

Dual N-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	12 at $V_{GS} = 10$ V	38	50 nC
	16 at $V_{GS} = 4.5$ V		

FEATURES

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

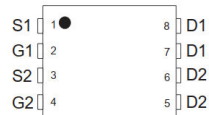


RoHS
COMPLIANT

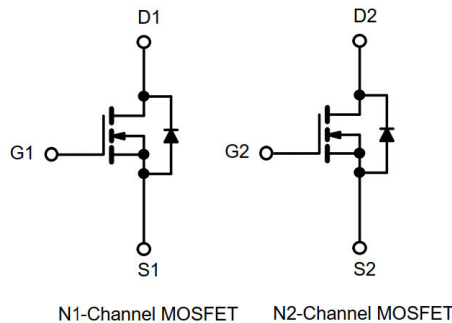
APPLICATIONS

- 12 V Automotive systems
- Motors, lamps and solenoid control
- Transmission control

DFN5X6-8L Pin Configuration



Top View



N1-Channel MOSFET

N2-Channel MOSFET

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 175$ °C)	I_D	$T_C = 25$ °C	A
		$T_C = 70$ °C	
		$T_A = 25$ °C	
		$T_A = 70$ °C	
Pulsed Drain Current	I_{DM}	164	
Avalanche Current Pulse	I_{AS}	31	mJ
Single Pulse Avalanche Energy	E_{AS}	60	
Continuous Source-Drain Diode Current	I_S	$T_C = 25$ °C	A
		$T_A = 25$ °C	
Maximum Power Dissipation	P_D	$T_C = 25$ °C	W
		$T_C = 70$ °C	
		$T_A = 25$ °C	
		$T_A = 70$ °C	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, d}	R_{thJA}	35	45	°C/W
Maximum Junction-to-Case	R_{thJC}	5	8	

Notes:

a. Based on $T_C = 25$ °C.

b. Surface mounted on 1" x 1" FR4 board.

c. $t = 10$ s.

d. Maximum under steady state conditions is 90 °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 V, I _D = 250 μA	60			V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA		55		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			-6.3		
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} = 48 V, V _{GS} = 0 V			1	μA
		V _{DS} = 48 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	38			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 10 A		12	17	mΩ
		V _{GS} = 4.5 V, I _D = 10 A		16	25	
Forward Transconductance ^a	g _{fs}	V _{DS} = 10 V,I _D = 10 A		50		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 30 V , V _{GS} = 0 V, f = 1 MHz		2750		pF
Output Capacitance	C _{oss}			110		
Reverse Transfer Capacitance	C _{rss}			101		
Total Gate Charge	Q _g	V _{DS} = 30 V, V _{GS} = 10 V, I _D = 10 A		52		nC
Gate-Source Charge	Q _{gs}			4.8		
Gate-Drain Charge	Q _{gd}			7.6		
Gate Resistance	R _g	f = 1 MHz		2.0		Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 30 V, R _L = 5.4 Ω I _D ≅ 10 A, V _{GEN} = 10 V, R _g = 1 Ω		8		ns
Rise Time	t _r			12		
Turn-Off Delay Time	t _{d(off)}			15		
Fall Time	t _f			8		
Turn-On Delay Time	t _{d(on)}	V _{DD} =30 V, R _L = 5.4 Ω I _D ≅ 10 A, V _{GEN} = 4.5 V, R _g = 1 Ω		10		
Rise Time	t _r			28		
Turn-Off Delay Time	t _{d(off)}			30		
Fall Time	t _f			16		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			38	A
Pulse Diode Forward Current ^a	I _{SM}				164	
Body Diode Voltage	V _{SD}	I _S = 1 A		0.6	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 10 A, ci/dt = 100 A/μs, T _J = 25 °C		20		ns
Body Diode Reverse Recovery Charge	Q _{rr}			25		nC
Reverse Recovery Fall Time	t _a			20		ns
Reverse Recovery Rise Time	t _b			8		

