

P-Channel 40-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (m Ω)(Typ.)	I_D (A) ^a	Q_g (Typ.)
-40	3 at $V_{GS} = -10$ V	-130	80 nC
	4 at $V_{GS} = -4.5$ V		

FEATURES

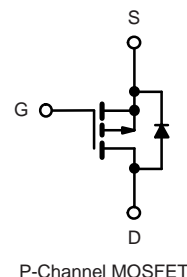
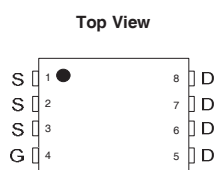
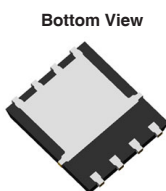
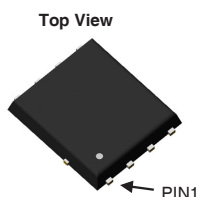
- DT-Trench Power MOSFET
- Low Gate Charge
- 100 % R_g and UIS Tested
- AEC-Q101 Qualified for Automotive Applications


RoHS
 COMPLIANT

APPLICATIONS

- PWM Applications
- Load Switch
- Power Management

DFN5X6-8L Pin Configuration



ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	- 40	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current	I_D	- 130	A
		- 98	
Continuous Source Current (Diode Conduction)	I_S	- 125	
Pulsed Drain Current ^a	I_{DM}	- 520	
Single Pulse Avalanche Current	I_{AS}	- 120	
Single Pulse Avalanche Energy	E_{AS}	150	mJ
Maximum Power Dissipation ^b	P_D	90	W
		43	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 175	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Case (Drain) ^{c,d}	R_{thJC}	1.39	$^\circ\text{C/W}$

Notes:

- Based on $T_C = 25^\circ\text{C}$.
- Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.
- When mounted on 1" square PCB (FR-4 material).
- Parametric verification ongoing.

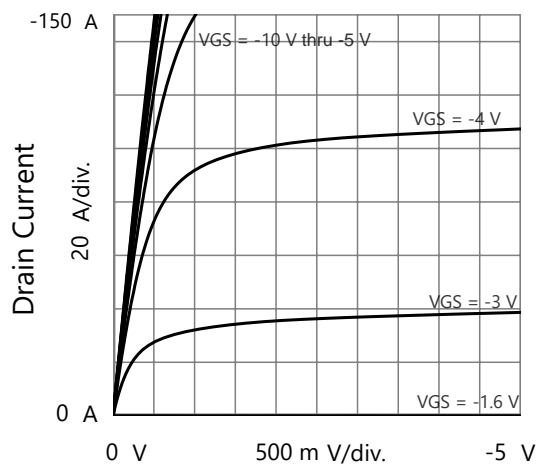
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min .	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = -250 μA	-40			V
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250 μA	-1		-3	V
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -40V, V _{GS} = 0 V			-1	μA
		V _{DS} = -30V, V _{GS} = 0 V, T _J = 125 °C		-20		
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 10 V, I _D = - 20 A		3	3.8	mΩ
		V _{GS} = - 4.5 V, I _D = - 20 A		4	5.5	
Forward Transconductance ^a	g _{fs}	V _{DS} = -10 V,I _D = - 20 A		40		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = - 20 V,V _{GS} = 0 V, f = 1 MHz		10400		pF
Output Capacitance	C _{oss}			818		
Reverse Transfer Capacitance	C _{rss}			961		
Total Gate Charge	Q _g	V _{DS} = -20 V,V _{GS} = -10V, I _D = -20 A		80		nC
Gate-Source Charge	Q _{gs}			12		
Gate-Drain Charge	Q _{gd}			7.5		
Gate Resistance	R _g	f = 1 MHz		1.5		Ω
Turn-On Delay Time	t _{d(on)}	V _{DS} = -20 V, R _L = 4 Ω I _D ≡ -20A, V _{GS} = -10 V, R _g = 6 Ω		15		ns
Rise Time	t _r			90		
Turn-Off Delay Time	t _{d(off)}			110		
Fall Time	t _f			85		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _A = 25 °C			- 130	A
Pulse Diode Forward Current ^a	I _{SM}				- 520	
Body Diode Voltage	V _{SD}	I _S = - 1 A			- 1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = - 20 A, di/dt = 100 A/μs, T _J = 25 °C		30		ns
Body Diode Reverse Recovery Charge	Q _{rr}			20		nC

Notes:

