

N-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	2 at $V_{GS} = 10$ V	110	120 nC
	3.5 at $V_{GS} = 4.5$ V		

FEATURES

- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested

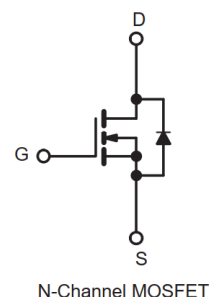
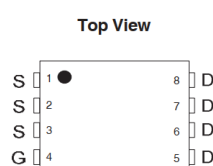
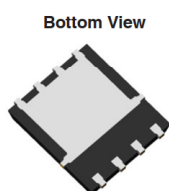
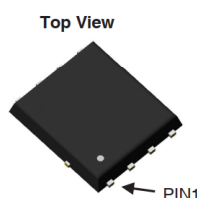
APPLICATIONS

- DC/DC Converter
- VRM/POL



RoHS
COMPLIANT

DFN5X6-8L Pin Configuration



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 ($T_J = 175$ °C)	$T_C = 25$ °C	110	A
	$T_C = 100$ °C	47.5	
Pulsed Drain Current	I_{DM}	400	
Single Avalanche Energy ^a	$L = 0.5$ mH	E_{AS}	mJ
Maximum Power Dissipation	$T_C = 25$ °C	75 ^{b,c}	W
	$T_C = 100$ °C	36 ^{b,c}	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	°C
Soldering Recommendations (Peak Temperature)		260	

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) ^{b,d}	$t \leq 10$ s	R_{thJA}	17
Junction-to-Case (Drain)	Steady State	R_{thJC}	1.66

Notes:

- $T_C = 25$ °C.
- Surface mounted on 1" x 1" FR4 board.
- $t = 10$ s.
- Maximum under steady state conditions is 20 °C/W.

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, 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} = 40 V, V _{GS} = 0 V			1	μA
		V _{DS} = 32 V, V _{GS} = 0 V, T _J = 55 °C			10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	110			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 30 A		2	2.5	mΩ
		V _{GS} = 4.5 V, I _D = 30 A		3.5	4	
Forward Transconductance ^a	g _{fs}	V _{DS} = 5 V, I _D = 30 A		55		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 20 V, V _{GS} = 0 V, f = 1 MHz		6480		pF
Output Capacitance	C _{oss}			470		
Reverse Transfer Capacitance	C _{rss}			445		
Total Gate Charge	Q _g	V _{DS} = 20 V, V _{GS} = 10 V, I _D = 30 A		120		nC
Gate-Source Charge	Q _{gs}			12.5		
Gate-Drain Charge	Q _{gd}			20		
Gate Resistance	R _g	f = 1 MHz		0.8		Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 20 V, R _L = 1 Ω I _D ≅ 30 A, V _{GEN} = 10 V, R _g = 1.6 Ω		8		ns
Rise Time	t _r			3		
Turn-Off DelayTime	t _{d(off)}			28		
Fall Time	t _f			4		
Drain-Source Body Diode Characteristics						
Continous Source-Drain Diode Current	I _S	T _C = 25 °C			110	A
Pulse Diode Forward Current (100 μs)	I _{SM}				400	
Body Diode Voltage	V _{SD}	I _S = 1 A			1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 30 A, dI/dt = 100 A/μs, T _J = 25 °C		20		ns
Body Diode Reverse Recovery Charge	Q _{rr}			59		nC

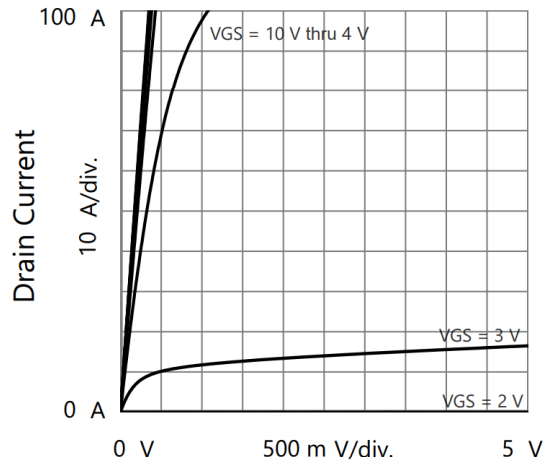
Notes:

