

Dual 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	10 at $V_{GS} = 10$ V	42	45 nC
	15 at $V_{GS} = 4.5$ V		

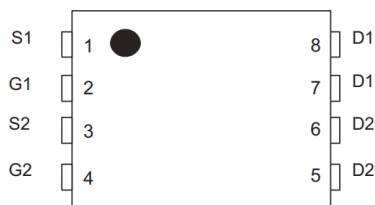
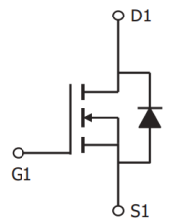
FEATURES

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

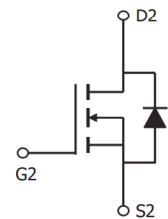
APPLICATIONS

- 12 V Automotive systems
- Motors, lamps and solenoid control
- Transmission control
- Ultra high performance power switching


RoHS
 COMPLIANT

DFN5X6

Top View


N-Channel MOSFET



N-Channel MOSFET

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 ($T_J = 150^\circ\text{C}$)	I_D	42	A
		28	
Pulsed Drain Current	I_{DM}	168	
Single Avalanche Energy ^a	E_{AS}	85	mJ
Maximum Power Dissipation	P_D	70 ^b	W
		28 ^b	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) ^{c,d}	R_{thJA}	45	$^\circ\text{C/W}$
Junction-to-Case (Drain)	R_{thJC}	1.78	

Notes:

- $T_C = 25^\circ\text{C}$.
- Surface mounted on 1" x 1" FR4 board.
- $t = 10$ s.
- Maximum under steady state conditions is 45°C/W .

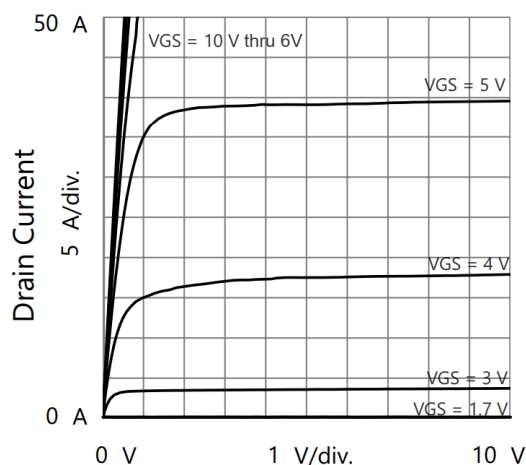
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0, I _D = 250 μA	40			V
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1		3	V
Gate-Source Leakage	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	42			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 10 A		10	12	mΩ
		V _{GS} = 4.5 V, I _D = 10 A		15	19.5	
Forward Transconductance ^a	g _{fs}	V _{DS} = 5 V, I _D = 10 A		50		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 20 V, V _{GS} = 0 V, f = 1 MHz		2240		pF
Output Capacitance	C _{oss}			175		
Reverse Transfer Capacitance	C _{rss}			160		
Total Gate Charge	Q _g	V _{DS} = 20 V, V _{GS} = 10 V, I _D = 10 A		45		nC
Gate-Source Charge	Q _{gs}			4.5		
Gate-Drain Charge	Q _{gd}			11		
Gate Resistance	R _g	f = 1 MHz		2.5		Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 20 V, R _L = 0.75 Ω I _D ≅ 10 A, V _{GEN} = 10 V, R _g = 3 Ω		10		ns
Rise Time	t _r			20		
Turn-Off DelayTime	t _{d(off)}			27		
Fall Time	t _f			15		
Drain-Source Body Diode Characteristics						
Continous Source-Drain Diode Current	I _S	T _C = 25 °C			42	A
Pulse Diode Forward Current (100 μs)	I _{SM}				168	
Body Diode Voltage	V _{SD}	I _S = 1 A			1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 10 A, dI/dt = 100 A/μs, T _J = 25 °C		20		ns
Body Diode Reverse Recovery Charge	Q _{rr}			35		nC

Notes:

