

N-Channel 40 V (D-S) MOSFET

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (mΩ)(Typ.)	I _D (A) ^a	Q _g (Typ.)
40	1.8 at V _{GS} = 10 V	163	28 nC

FEATURES

- DT-SGT Power MOSFET
- 100 % Rg and UIS tested
- Excellent FoM (Figure of Merit)
- Low On-Resistance

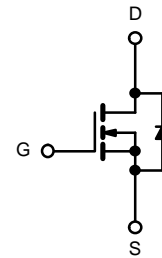
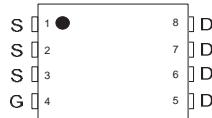


RoHS
COMPLIANT

APPLICATIONS

- Motor Drive
- Load Switching
- High Frequency Switching, Synchronous Rectification

DFN5X6-8L Pin Configuration



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V _{DS}	40	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C) ^a	I _D	T _C = 25 °C	163
		T _C = 100 °C	103
Pulsed Drain Current ^b	I _{DM}	652	A
Single Avalanche Energy	E _{AS}	314	mJ
Maximum Power Dissipation ^c	P _D	T _C = 25 °C	96
		T _C = 100 °C	38
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}	43	°C/W
Junction-to-Case (Drain)	R _{thJC}	1.3	

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.

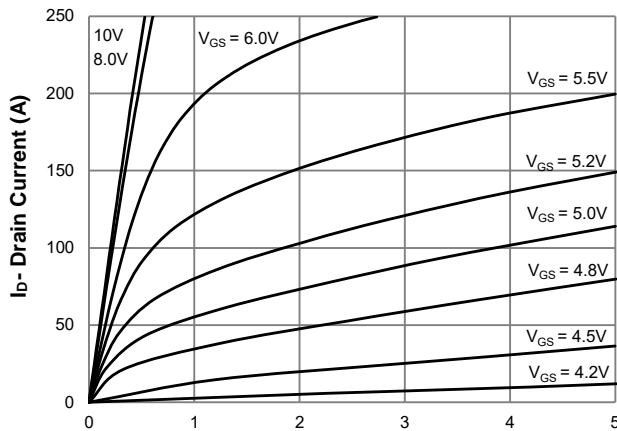
SPECIFICATIONS (T _C = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	40	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.0	-	4.0	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 40 V, V _{GS} = 0 V	-	-	1	μA
		V _{DS} = 32 V, V _{GS} = 0 V, T _J = 125 °C	-	-	100	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≤ 5 V, V _{GS} = 10 V	163	-	-	A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A	-	1.8	2.2	mΩ
Forward Transconductance ^a	g _{fs}	V _{DS} = 5 V, I _D = 20 A	-	35	-	S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 20 V, f = 1 MHz	-	2087	-	pF
Output Capacitance	C _{oss}		-	1194	-	
Reverse Transfer Capacitance	C _{rss}		-	42	-	
Total Gate Charge ^c	Q _g	V _{DS} = 20 V, V _{GS} = 10 V, I _D = 20 A	-	28	-	nC
Gate-Source Charge ^c	Q _{gs}		-	8.3	-	
Gate-Drain Charge ^c	Q _{gd}		-	4.3	-	
Gate Resistance	R _g	f = 1 MHz	-	1.4	-	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 20 V, R _{GEN} = 3 Ω, I _D = 20 A, V _{GS} = 10 V	-	9.4	-	ns
Rise Time ^c	t _r		-	15	-	
Turn-Off Delay Time ^c	t _{d(off)}		-	18	-	
Fall Time ^c	t _f		-	7.8	-	
Drain-Source Body Diode Ratings and Characteristics ^b (T_C = 25 °C)						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	-	-	147	A
Pulsed Current	I _{SM}		-	-	652	A
Forward Voltage ^a	V _{SD}	I _F = 2 A, V _{GS} = 0 V	-	0.7	1.2	V
Reverse Recovery Time	t _{rr}	I _F = 20 A, di/dt = 100 A/μs	-	40	-	ns
Reverse Recovery Charge	Q _{rr}		-	35	-	nC

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.

