

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



RoHS
COMPLIANT

PRODUCT SUMMARY			
V_{DS} (V)@ T_J (max)	$R_{DS(on)}$ (m Ω)(Typ.)	I_D (A)	Q_g (Typ.)
850	62 at $V_{GS} = 10$ V	40	163 nC

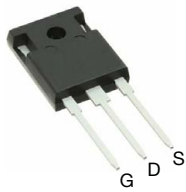
FEATURES

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

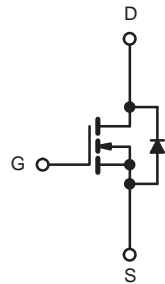
APPLICATIONS

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

TO-247 Pin Configuration



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	800	V
Gate-Source Voltage	V_{GS}	± 30	
Continuous Drain Current ($T_J = 150$ °C) ^a	I_D	$T_C = 25$ °C	A
		$T_C = 100$ °C	
Pulsed Drain Current ^b	I_{DM}	120	
Single Avalanche Energy ^e	E_{AS}	2300	mJ
Maximum Power Dissipation ^c	P_D	$T_C = 25$ °C	415
		$T_C = 100$ °C	200
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}	0.3	

Notes

- Calculated continuous current based on maximum allowable junction temperature.
- Repetitive rating; pulse width limited by max. junction temperature.
- P_D is based on max. junction temperature, using junction-case thermal resistance.
- The value of R_{thJA} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_a = 25$ °C.
- $V_{DS} = 300$ V, $V_{GS} = 10$ V, $L = 40$ 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 = 2 mA	2	-	4	
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 = 20 A	-	62	78	mΩ
		V _{GS} = 10 V, I _D = 20 A, T _J = 150 °C	-	110	-	
Forward Transconductance ^a	g _{fs}	V _{DS} = 50 V, I _D = 20 A	-	40	-	S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 50 V, f = 100 KHz	-	7556	-	pF
Output Capacitance	C _{oss}		-	410	-	
Reverse Transfer Capacitance	C _{rss}		-	6.8	-	
Total Gate Charge ^c	Q _g	V _{DS} = 400 V, V _{GS} = 10 V, I _D = 40 A	-	163	-	nC
Gate-Source Charge ^c	Q _{gs}		-	28	-	
Gate-Drain Charge ^c	Q _{gd}		-	55	-	
Gate Resistance	R _g	f = 1 MHz	-	2.8	-	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 400 V, I _D = 10 A, V _{GEN} = 10 V, R _g = 2 Ω	-	44	-	ns
Rise Time ^c	t _r		-	88	-	
Turn-Off Delay Time ^c	t _{d(off)}		-	105	-	
Fall Time ^c	t _f		-	9	-	
Drain-Source Body Diode Ratings and Characteristics ^b (T_C = 25 °C)						
Continuous Source Current	I _S	T _C = 25 °C	-	-	40	A
Pulsed Current (t = 100 μs)	I _{SM}		-	-	120	A
Forward Voltage ^a	V _{SD}	I _S = 40 A, V _{GS} = 0 V	-	-	1.3	V
Reverse Recovery Time	t _{rr}	I _S = 20 A, di/dt = 100 A/μs	-	440	-	ns
Reverse Recovery Charge	Q _{rr}		-	9.3	-	μC
Peak reverse recovery current	I _{rrm}		-	40.5	-	A

Notes

- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- Guaranteed by design, not subject to production testing.
- 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 ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)