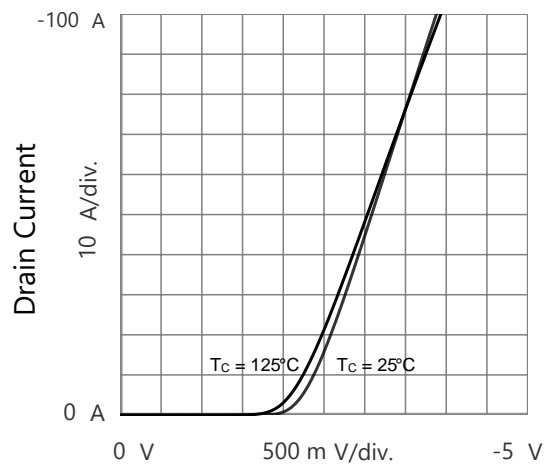
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.

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.

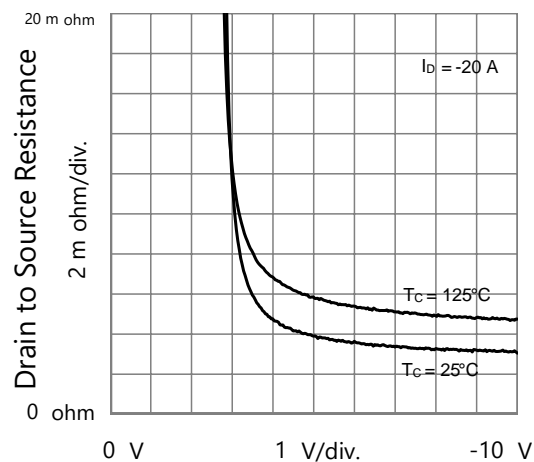
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



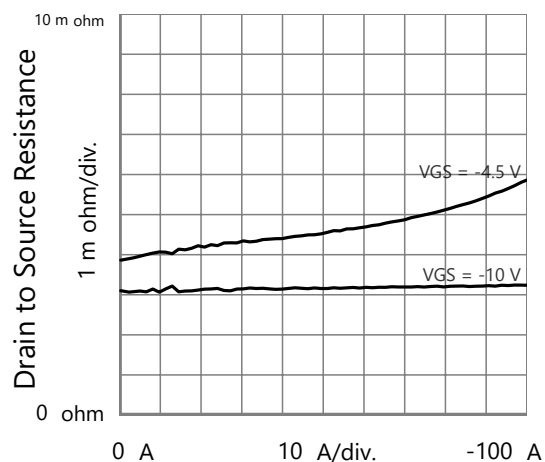
Drain to Source Voltage
Output Characteristics



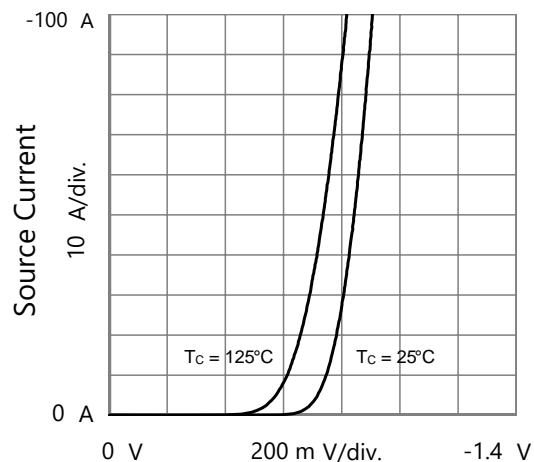
Gate to Source Voltage
Transfer Characteristics



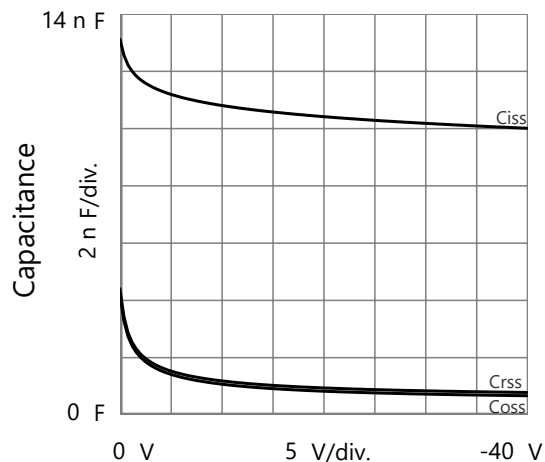
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current