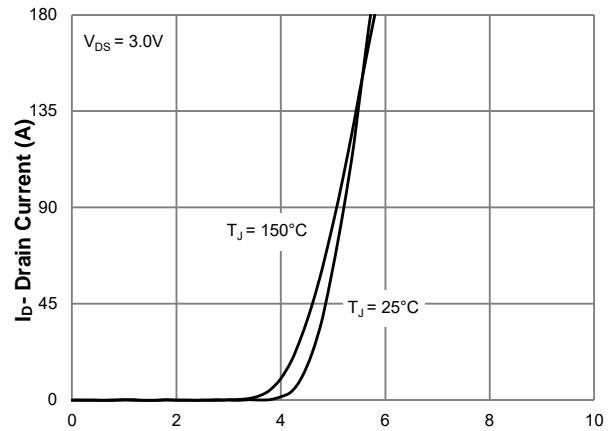
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



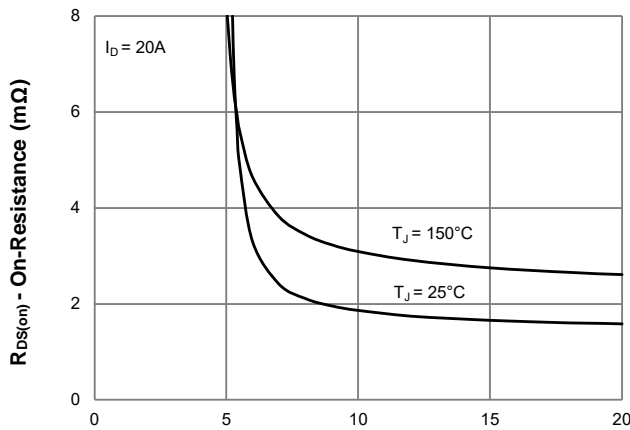
V_{DS} - Drain-to-Source Voltage (V)

Figure 1: Output Characteristics



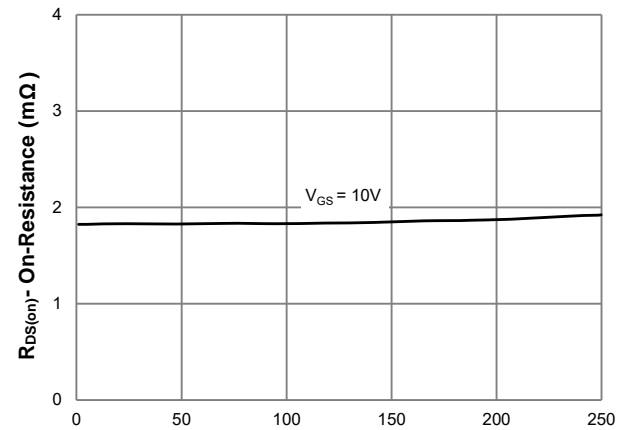
V_{GS} - Gate-to-Source Voltage (V)

Figure 2: Transfer Characteristics



V_{GS} - Gate-to-Source Voltage (V)

Figure 3: On-Resistance vs. Gate-Source Voltage



ID - Drain Current (A)