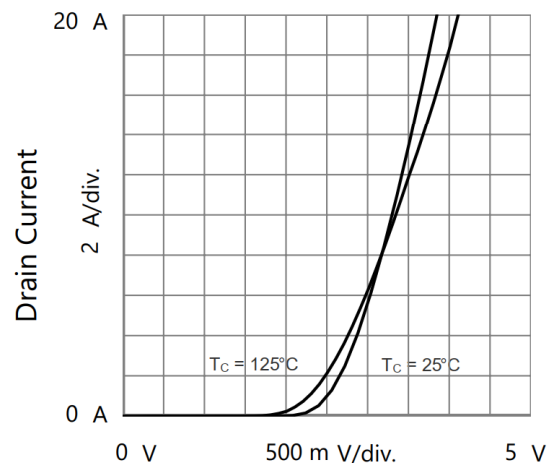
 a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

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

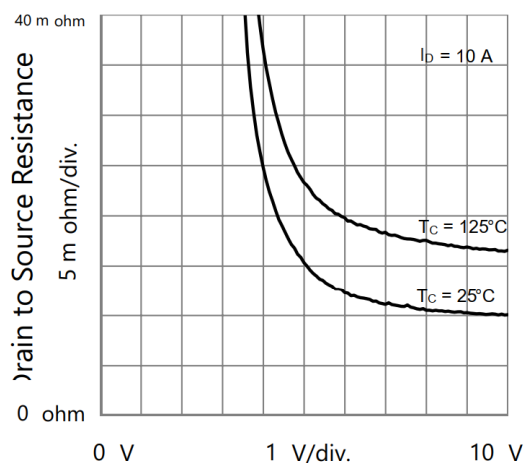
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