a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

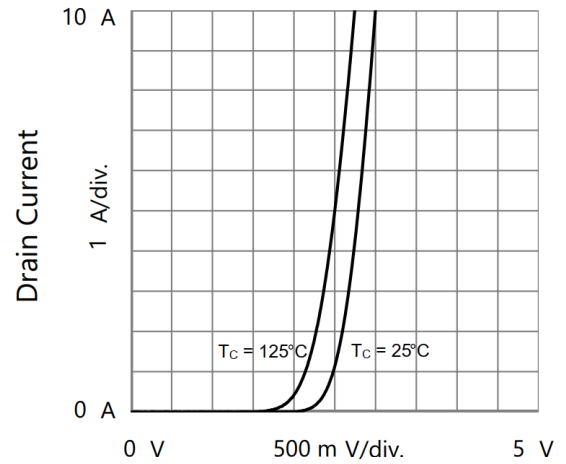
b. Guaranteed by design, not subject to production testing.

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.

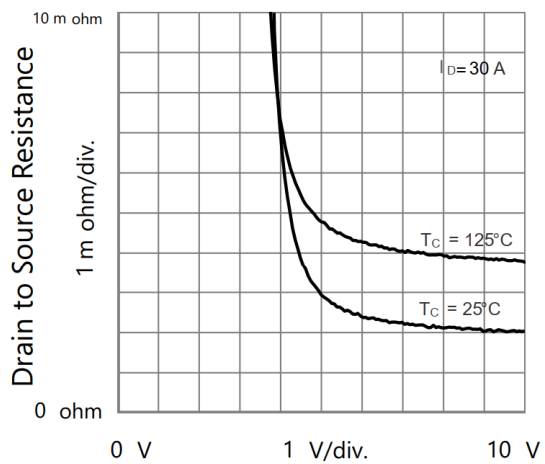
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



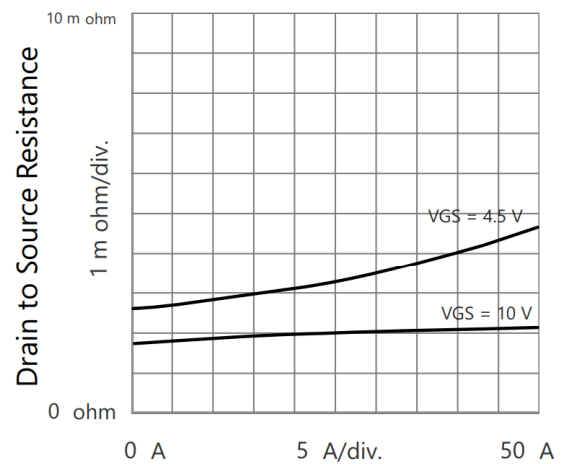
Drain to Source Voltage
Output Characteristics



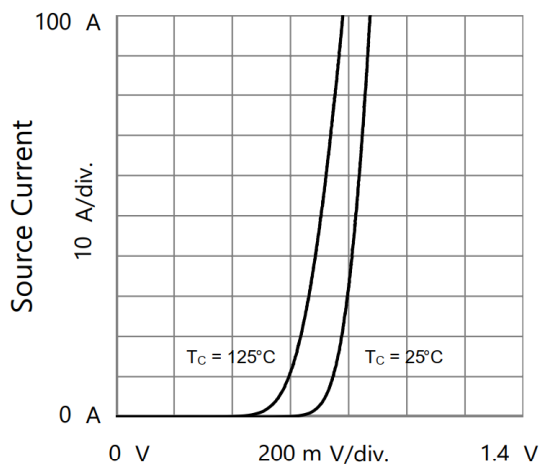
Gate to Source Voltage
Transfer Characteristics



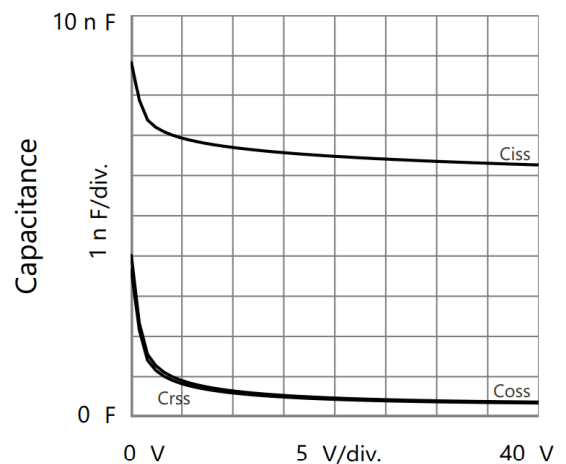
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