Figure 4: On-Resistance vs. Gate-Source Voltage

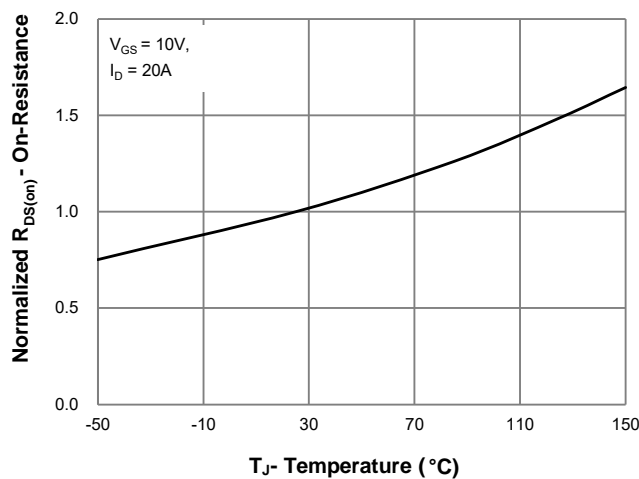


Figure 5: On-Resistance vs. Junction Temperature

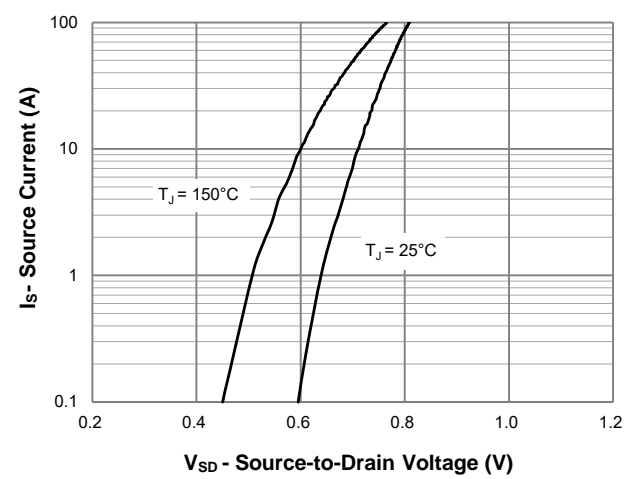


Figure 6: Source-Drain Diode Forward Voltage

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

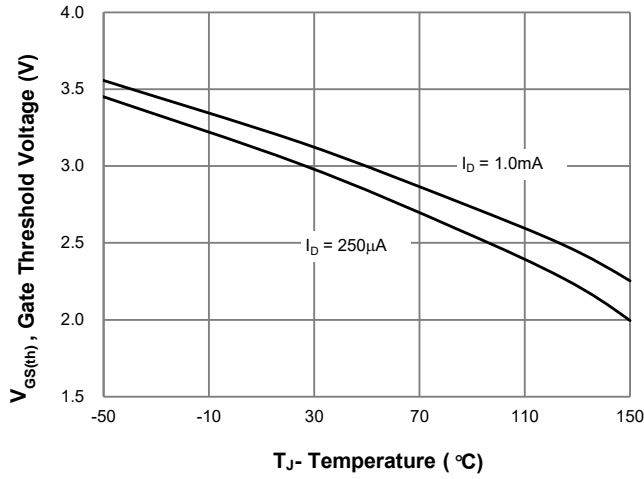


Figure 7: Gate Threshold Variation vs. Junction Temperature

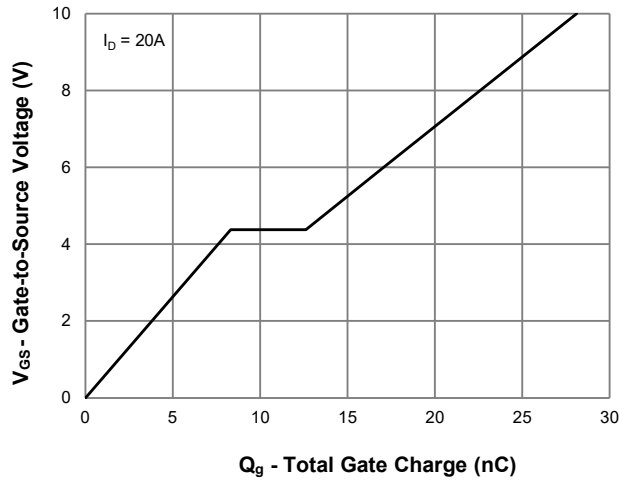