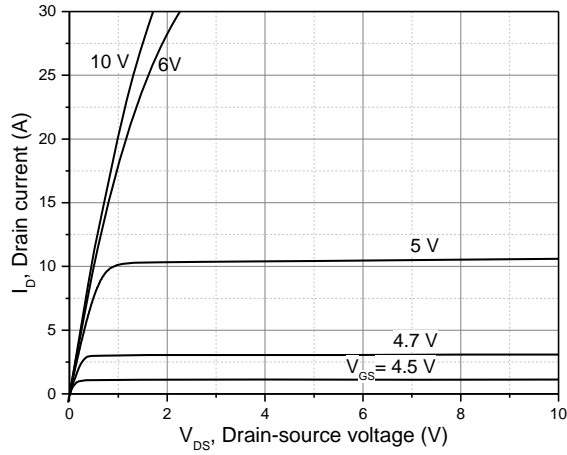


Figure 1. Typ. output characteristics

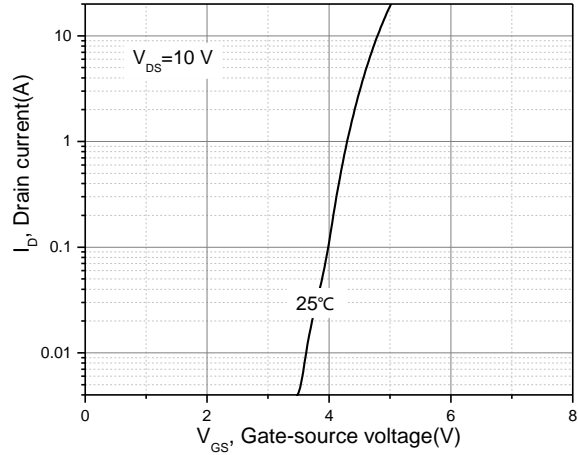


Figure 2. Typ. transfer characteristics

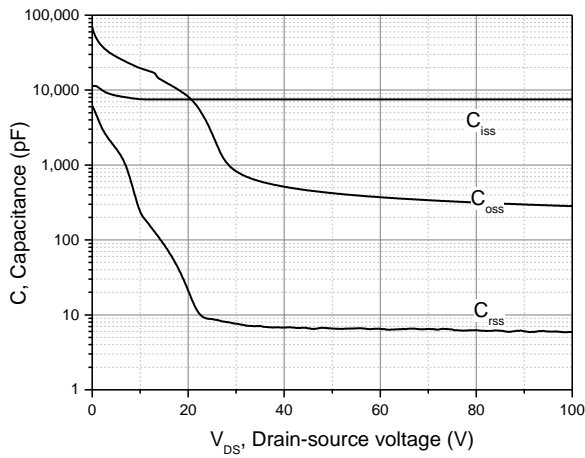


Figure 3. Typ. capacitances

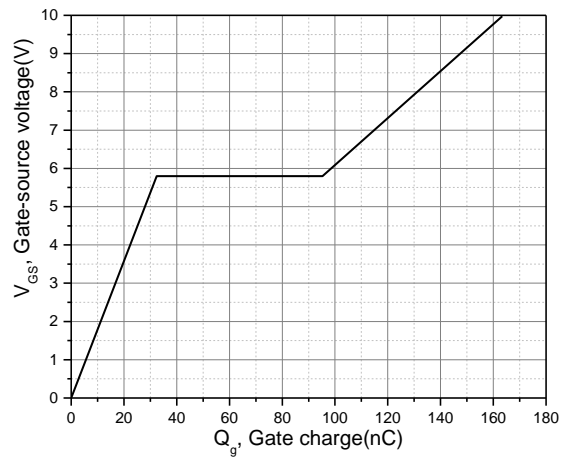


Figure 4. Typ. gate charge

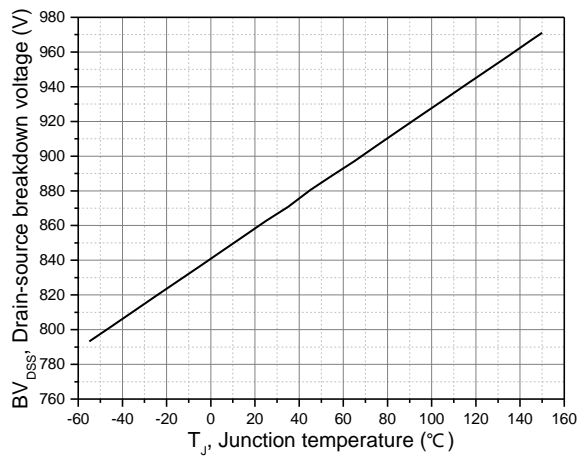


Figure 5. Drain-source breakdown voltage

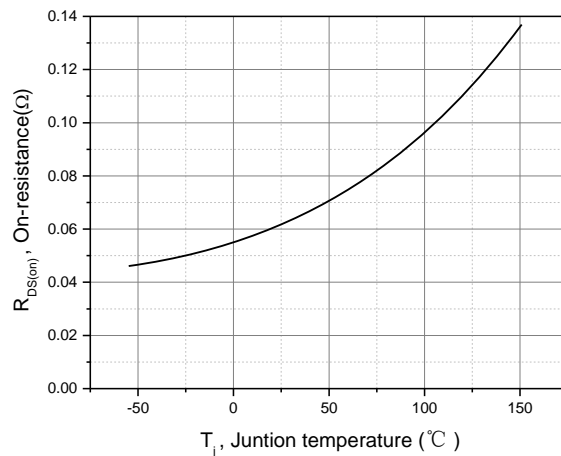


Figure 6. Drain-source on-state resistance

TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)

