

N-Channel 45 V (D-S) Super Junction MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (m Ω)(Typ.)	I_D (A) ^{a,e}	Q_g (Typ.)
45	5.8 at $V_{GS} = 10$ V	60	12.8 nC
	7.7 at $V_{GS} = 4.5$ V		

FEATURES

- DT-SJ Power MOSFET
- Low $R_{DS(on)} \times FOM$
- Extremely low switching loss
- Fast switching and soft recovery

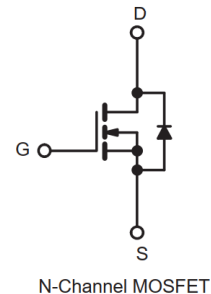
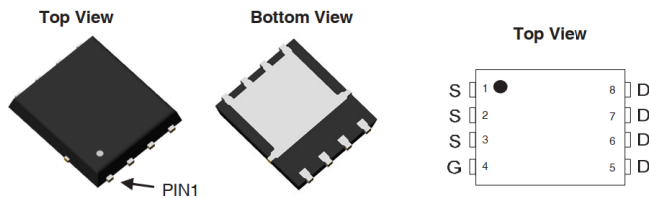
APPLICATIONS

- Motor driver
- Switching voltage regulator
- DC-DC convertor



RoHS
COMPLIANT

DFN5X6-8L Pin Configuration



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	45	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	I_D	$T_C = 25^\circ\text{C}$	A
		$T_C = 100^\circ\text{C}$	
Pulsed Drain Current ($t = 300 \mu\text{s}$)	I_{DM}	240	
Single Pulse Avalanche Energy	E_{AS}	250	mJ
Maximum Power Dissipation	P_D	$T_C = 25^\circ\text{C}$	W
		$T_C = 100^\circ\text{C}$	
		$T_A = 25^\circ\text{C}$	
		$T_A = 100^\circ\text{C}$	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	$^\circ\text{C}$
Soldering Recommendations (Peak Temperature) ^{d, e}		260	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, f}	R_{thJA}	-	35	$^\circ\text{C/W}$
Maximum Junction-to-Case (Drain)	R_{thJC}	-	2.2	

Notes:

- Based on $T_C = 25^\circ\text{C}$.
- Surface mounted on 1" x 1" FR4 board.
- $t = 10$ s.
- The DFN5X6 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
- Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.
- Maximum under steady state conditions is 70°C/W .

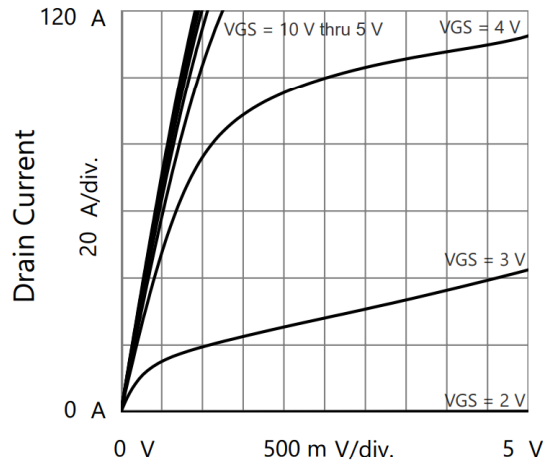
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0, I _D = 250 μA	45			V
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1		3	V
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 45 V, V _{GS} = 0 V			1	μA
		V _{DS} = 36 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	60			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		5.8	7.2	mΩ
		V _{GS} = 4.5 V, I _D = 10 A		7.7	10	
Forward Transconductance ^a	g _{fs}	V _{DS} = 4.5 V, I _D = 20 A		75		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 20 V, V _{GS} = 0 V, f = 1 MHz		812		pF
Output Capacitance	C _{oss}			309		
Reverse Transfer Capacitance	C _{rss}			4.5		
Total Gate Charge ^c	Q _g	V _{DS} = 20 V, V _{GS} = 10 V, I _D = 20 A		12.8		nC
Gate-Source Charge ^c	Q _{gs}			1.7		
Gate-Drain Charge ^c	Q _{gd}			2		
Gate Resistance	R _g	f = 1 MHz		3.5		Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 20 V, R _L = 0.5 Ω I _D ≅ 20 A, V _{GEN} = 10 V, R _g = 1 Ω		23		ns
Rise Time ^c	t _r			10		
Turn-Off DelayTime ^c	t _{d(off)}			65		
Fall Time ^c	t _f			10		
Drain-Source Body Diode Characteristics						
Continous Source-Drain Diode Current	I _S	T _C = 25 °C			60	A
Pulse Diode Forward Current (100 μs)	I _{SM}				240	
Body Diode Voltage	V _{SD}	I _S = 1 A			1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 20 A, dl/dt = 100 A/μs, T _J = 25 °C		43		ns
Body Diode Reverse Recovery Charge	Q _{rr}			58		nC
Reverse Recovery Fall Time	t _a			20		ns
Reverse Recovery Rise Time	t _b			19		