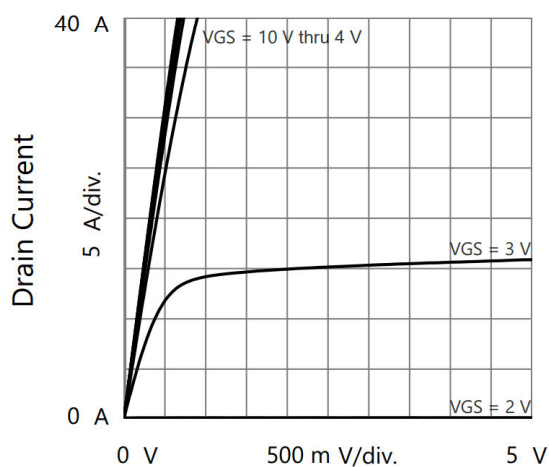
Notes:

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

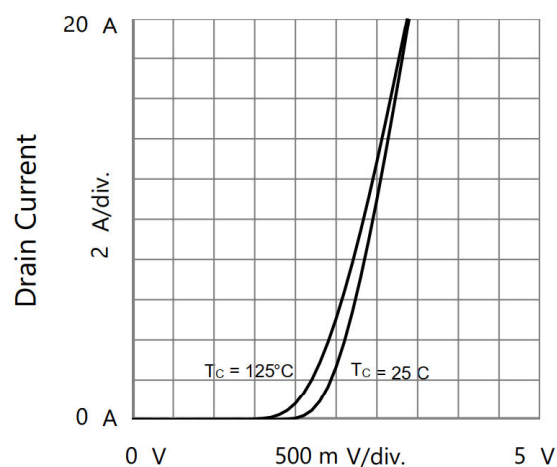
b. Guaranteed by design, not subject to production testing.

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.

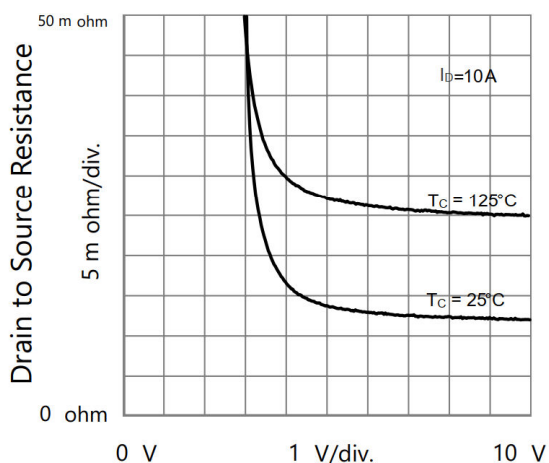
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



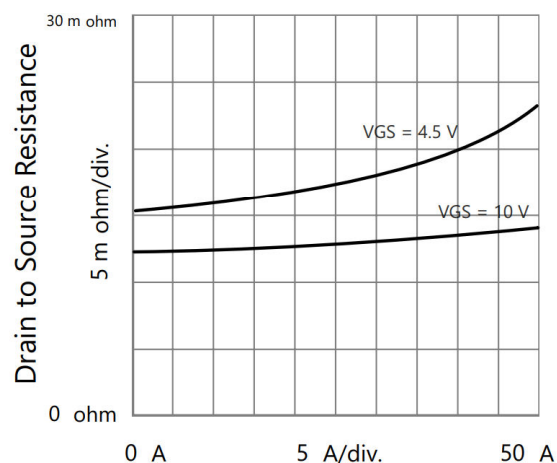
Drain to Source Voltage
Output Characteristics



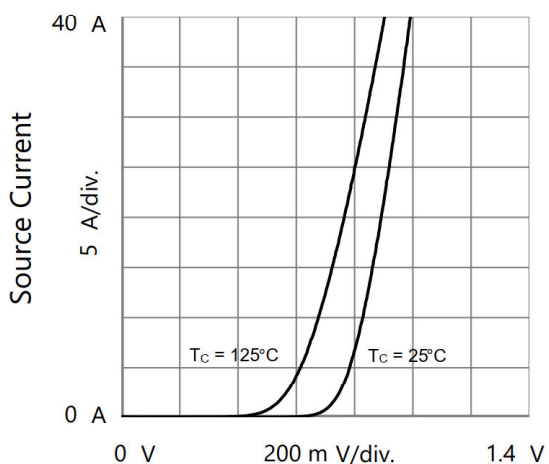
Gate to Source Voltage
Transfer Characteristics