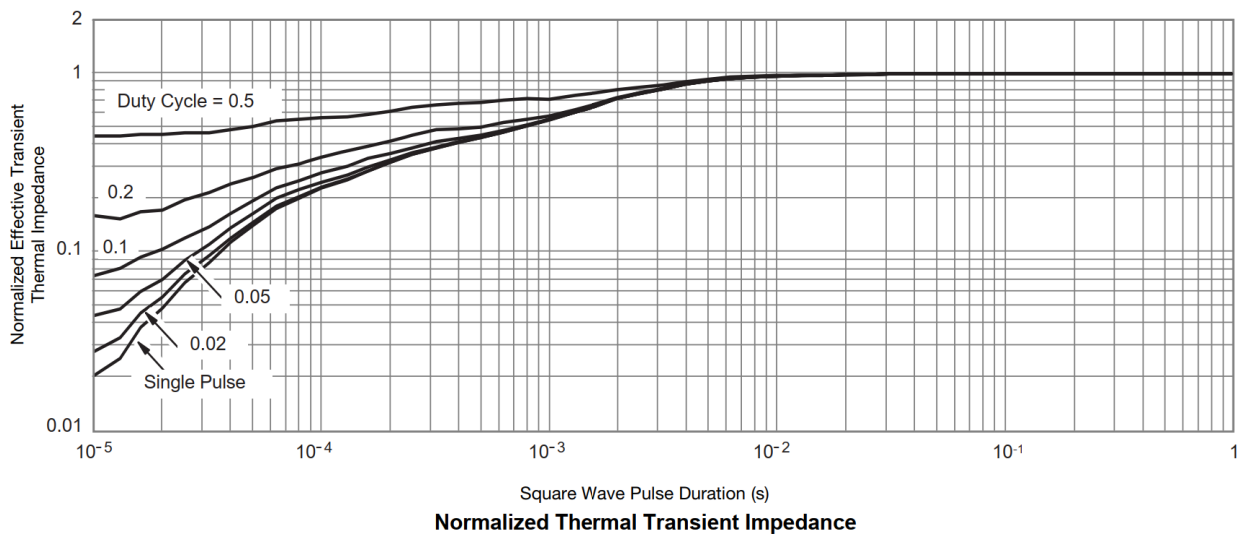
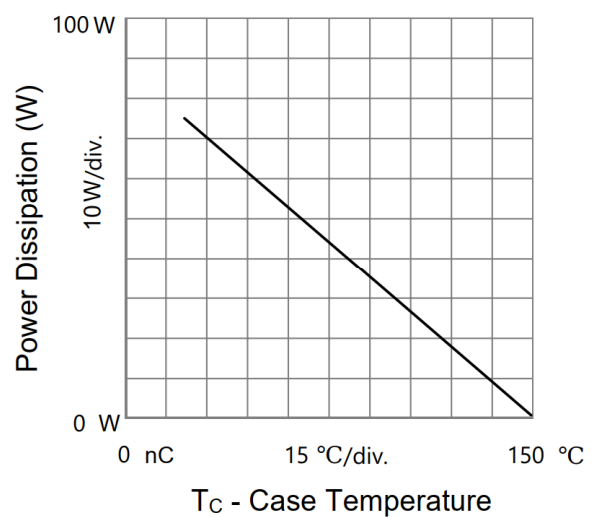
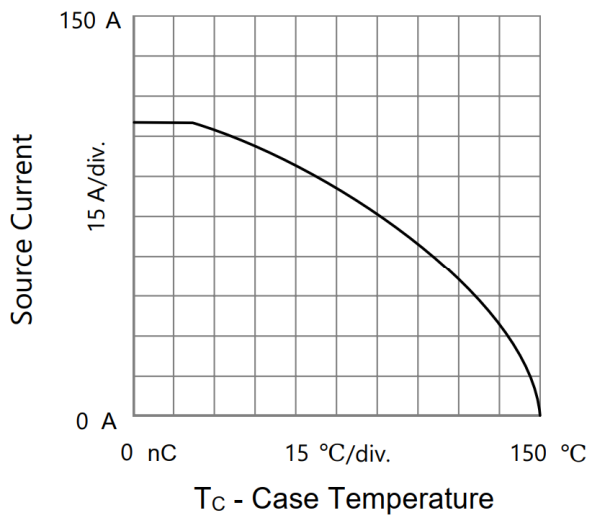
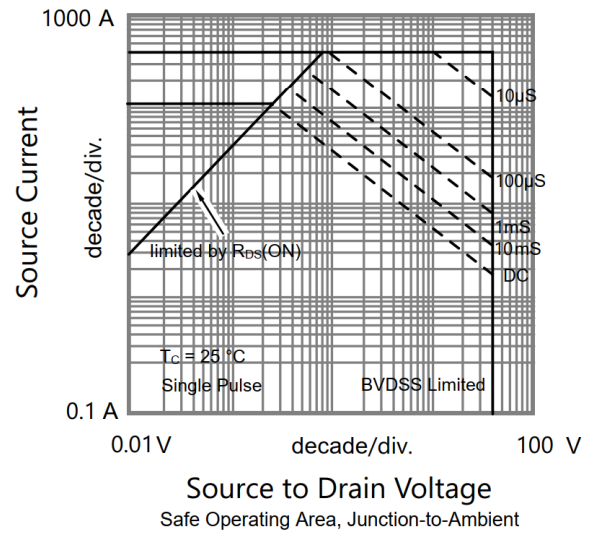
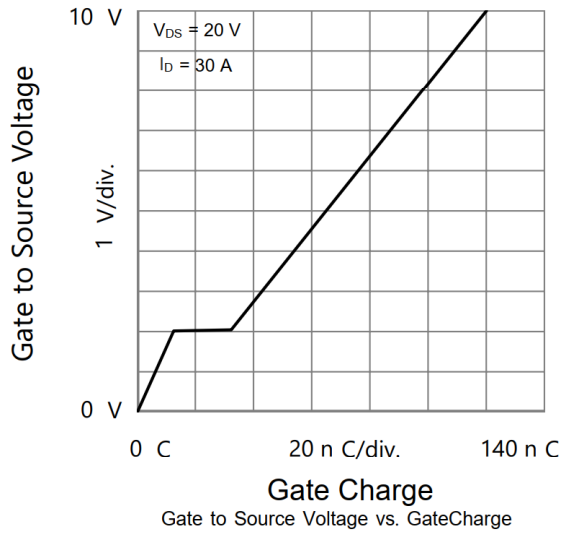


