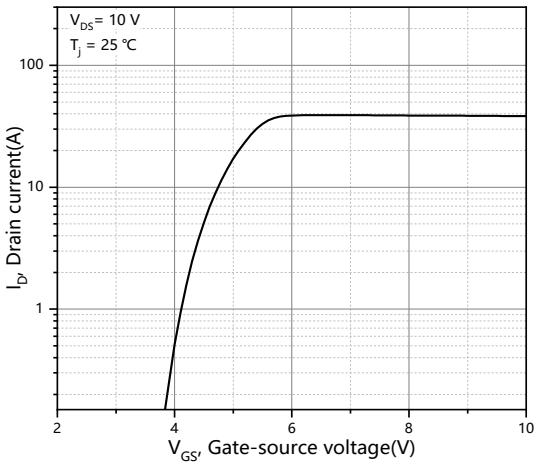


Figure 2. Typ. transfer characteristics

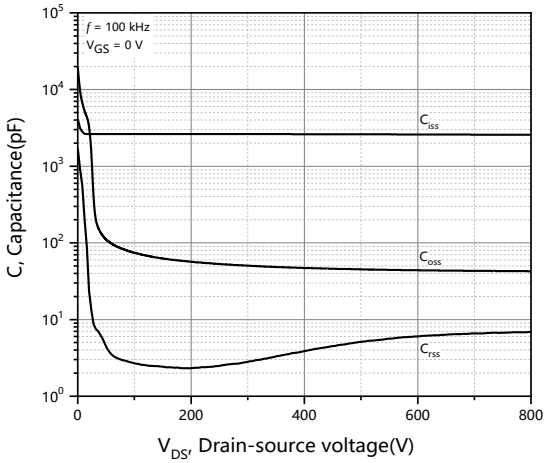


Figure 3. Typ. capacitances

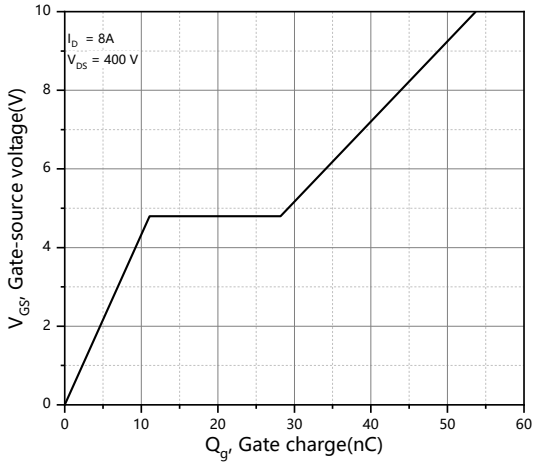


Figure 4. Typ. gate charge

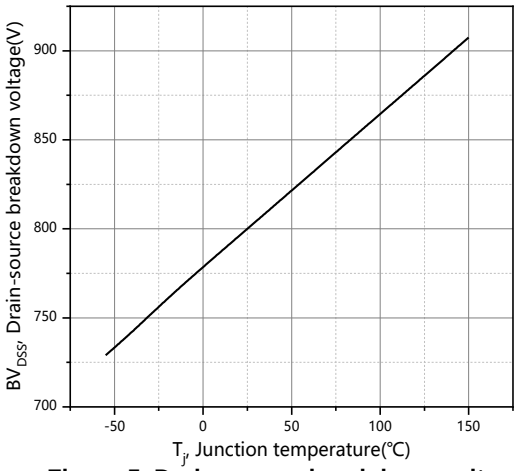


Figure 5. Drain-source breakdown voltage

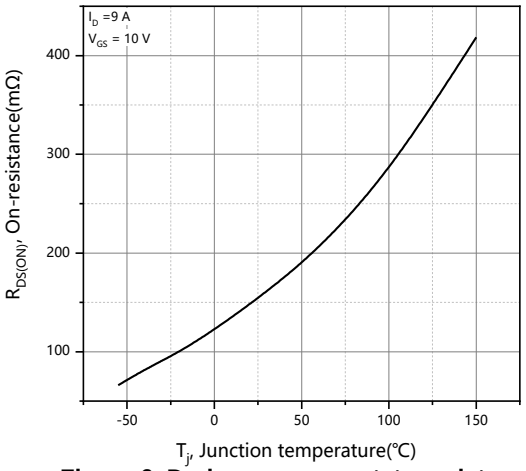


Figure 6. Drain-source on-state resistance

TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)

