N- and P-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY				
	V_{DS} (V)	$R_{DS(on)}$ (mΩ)(Typ.)	I_D (A)[a]	Q_g (Typ.)
N-Channel	30	9.5 at V_{GS} = 10 V	40	13.7 nC
		16 at V_{GS} = 4.5 V		
P-Channel	- 30	12.5 at V_{GS} = - 10 V	- 30	28 nC
		16 at V_{GS} = - 4.5 V		

FEATURES

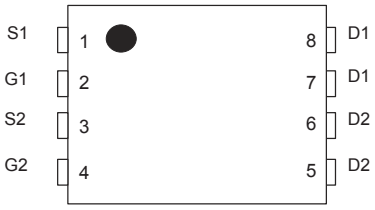
- DT-Trench Power MOSFET
- 100 % R_g and UIS tested
- Excellent Thermal Performance
- RoHS and Halogen Free Compliant

RoHS COMPLIANT

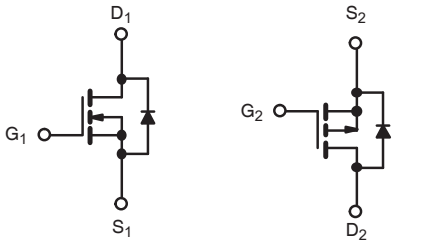
APPLICATIONS

- Motor Drive
- DC-FAN

DFN5X6



Top View



N-Channel MOSFET P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)					
PARAMETER		SYMBOL	N-Channel	P-Channel	UNIT
Drain-Source Voltage		V_{DS}	30	- 30	V
Gate-Source Voltage		V_{GS}	± 20	± 20	
Continuous Drain Current (T_J = 150° C)[a]	T_C = 25 °C	I_D	40	- 30	A
	T_C = 100 °C		25	- 19	
Pulsed Drain Current[b]		I_{DM}	140	- 105	
Maximum Power Dissipation[c]	T_C = 25 °C	P_D	30	25	W
	T_C = 100 °C		12	10	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to +150		°C
Soldering Recommendations (Peak Temperature)			260		

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	N-Channel	P-Channel	Unit
			Max	Max	
Maximum Junction-to-Ambient[d]	t ≤ 10 s	R_{thJA}	55	60	°C/W
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	4.16	5	

Notes

a. Calculated continuous current based on maximum allowablejunction temperature.
b. Repetitive rating; pulse width limited by max. junction temperature.
c. Pd is based on max. junction temperature, using junction-case thermal resistance.
d. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper,in a still air environment with Ta=25 °C.

N-Channel Electrical Characteristics (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	30	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1.0	-	3.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V	-	-	1	µA
		V_{DS} = 24 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	40	-	-	A
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 10 A	-	9.5	12	mΩ
		V_{GS} = 4.5 V, I_D = 8 A	-	16	20	
Forward Transconductance [a]	g_{fs}	V_{DS} = 5 V, I_D = 10 A	-	43	-	S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 15 V, f = 1 MHz	-	660	-	pF
Output Capacitance	C_{oss}		-	100	-	
Reverse Transfer Capacitance	C_{rss}		-	85	-	
Total Gate Charge [c]	Q_g	V_{DS} = 15 V, V_{GS} = 10 V, I_D = 10 A	-	13.7	-	nC
Gate-Source Charge [c]	Q_{gs}		-	1.1	-	
Gate-Drain Charge [c]	Q_{gd}		-	2.7	-	
Gate Resistance	R_g	f = 1 MHz	-	3.2	-	Ω
Turn-On Delay Time [c]	$t_{d(on)}$	V_{DS} = 15 V, I_D = 10 A, R_g = 2.5 Ω V_{GS} = 10 V	-	6	-	ns
Rise Time [c]	t_r		-	10	-	
Turn-Off Delay Time [c]	$t_{d(off)}$		-	18	-	
Fall Time [c]	t_f		-	8	-	
Drain-Source Body Diode Ratings and Characteristics [b] (T_C = 25 °C)						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C	-	-	40	A
Pulsed Current (t = 100 µs)	I_{SM}		-	-	140	A
Forward Voltage [a]	V_{SD}	I_F = 1 A, V_{GS} = 0 V	-	-	1.2	V
Reverse Recovery Time	t_{rr}	I_F = 10 A, di/dt = 100 A/µs	-	7	-	ns
Reverse Recovery Charge	Q_{rr}		-	9	-	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.