Source to Drain Voltage
Body Diode Forward Characteristics

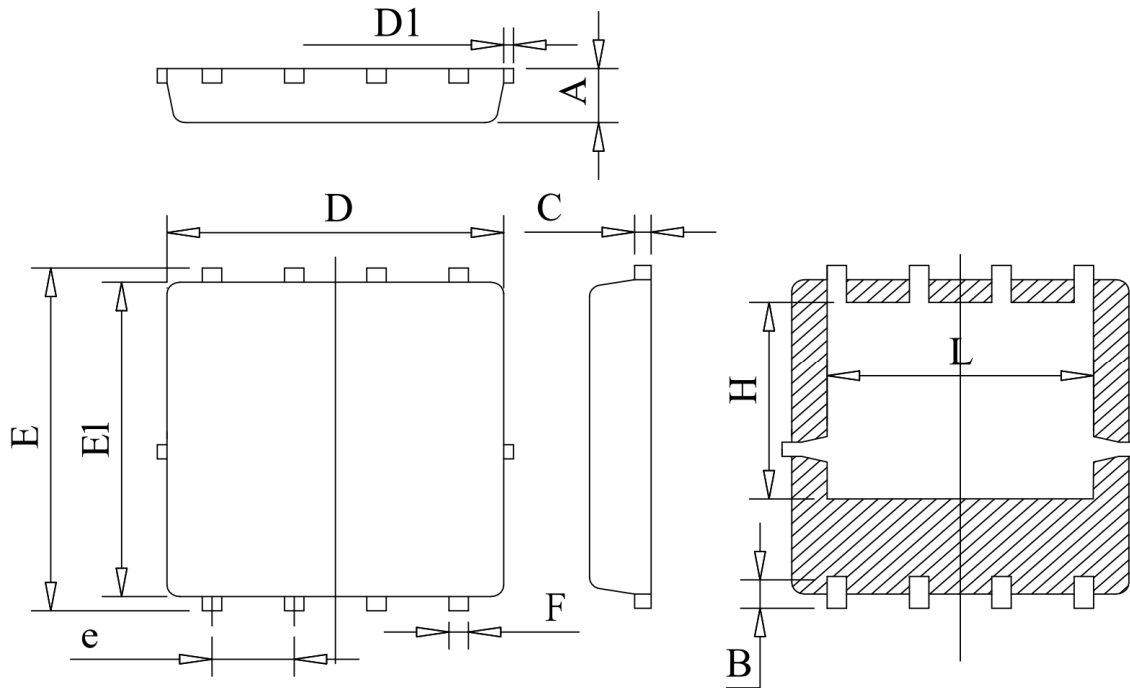


Drain to Source Voltage
Capacitances

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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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