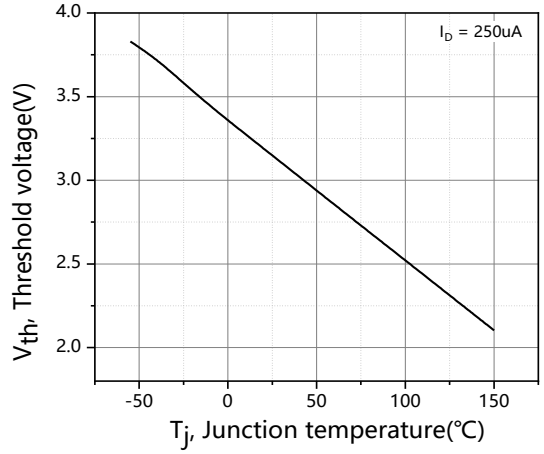


Figure 7. Threshold voltage

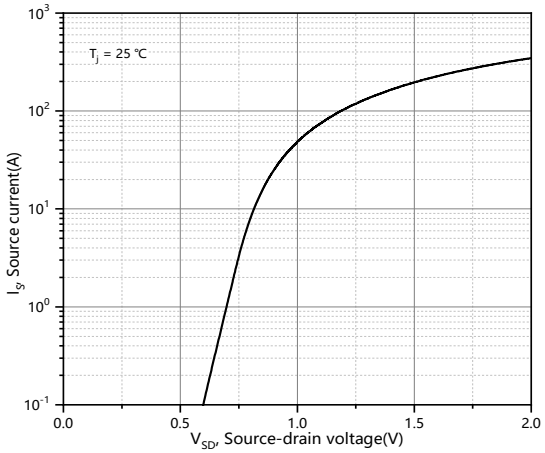


Figure 8. Forward characteristic of body diode

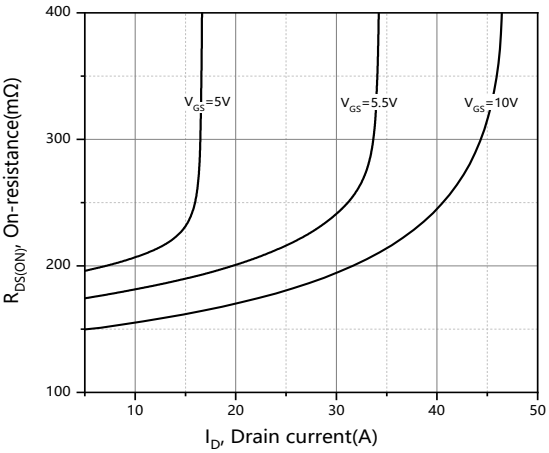


Figure 9. Drain-source on-state resistance

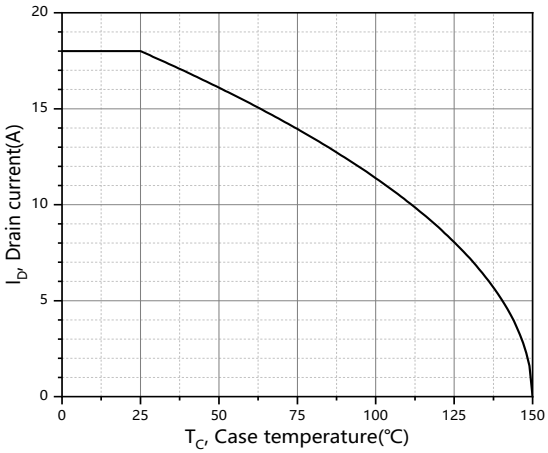


Figure 10. Drain current

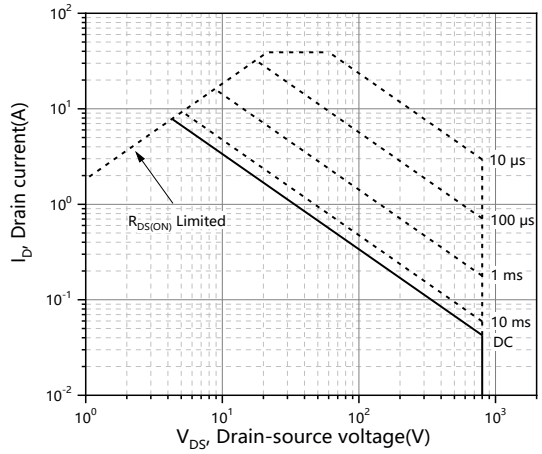


Figure 11. Safe operation area T_C=25 °C

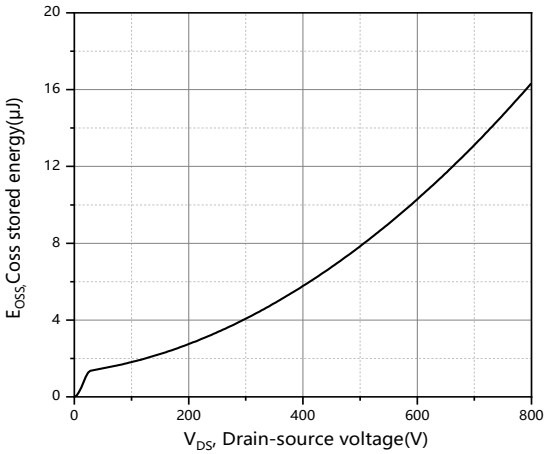


Figure 12. Typ. Coss stored energy

TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)