Drain to Source Voltage
Output Characteristics

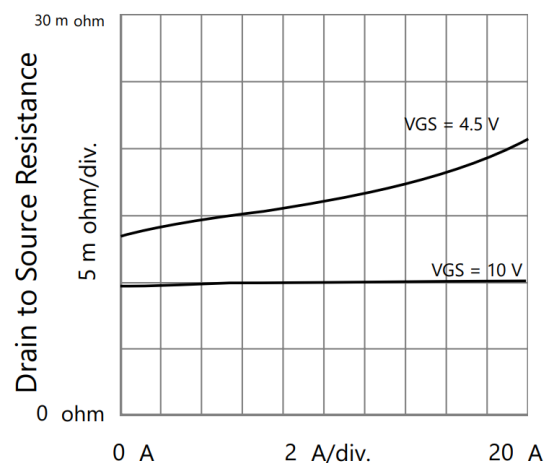


Gate to Source Voltage
Transfer Characteristics



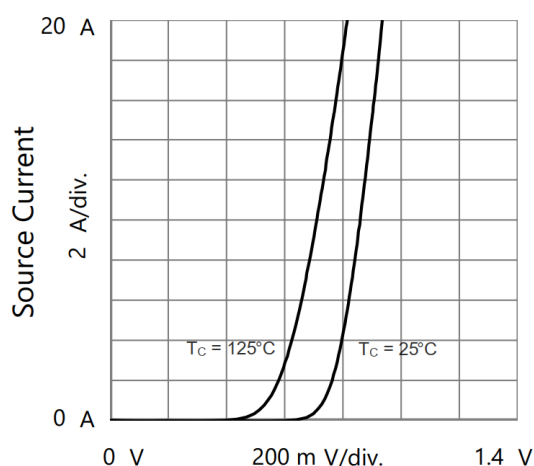
Gate to Source Voltage

Drain to Source Resistance vs. Gate to Source Voltage

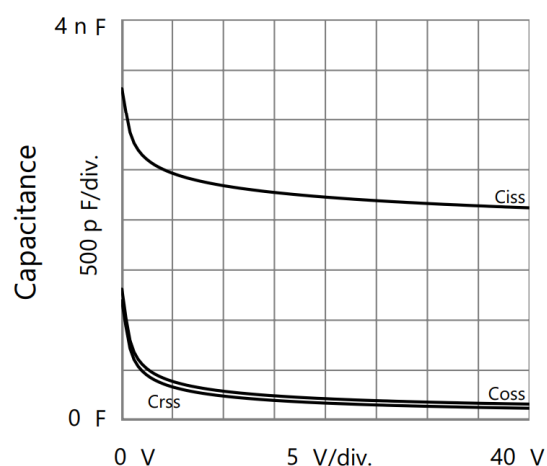


Drain Current

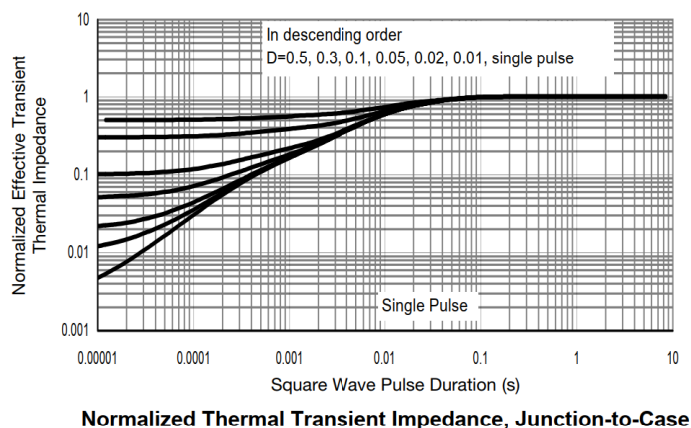
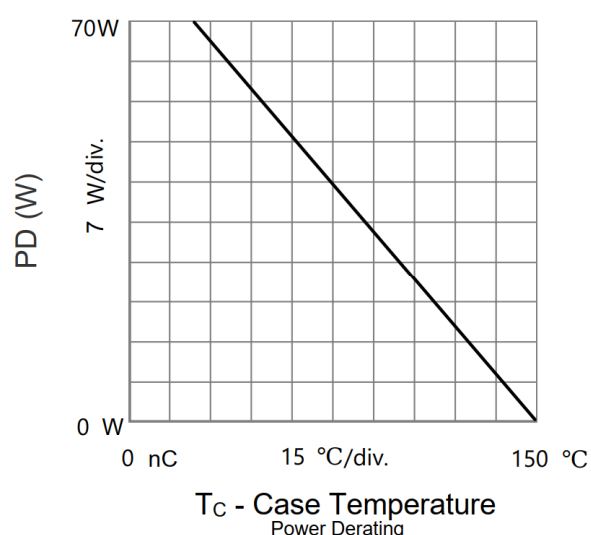
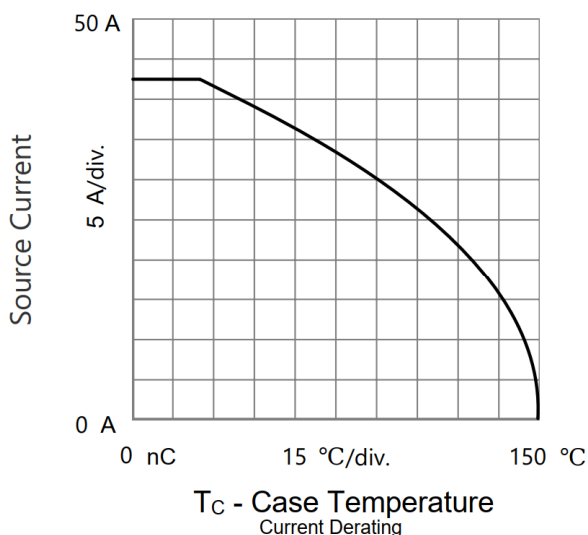
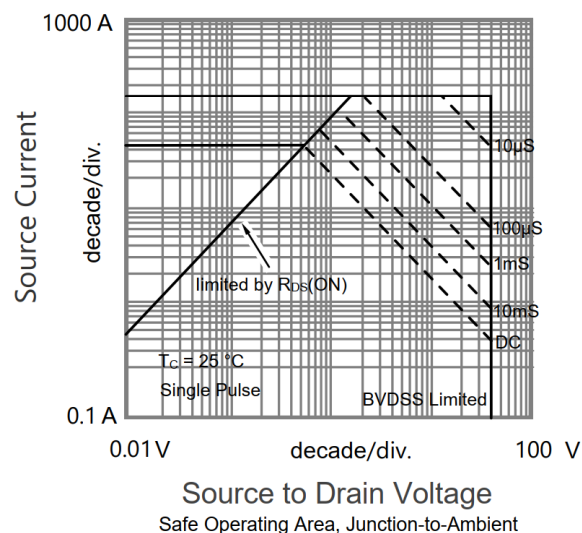
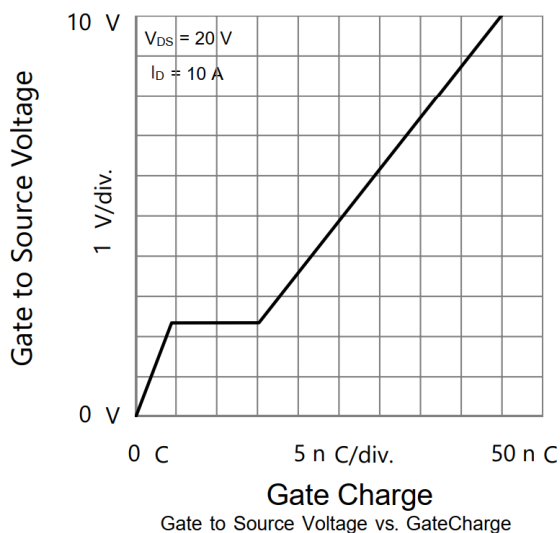
Drain to Source Resistance vs. Drain Current