Figure 8: Gate Charge Characteristics

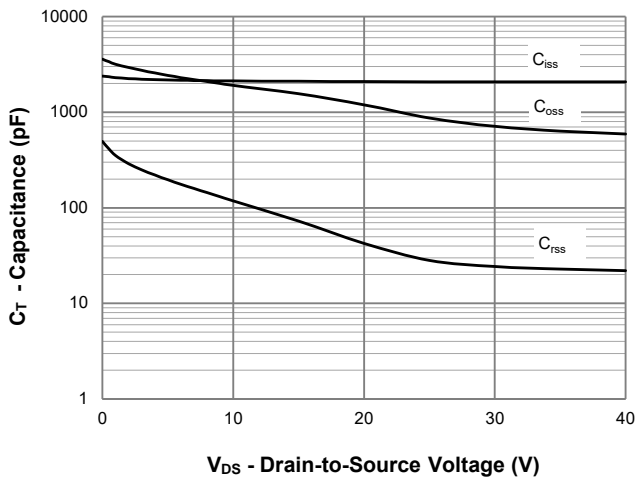


Figure 9: Capacitance Characteristics

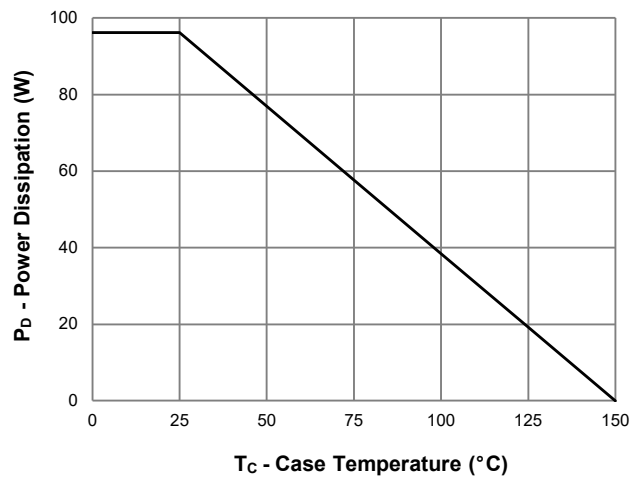


Figure 10: Power Derating

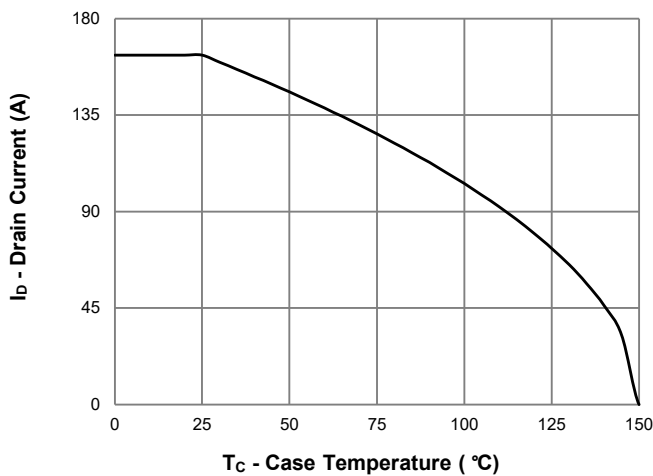


Figure 11: Current Derating

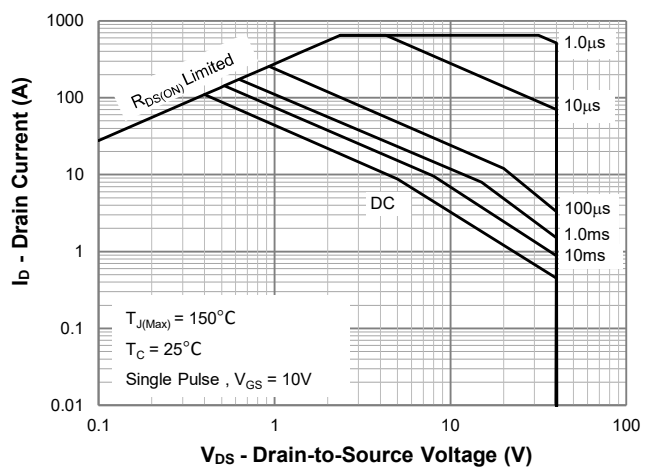


Figure 12: Safe Operating Area

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

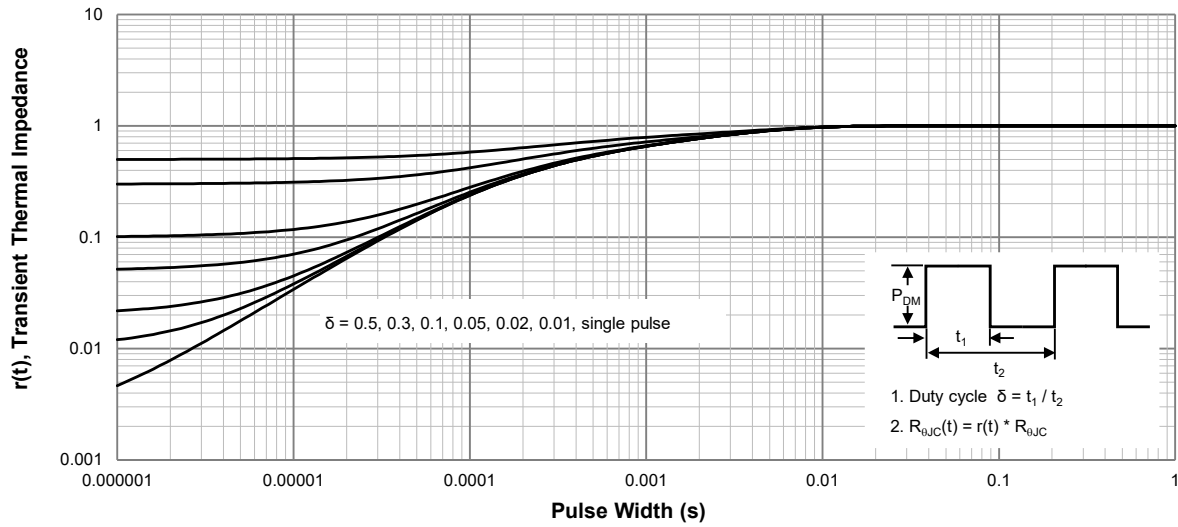