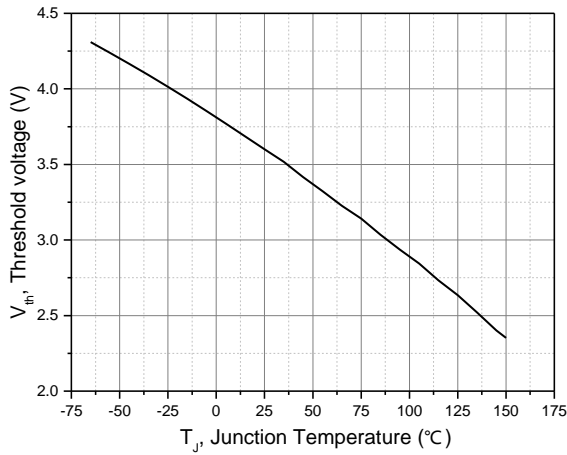


Figure 7. Threshold voltage

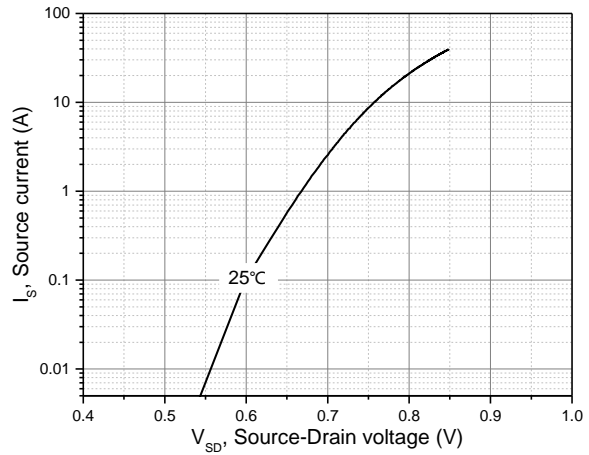


Figure 8. Forward characteristic of body diode

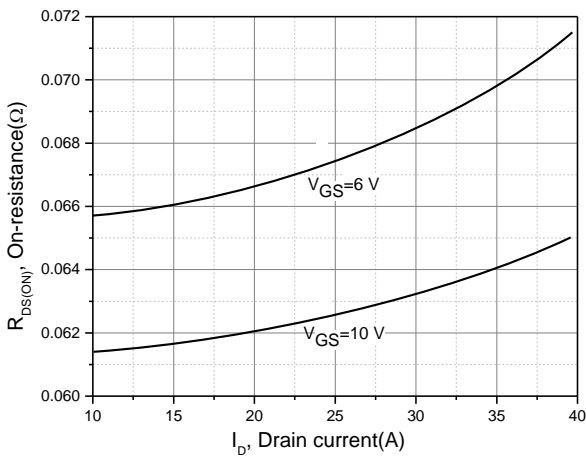


Figure 9. Drain-source on-state resistance

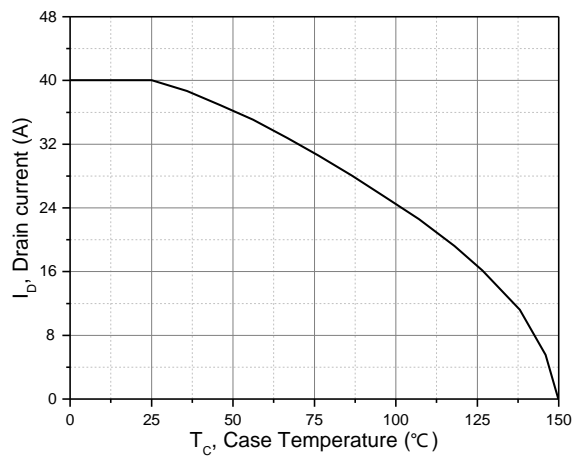


Figure 10. Drain current

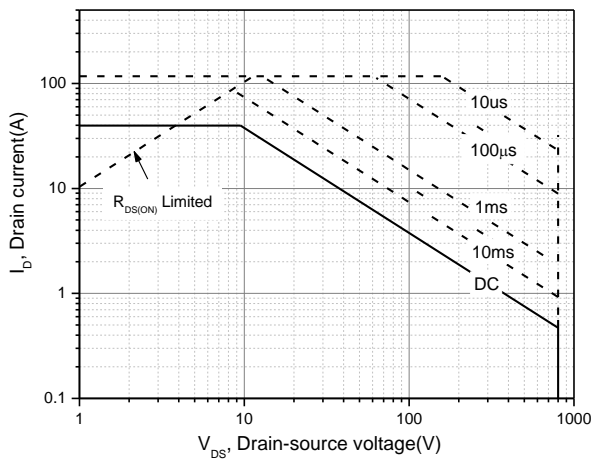


Figure 11. Safe operation area $T_C=25\text{ }^\circ\text{C}$

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