Notes

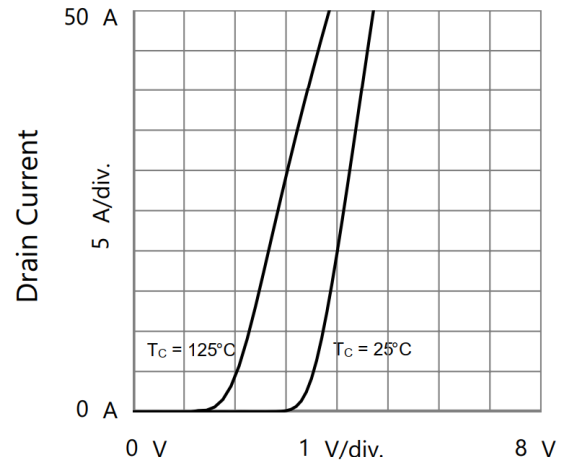
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

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.

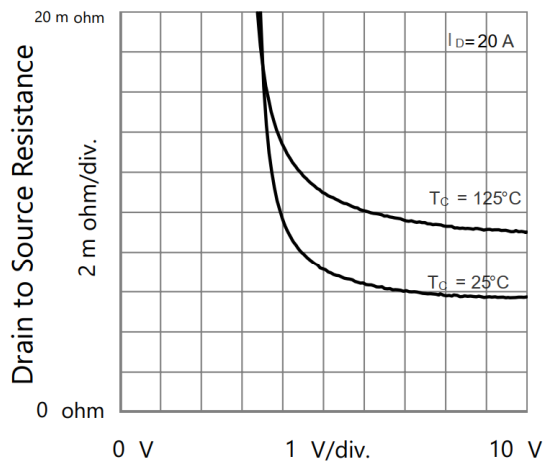
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



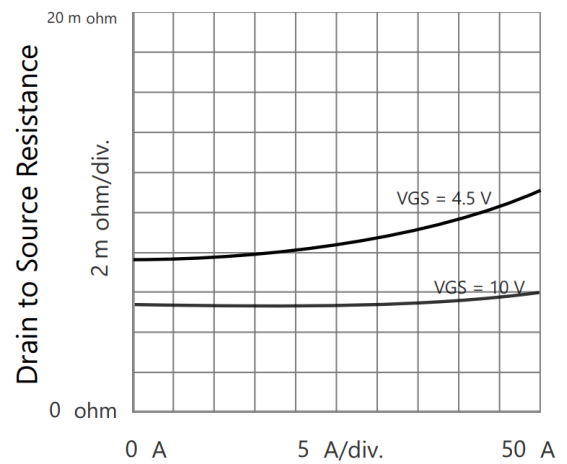
Drain to Source Voltage
Output Characteristics



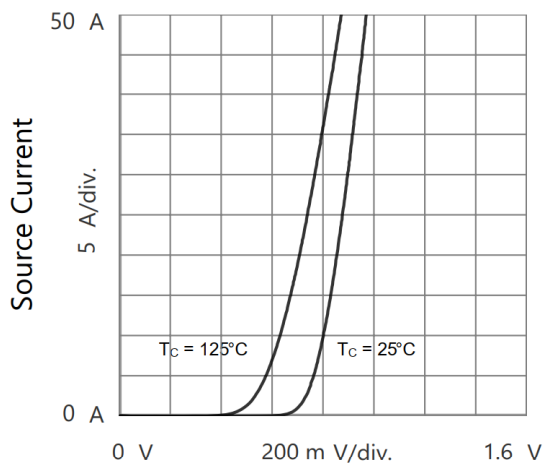
Gate to Source Voltage
Transfer Characteristics