P-Channel Electrical Characteristics (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	- 30	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 1.0	-	- 3.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 30 V, V_{GS} = 0 V	-	-	- 1	µA
		V_{DS} = - 24 V, V_{GS} = 0 V, T_J = 55 °C	-	-	- 10	
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} ≤ -5 , V_{GS} = - 10 V	- 30	-	-	A
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = - 10 V, I_D = - 8 A	-	12.5	16	mΩ
		V_{GS} = - 4.5 V, I_D = - 8 A	-	16	20	
Forward Transconductance [a]	g_{fs}	V_{DS} = - 5 V, I_D = - 8 A	-	38	-	S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = - 15 V, f = 1 MHz	-	2040	-	pF
Output Capacitance	C_{oss}		-	250	-	
Reverse Transfer Capacitance	C_{rss}		-	237	-	
Total Gate Charge [c]	Q_g	V_{DS} = - 15 V, V_{GS} = - 10 V, I_D = - 8 A	-	28	-	nC
Gate-Source Charge [c]	Q_{gs}		-	4.5	-	
Gate-Drain Charge [c]	Q_{gd}		-	7.5	-	
Gate Resistance	R_g	f = 1 MHz	-	6.8	-	Ω
Turn-On Delay Time [c]	$t_{d(on)}$	V_{DS} = - 15 V, I_D = - 8 A, R_g = 2.5 Ω V_{GS} = - 10 V	-	12	-	ns
Rise Time [c]	t_r		-	8.5	-	
Turn-Off Delay Time [c]	$t_{d(off)}$		-	45	-	
Fall Time [c]	t_f		-	19	-	
Drain-Source Body Diode Ratings and Characteristics [b] (T_C = 25 °C)						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C	-	-	- 30	A
Pulsed Current	I_{SM}		-	-	- 105	A
Forward Voltage [a]	V_{SD}	I_F = - 1 A, V_{GS} = 0 V	-	-	- 1.2	V
Reverse Recovery Time	t_{rr}	I_F = - 8 A, di/dt = 100 A/µs	-	14	-	ns
Reverse Recovery Charge	Q_{rr}		-	18	-	nC

Notes

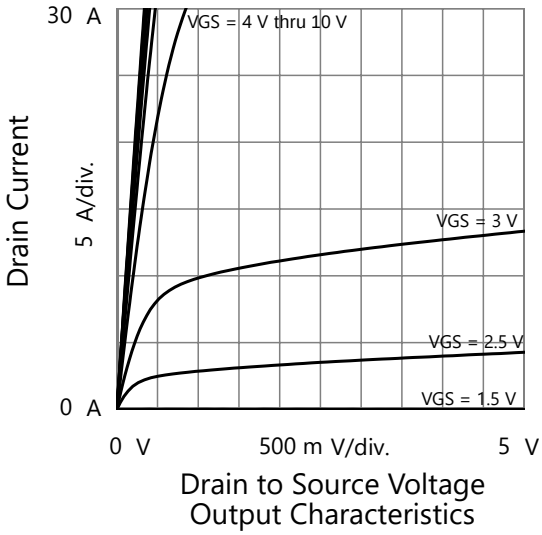
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

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

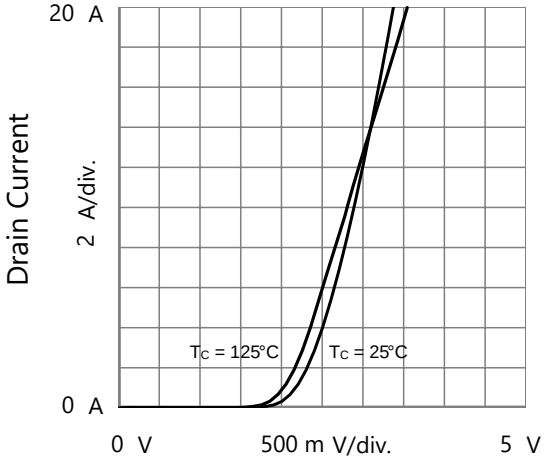
c. Independent of operating temperature.

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.