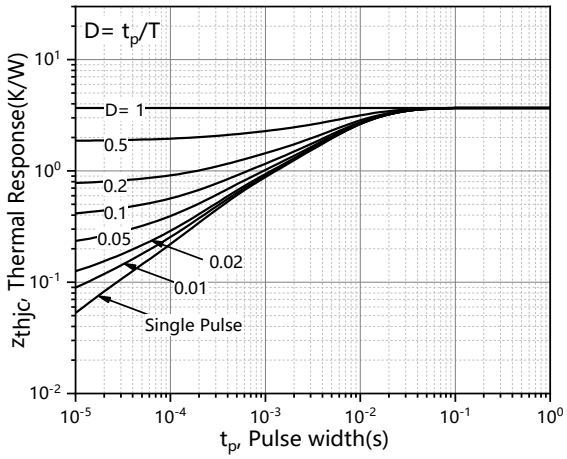
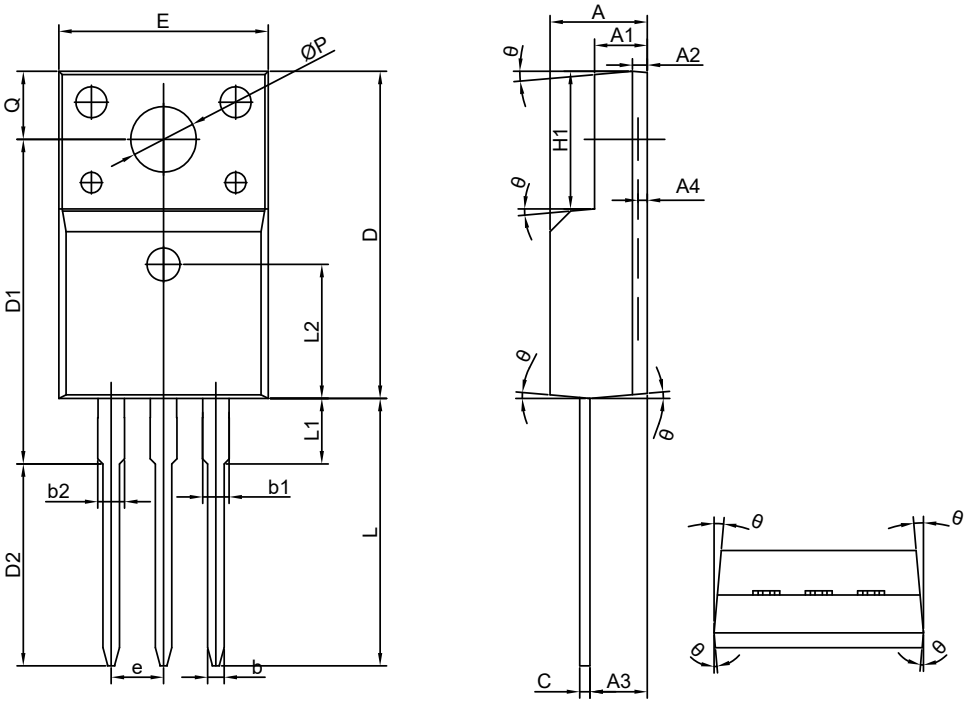
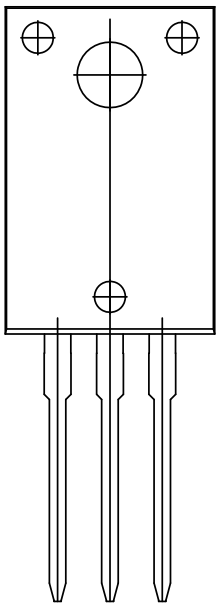


Figure 13. Max.transient thermai impedance

TO-220F-3L PACKAGE OUTLINE





COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	4.30	4.72	5.10
A1	2.25	2.56	2.90
A2		0.72 REF	
A3	2.28	2.78	3.50
A4		0.45 MAX	
b	0.65	-	0.95
b1	1.00	-	1.55
b2	-	-	1.55
c	0.40	0.50	0.65
D	15.47	15.87	16.37
D1	15.35	15.75	16.25
E	9.76	10.16	10.76
e		2.54 BSC	
H1	6.28	6.68	7.08
L	12.48	12.98	13.50
L1	2.90	-	3.80
L2		2.54 BSC	
ØP	2.98	3.18	3.50
Q	3.00	-	3.60
θ	3°	5°	7°

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