Source to Drain Voltage
Body Diode Forward Characteristics



Drain to Source Voltage
Capacitances

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

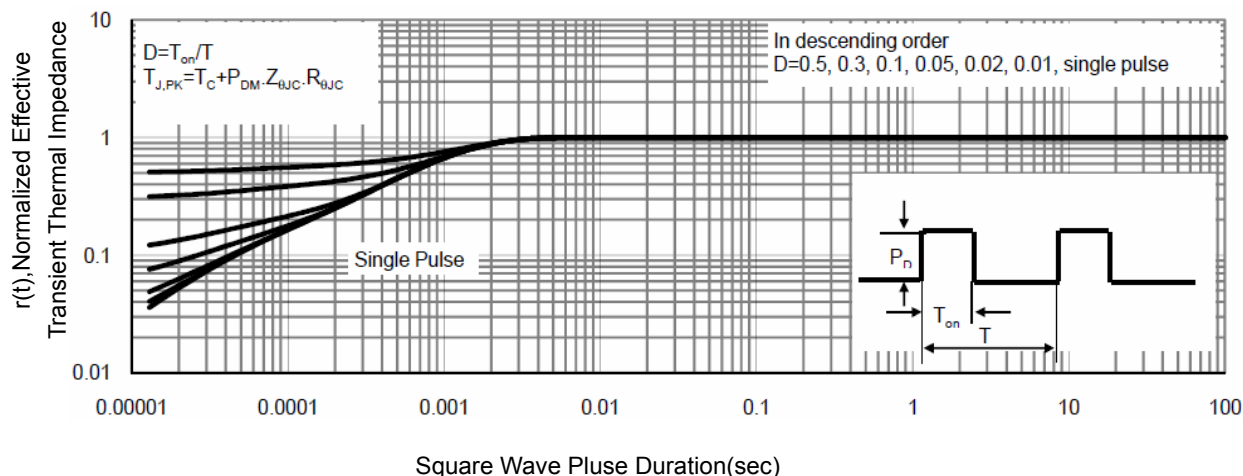
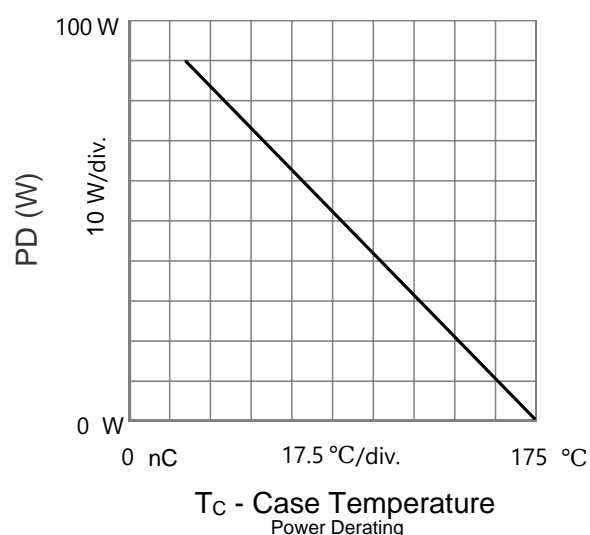
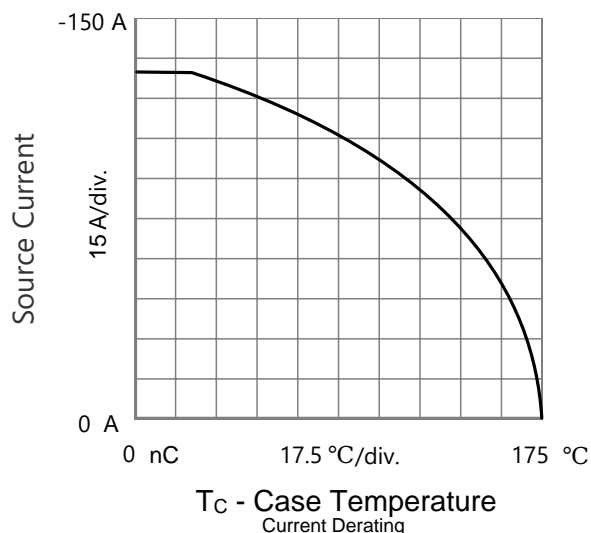