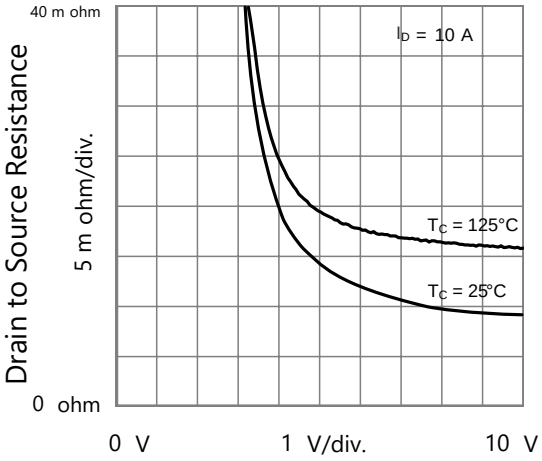
N-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



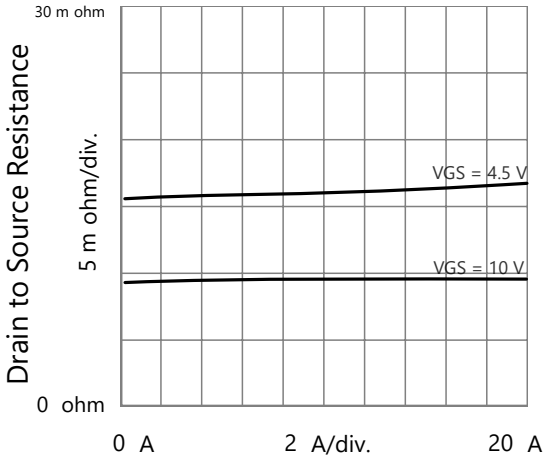
Drain to Source Voltage
Output Characteristics



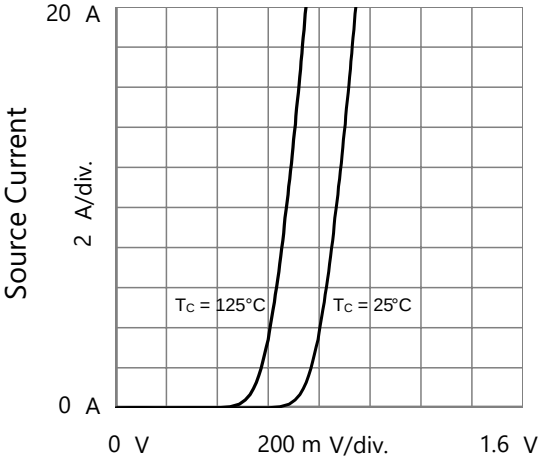
Gate to Source Voltage
Transfer Characteristics



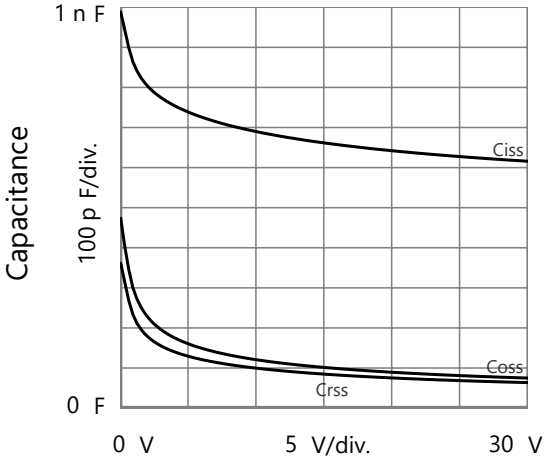
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