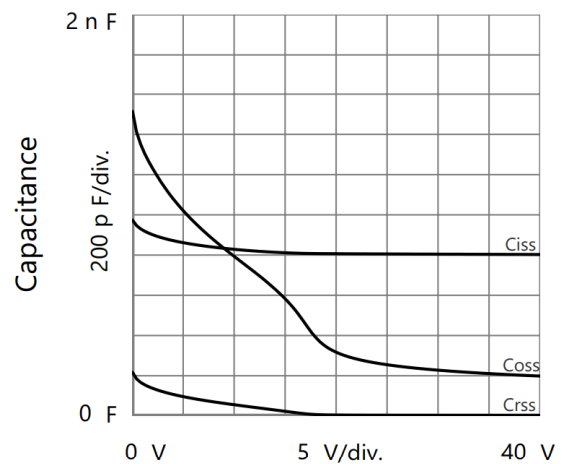
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

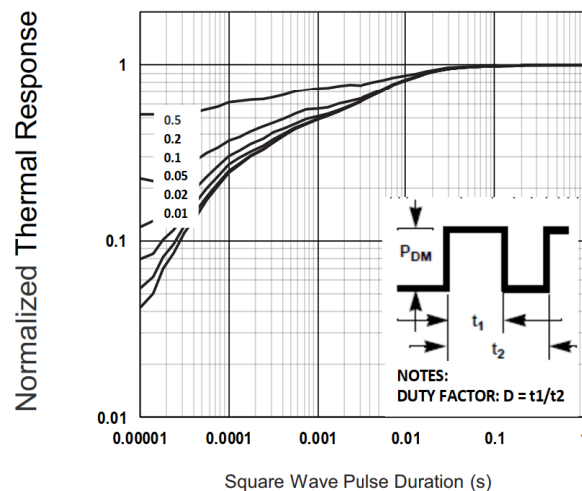
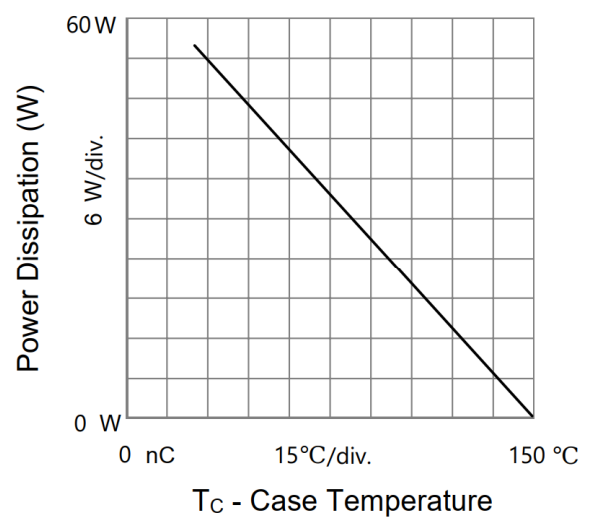
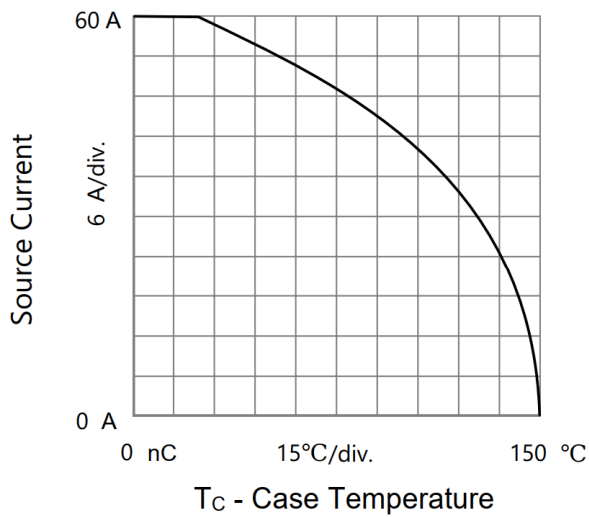
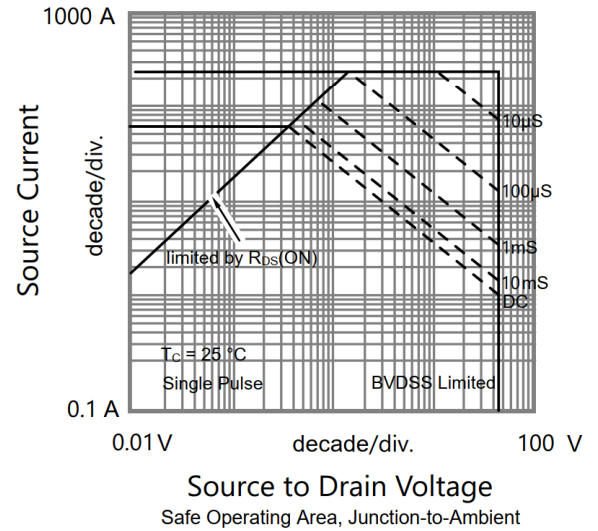
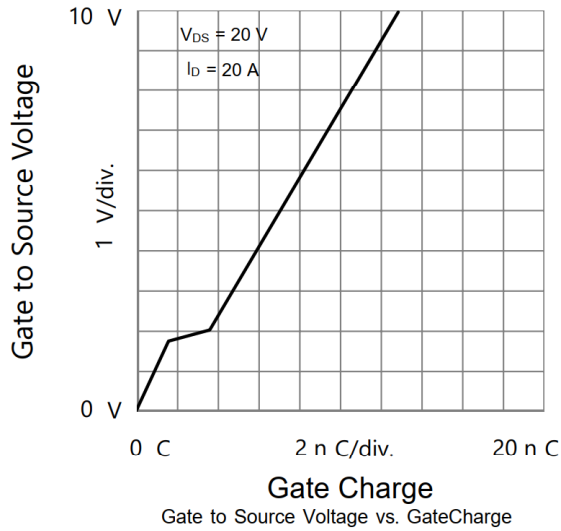