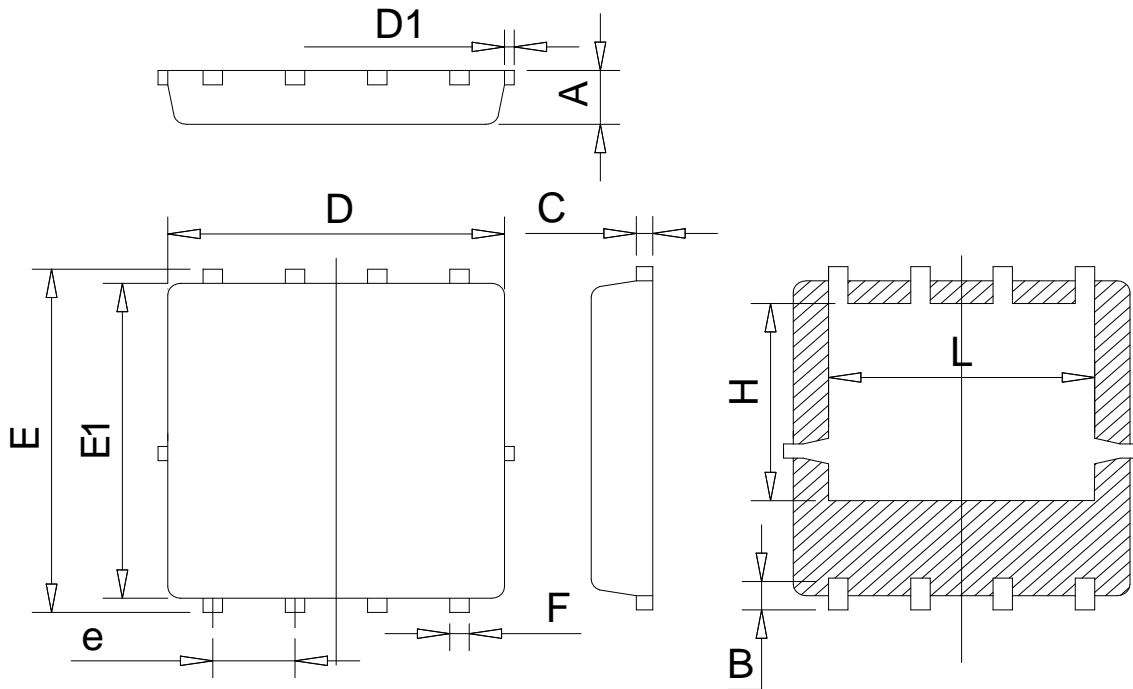


Figure 13: Normalized Maximum Transient Thermal Impedance

DFN5X6-8L PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

Symbol	Min	Typ	Max
A	0.78	0.95	1.12
B	0.45	0.58	0.78
C	0.18	0.254	0.36
D	4.70	5.20	5.45
D1			0.18
E	5.85	6.05	6.25
E1	5.38	5.55	5.98
e	1.15	1.27	1.40
F	0.18	0.30	0.52
H	3.25	3.47	3.70
L	3.75	4.00	4.25

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