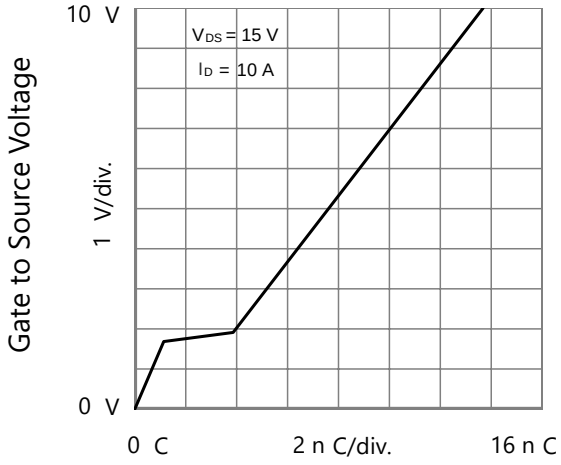


Source to Drain Voltage
Body Diode Forward Characteristics

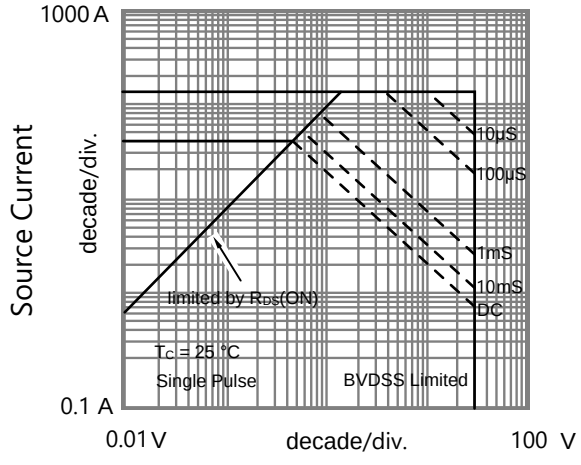


Drain to Source Voltage
Capacitances

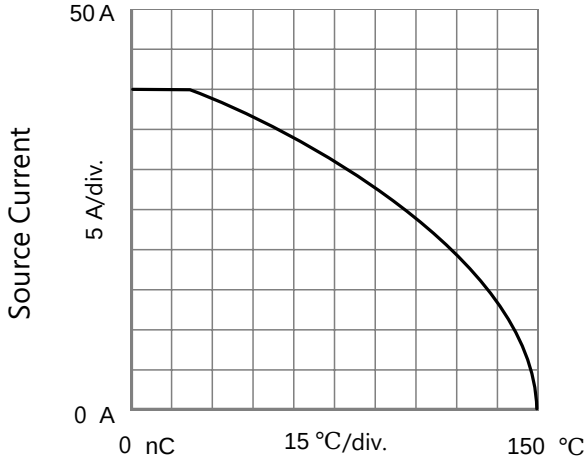
N-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

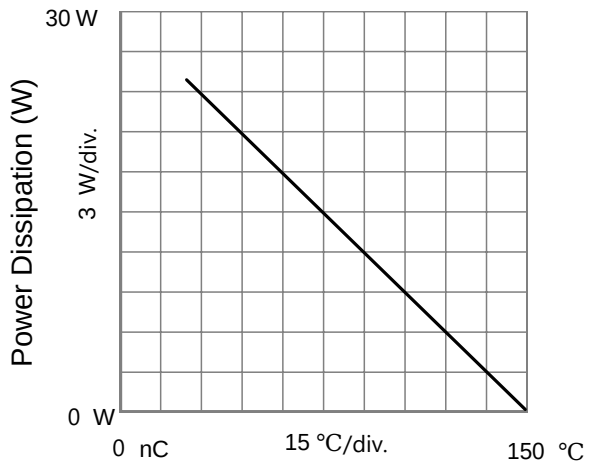


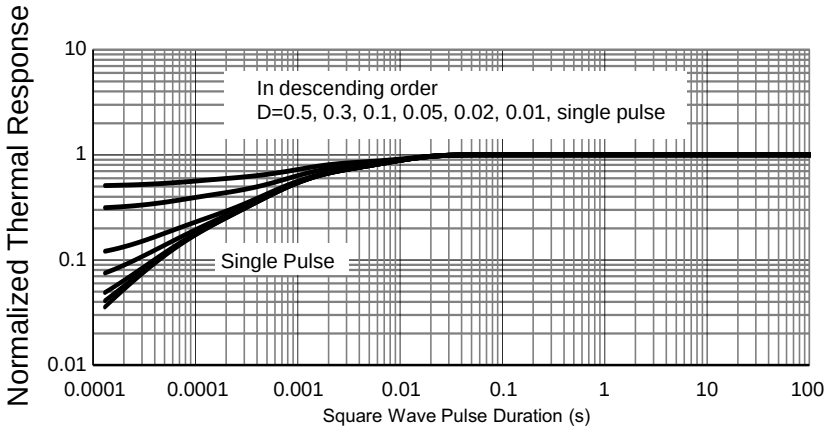
Gate to Source Voltage vs. GateCharge



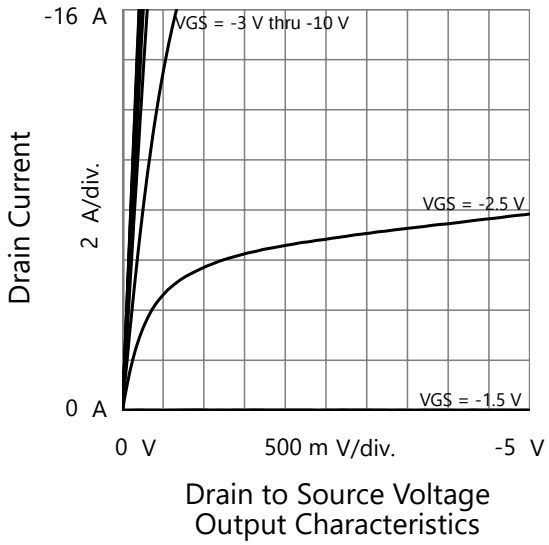
Safe Operating Area, Junction-to-Ambient