Source to Drain Voltage
Body Diode Forward Characteristics



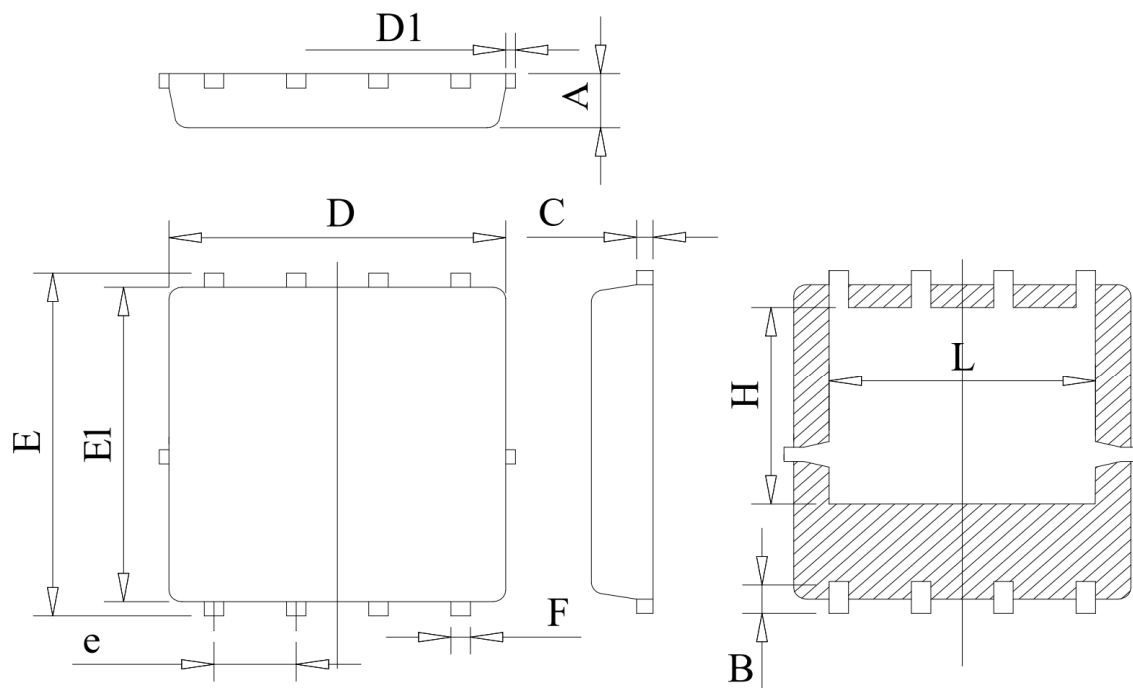
Drain to Source Voltage
Capacitances

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient

DFN5*6-8L 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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