

P-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (m Ω)(Typ.)	I_D (A) ^a	Q_g (Typ.)
- 60	7.5 at $V_{GS} = - 10$ V	- 90	120 nC
	9.5 at $V_{GS} = - 4.5$ V		

FEATURES

- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested
- Low $R_{DS(ON)}$
- High Current Capability

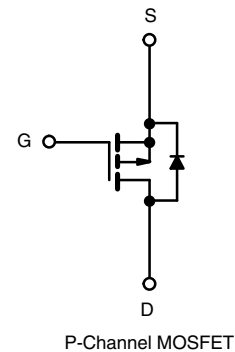
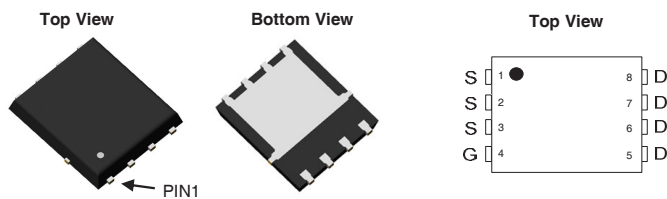


RoHS
COMPLIANT

APPLICATIONS

- General Automotive Applications
- Battery protection charge/discharge

DFN5X6-8L Pin Configuration



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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	- 60	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C) ^a	I_D	$T_C = 25$ °C	A
		$T_C = 100$ °C	
Pulsed Drain Current ^b	I_{DM}	- 360	
Single Avalanche Energy	E_{AS}	245	mJ
Maximum Power Dissipation ^c	P_D	$T_C = 25$ °C	W
		$T_C = 100$ °C	
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}	40	°C/W
Junction-to-Case (Drain)	R_{thJC}	1.13	

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.

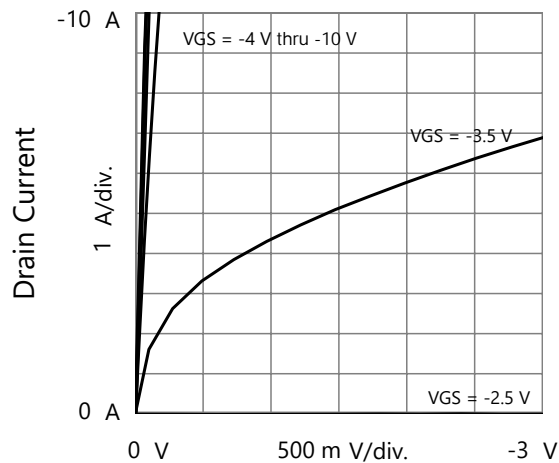
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0, I _D = - 250 μA	- 60			V
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = - 250 μA	- 1		- 3	V
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = - 60 V, V _{GS} = 0 V			- 1	μA
		V _{DS} = - 48 V, V _{GS} = 0 V, T _J = 55 °C			- 50	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≤ - 5 V, V _{GS} = - 10 V	- 90			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 10 V, I _D = - 15 A		7.5	9.2	mΩ
		V _{GS} = - 4.5 V, I _D = - 15 A		9.5	14	
Forward Transconductance ^a	g _{fs}	V _{DS} = - 5 V, I _D = - 15 A		40		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = - 30 V, V _{GS} = 0 V, f = 1 MHz		4890		pF
Output Capacitance	C _{oss}			930		
Reverse Transfer Capacitance	C _{rss}			5		
Total Gate Charge	Q _g	V _{DS} = - 30 V, V _{GS} = - 10 V, I _D = - 15 A		120		nC
Gate-Source Charge	Q _{gs}			21		
Gate-Drain Charge	Q _{gd}			32		
Gate Resistance	R _g	f = 1 MHz		8.5		Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = - 30 V, R _L = 1.5 Ω I _D ≅ - 15 A, V _{GEN} = - 10 V, R _g = 3 Ω		18		ns
Rise Time	t _r			20		
Turn-Off DelayTime	t _{d(off)}			90		
Fall Time	t _f			45		
Drain-Source Body Diode Characteristics						
Continous Source-Drain Diode Current	I _S	T _C = 25 °C			- 90	A
Pulse Diode Forward Current	I _{SM}				- 360	
Body Diode Voltage	V _{SD}	I _S = - 1 A			- 1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = - 15 A, dI/dt = 100 A/μs, T _J = 25 °C		35		ns
Body Diode Reverse Recovery Charge	Q _{rr}			180		nC