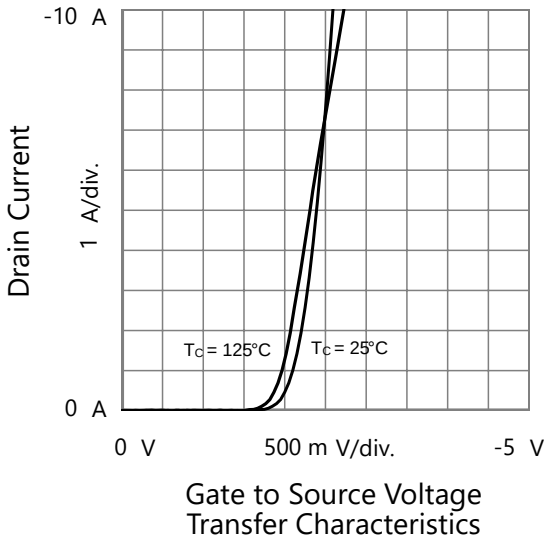




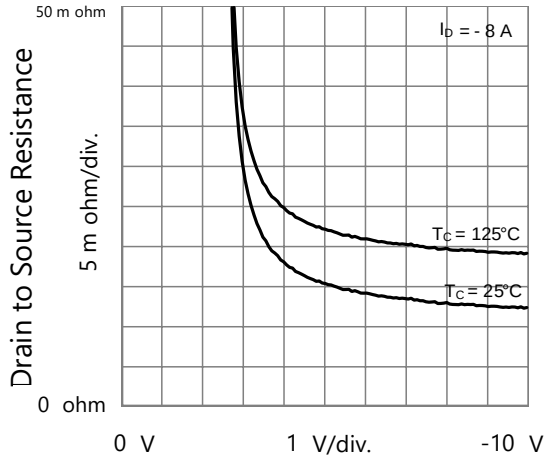
P-CHANNEL TYPICAL CHARACTERISTICS (25°C, unless otherwise noted)



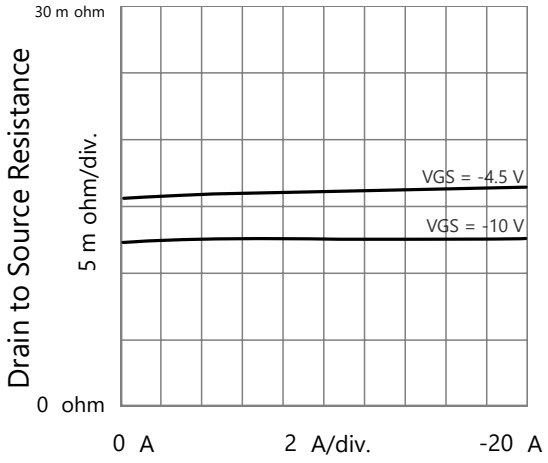
Drain to Source Voltage
Output Characteristics



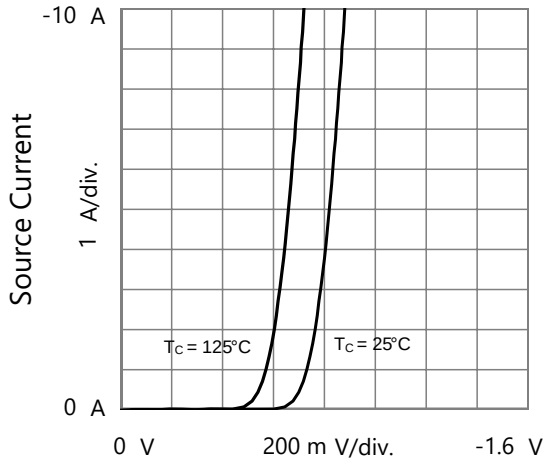
Gate to Source Voltage
Transfer Characteristics