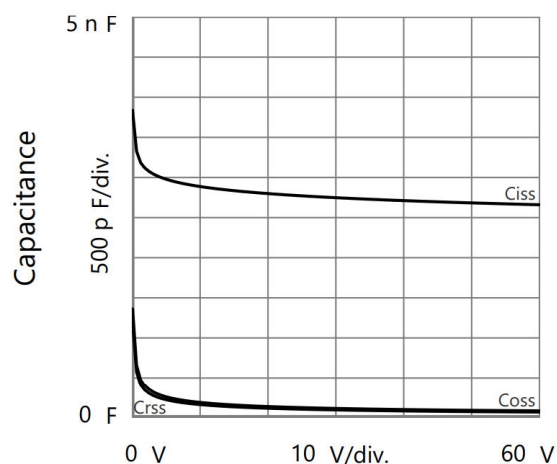
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

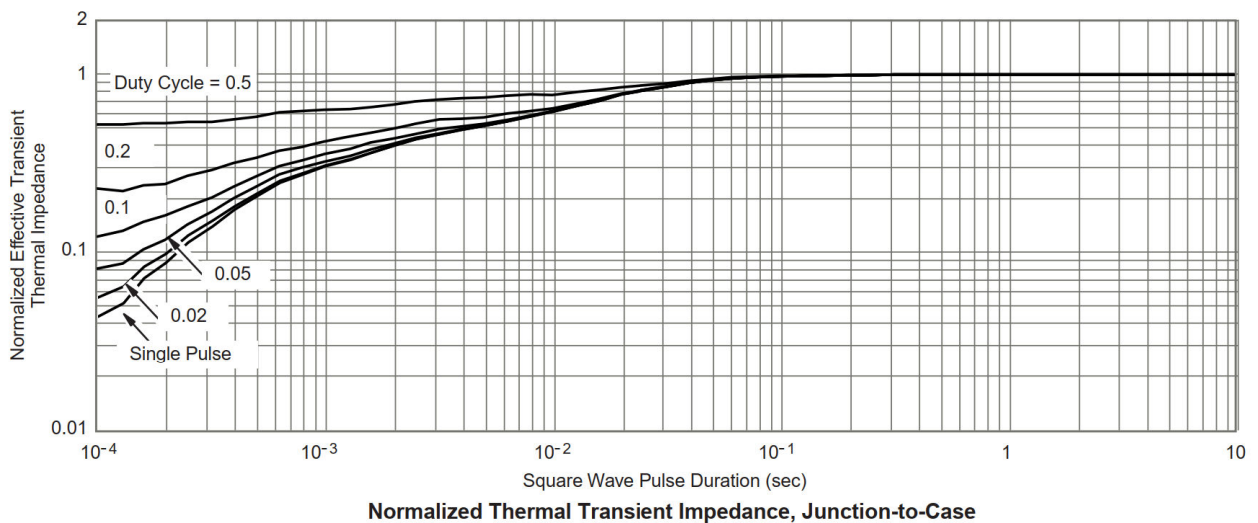
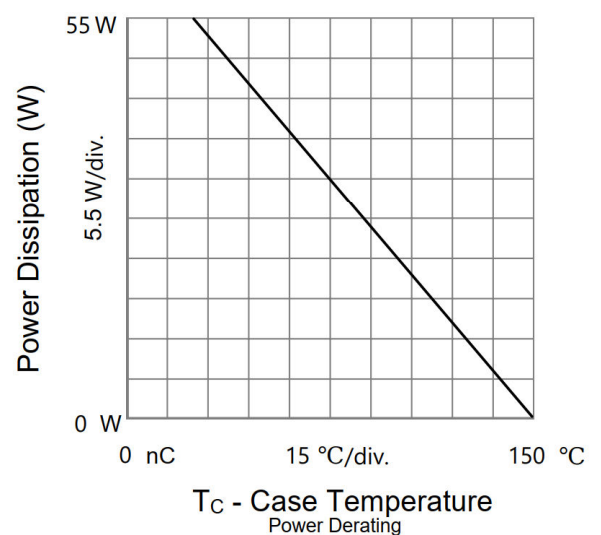
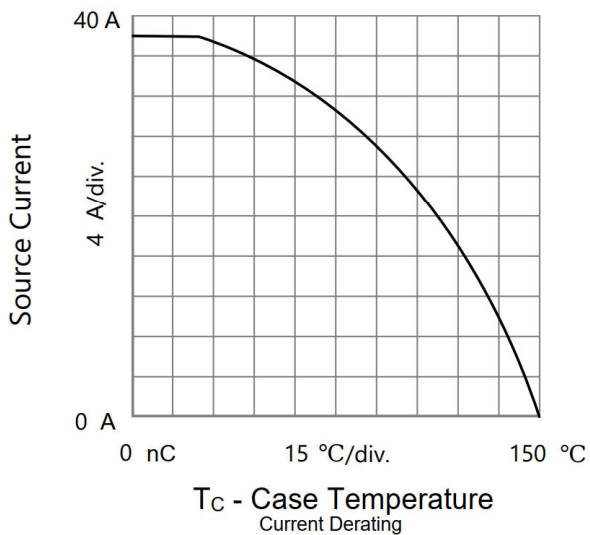
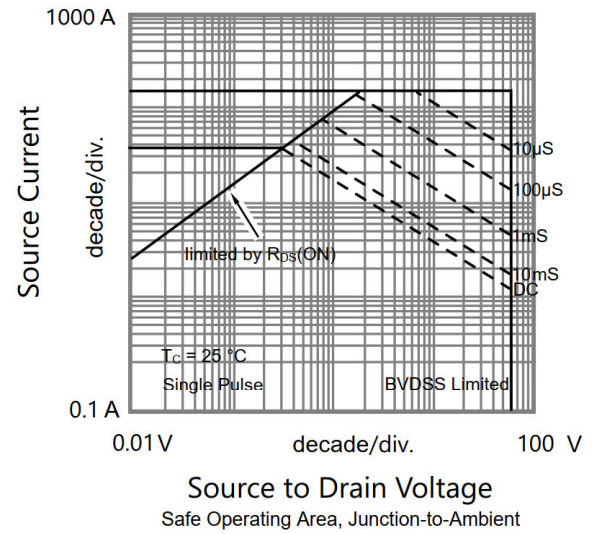
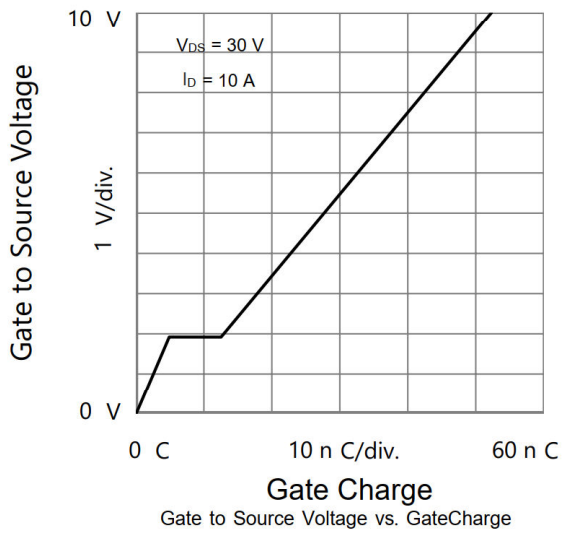


Source to Drain Voltage
Body Diode Forward Characteristics



Drain to Source Voltage
Capacitances

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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