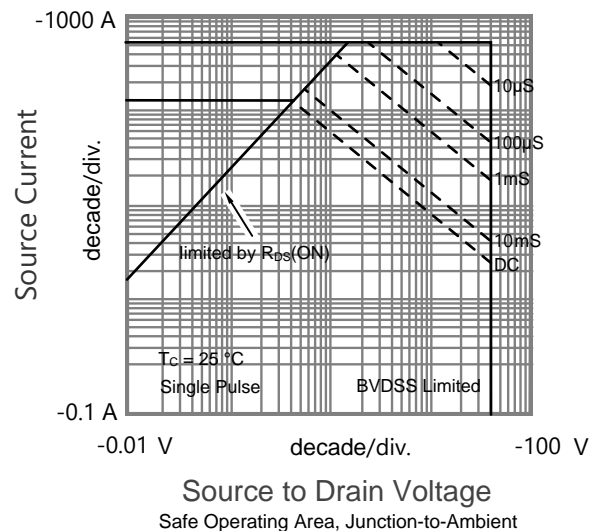
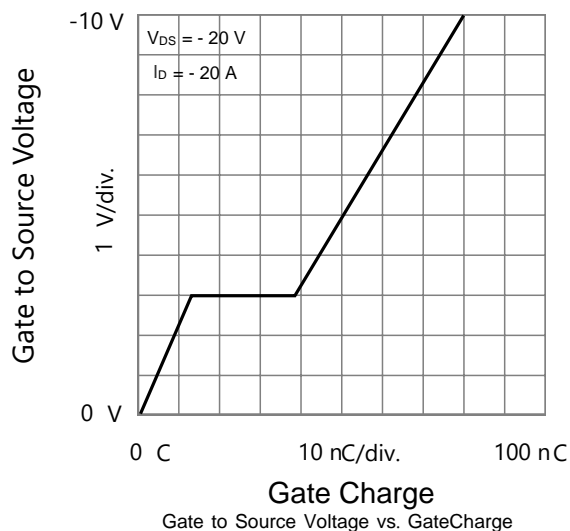
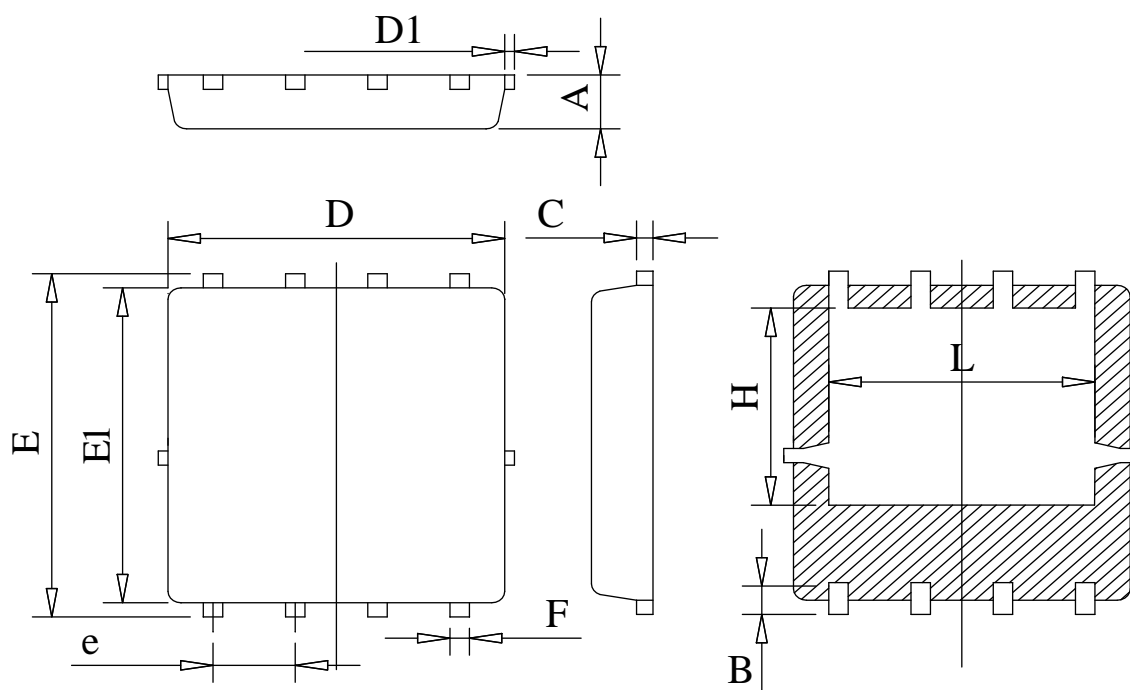


Figure 13 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

Unit : mm

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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