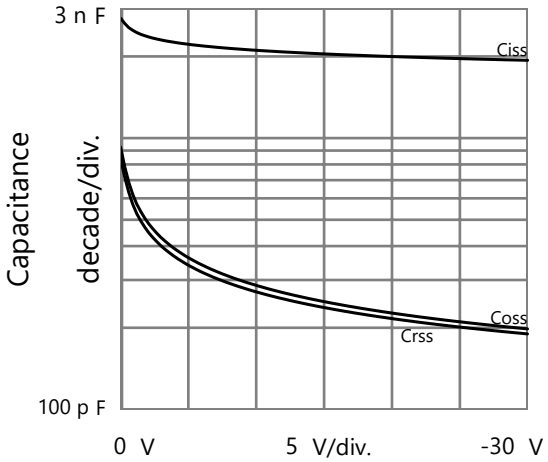
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

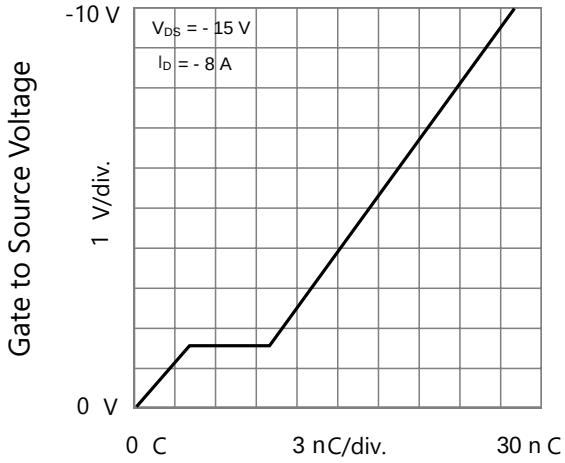


Source to Drain Voltage
Body Diode Forward Characteristics

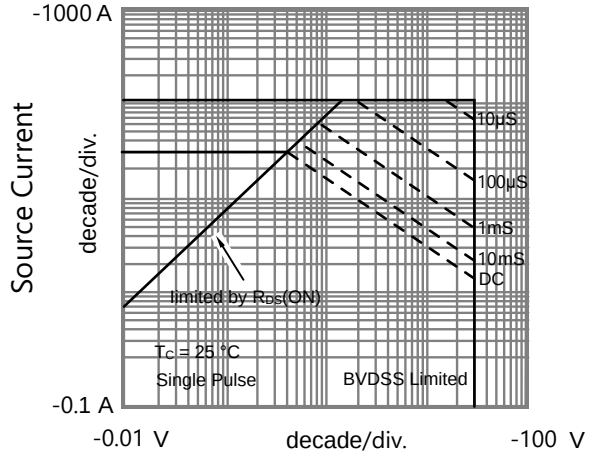


Drain to Source Voltage
Capacitances

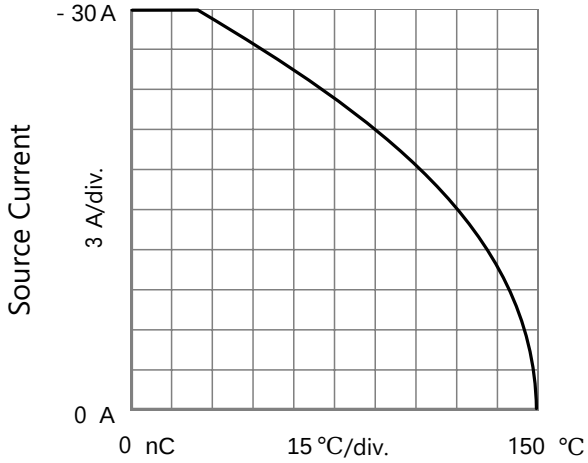
P-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