Notes:

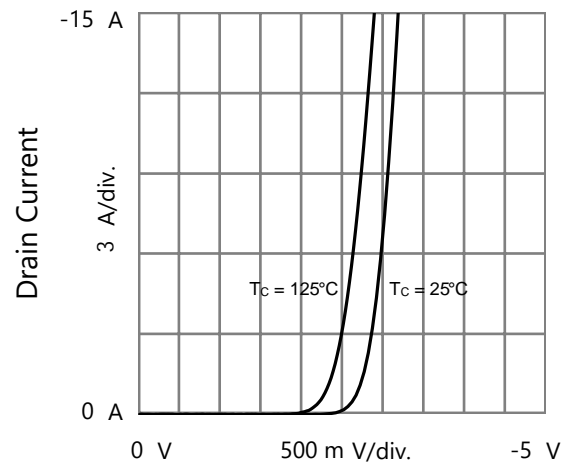
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.

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.

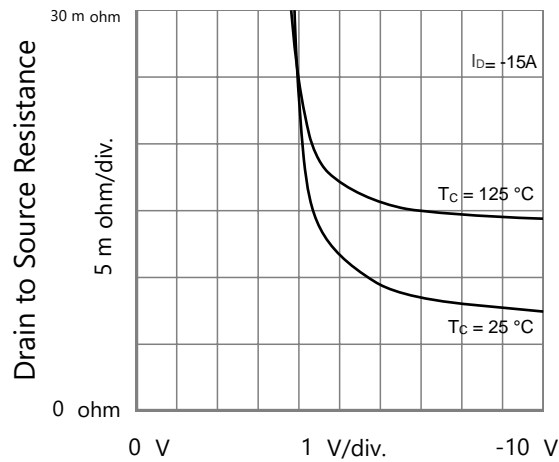
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



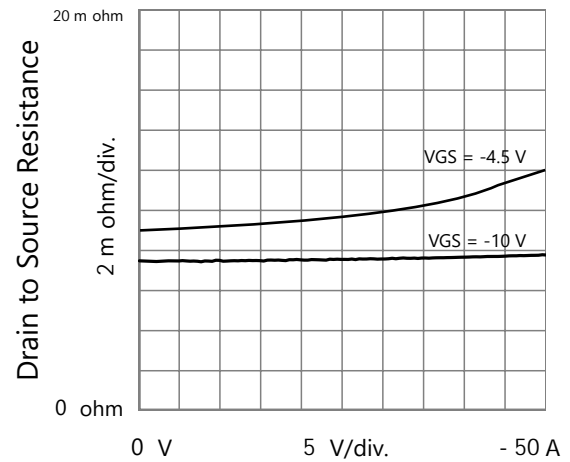
Drain to Source Voltage
Output Characteristics



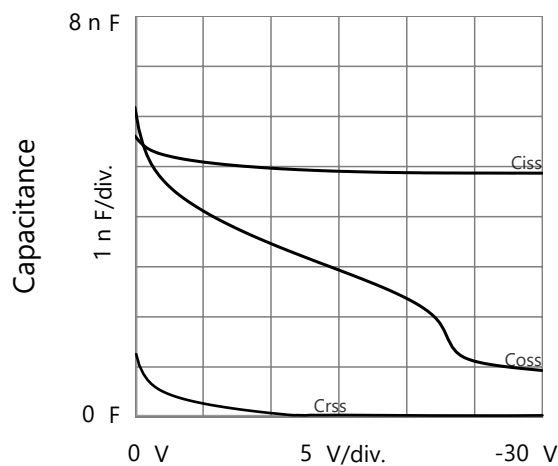
Gate to Source Voltage
Transfer Characteristics



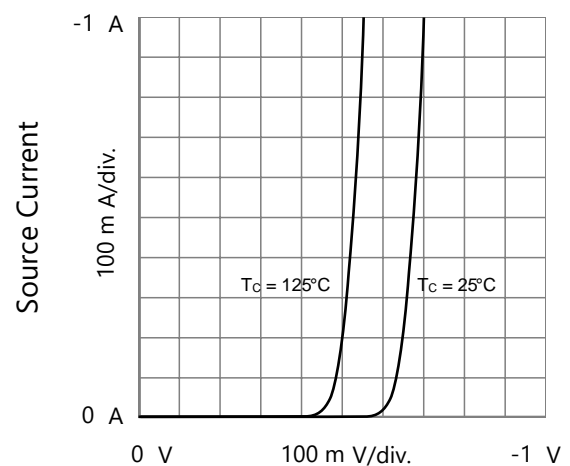
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