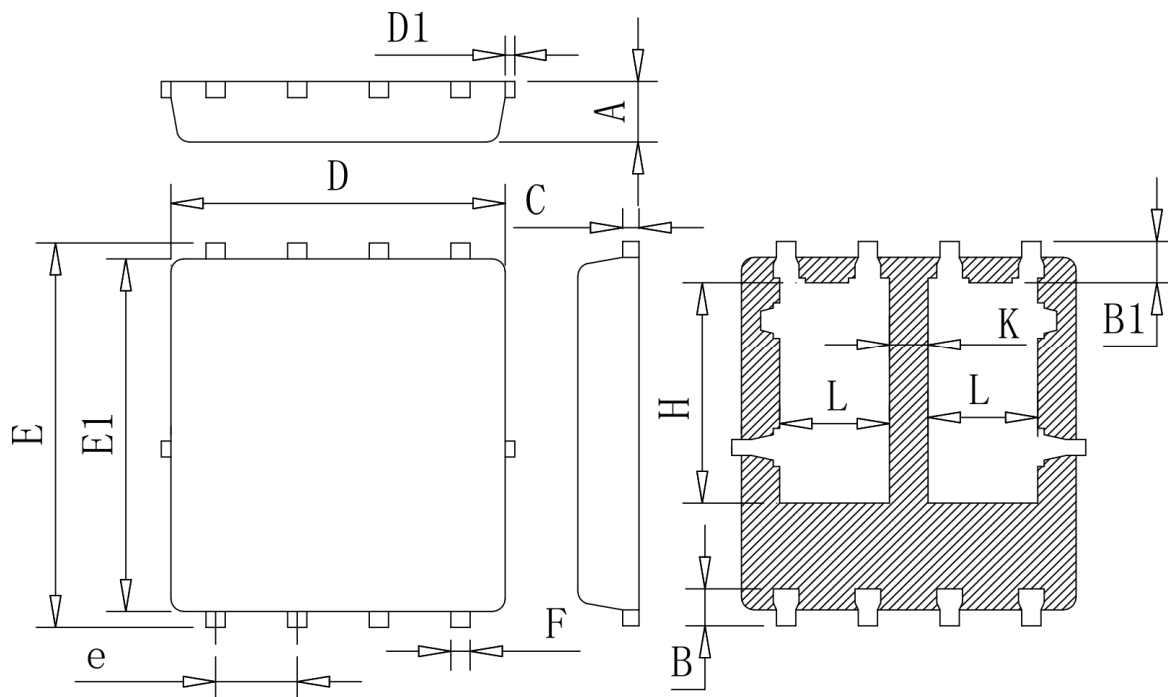
Source to Drain Voltage
Body Diode Forward Characteristics



Drain to Source Voltage
Capacitances



DFN5X6-8L-D PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

Symbol	Min	Typ	Max
A	0.85	0.95	1.05
B	0.46	0.58	0.73
B1	0.52	0.65	0.78
C	0.18	0.254	0.32
D	4.70	5.20	5.50
D1	-	-	0.18
E	5.75	6.05	6.35
E1	5.35	5.65	5.85
e	1.15	1.27	1.50
F	0.15	0.30	0.50
H	3.15	3.47	3.80
L	1.35	1.70	2.10
K	0.35	0.60	1.00

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