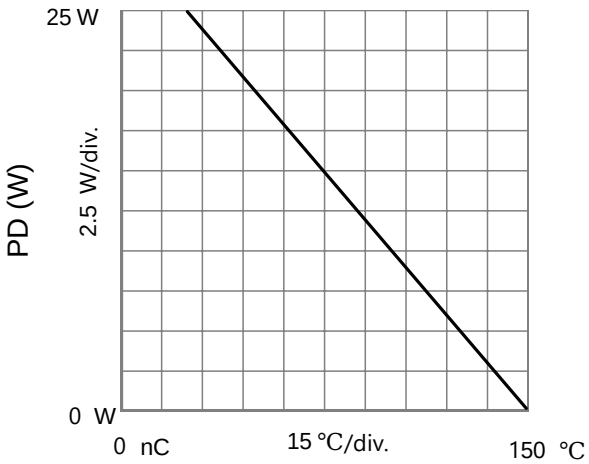
Gate to Source Voltage vs. GateCharge



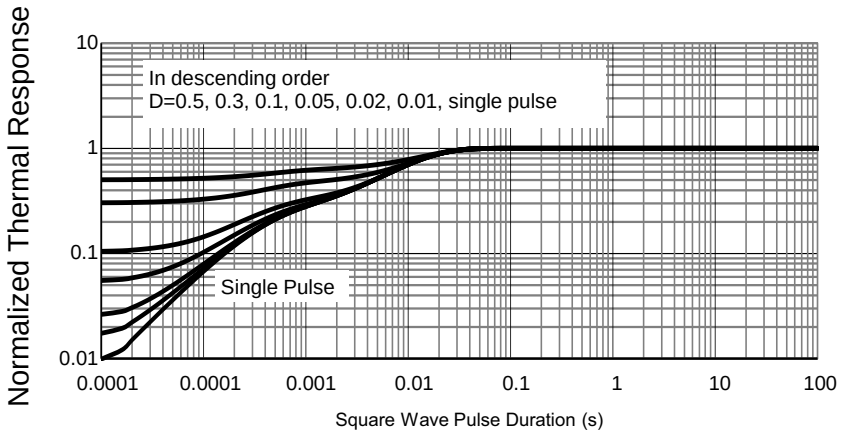
Safe Operating Area, Junction-to-Ambient



Current Derating

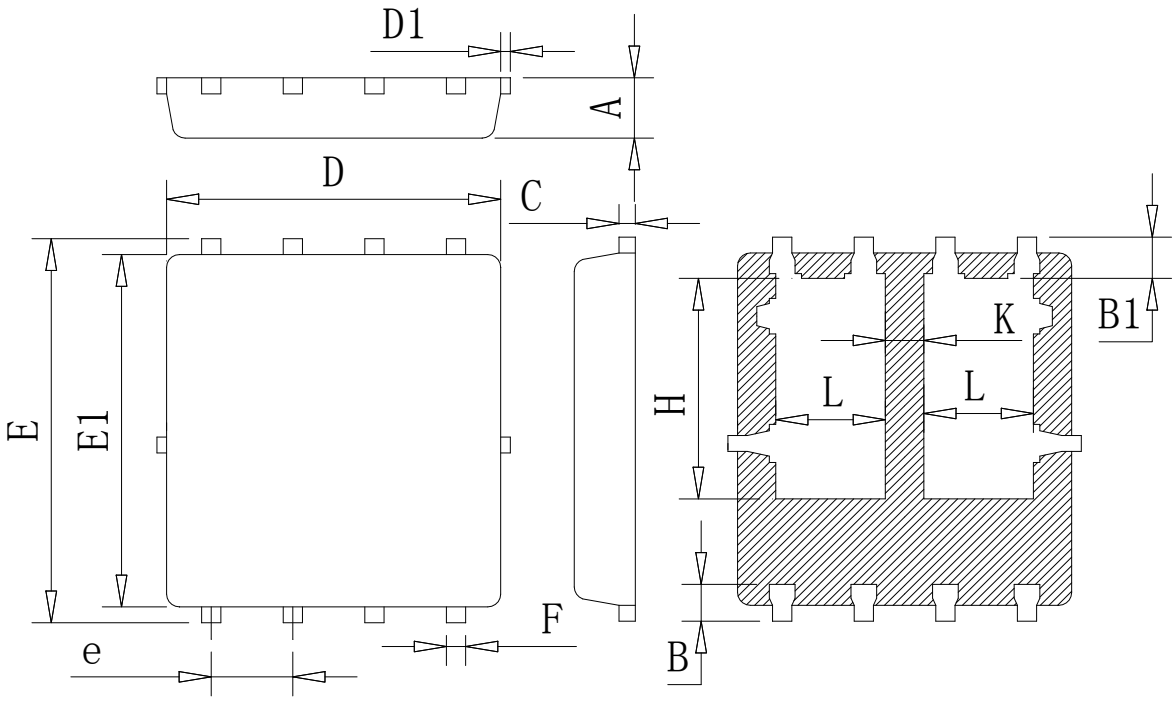


Power Derating



Normalized Thermal Transient Impedance

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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