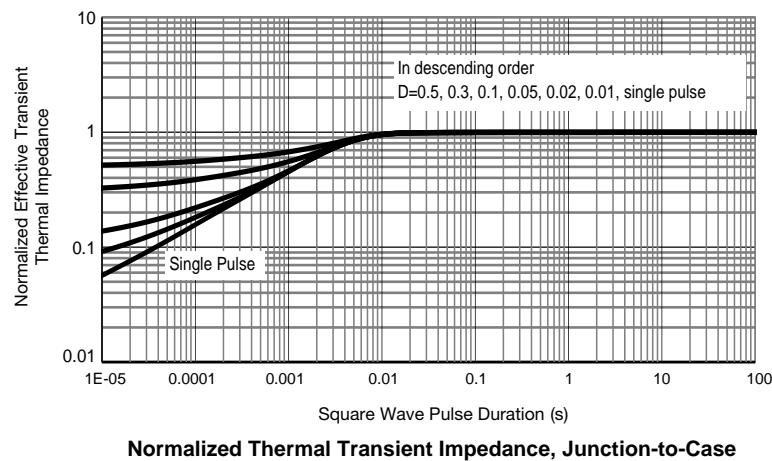
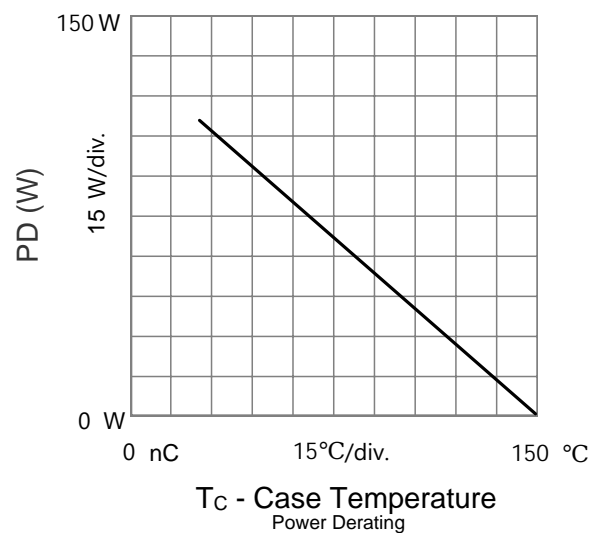
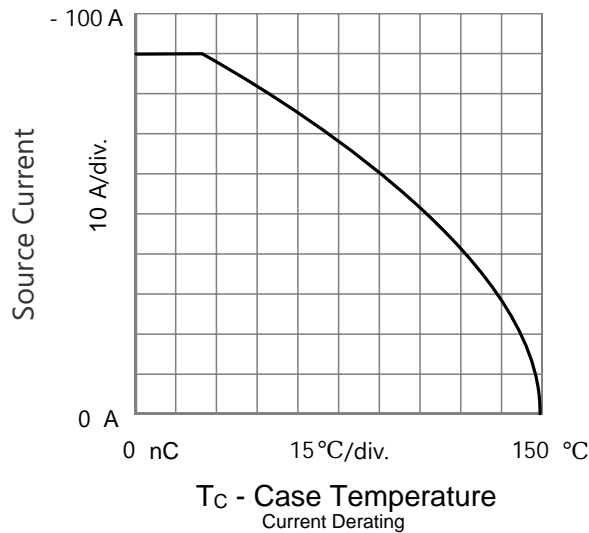
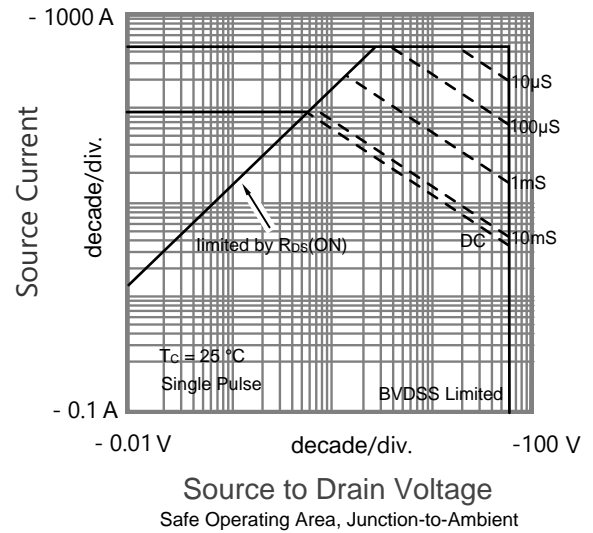
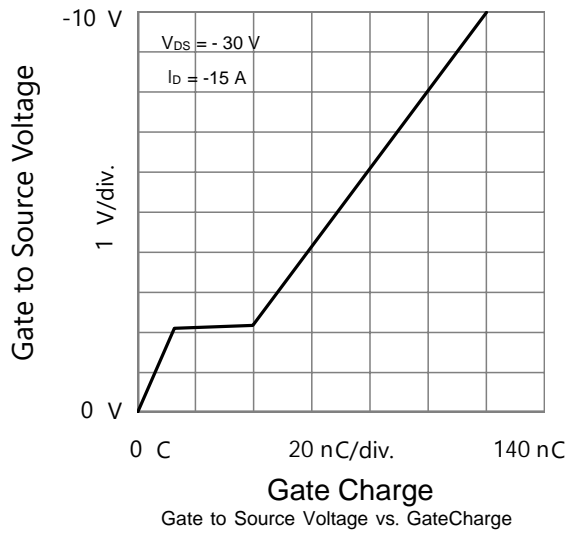


Drain to Source Voltage
Capacitances

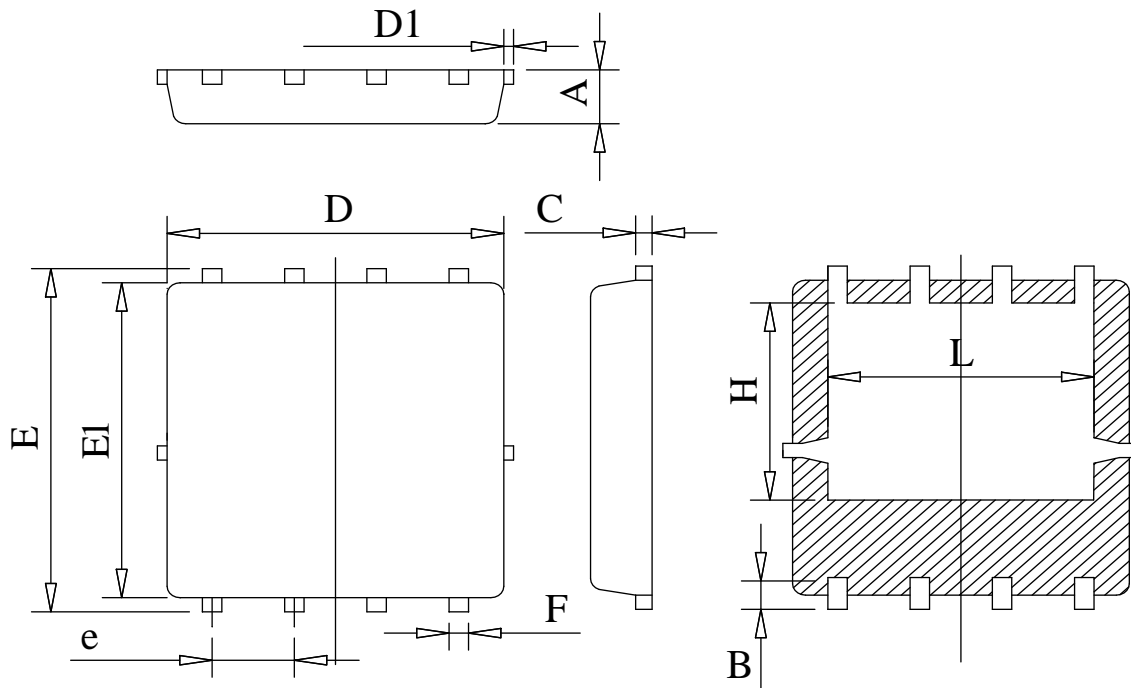


Source to Drain Voltage
Body Diode Forward Characteristics

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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