20V N-Channel Power MOSFET

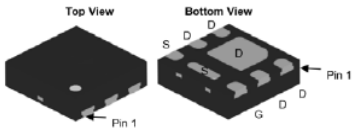
DESCRIPTION：

- Excellent $R_{DS(ON)}$
- Low Gate Charge
- 100% UIS Tested
- Pb-Free Lead Plating
- RoHS compliant

V_{DSS}	20V
I_D (T_A=25℃)	20A
$R_{DS(ON)\_Typ.}$@V_{GS}=4.5V	6.9mΩ

TYPICAL APPLICATIONS：

- Power Management
- Current Switch
- Motor Driving in Power Tool, E-Vehicle



DFN2020-6L

MAXIMUM RATINGS (at T_A = 25 °C, unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current	T_A=25℃ T_A=100℃	I_D	20 12	A
Pulsed Drain Current (1)		I_{DM}	80	A
Avalanche Energy (2)		E_{AS}	36	mJ
Power dissipation	T_A=25℃	P_D	2.7	W
Junction & Storage temperature Range		T_J, T_{STG}	-55~+150	℃

Notes： 1. Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} Condition : Starting T_J = 25°C, L =0.5mH, I_{AS} = 12A, V_G = 10V, V_{DD} = 10V; R_G=25ohm
.

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient	$R_{\theta JA}$	46	℃/W

ELECTRICAL CHARATERISTICS (at T_J = 25 °C, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage VGS = 0V, ID = 250uA	$V_{(BR)DSS}$	20			V
Zero Gate Voltage Drain Current VDS = 20 V, VGS = 0 V	I_{DSS}			1	uA
Gate-Source Leakage Current VGS = ±12V, VDS = 0V	I_{GSS}			±100	nA
Gate-Source threshold voltage VDS = VGS, ID = 250uA	$V_{GS(th)}$	0.5	0.75	1.0	V
Drain-Source On-State Resistance VGS = 4.5V, ID = 15A VGS = 2.5V, ID = 10A	$R_{DS(on)}$		6.9 9.0	9.0 11.7	mΩ
Input capacitance f=1MHz, VDS=10 V, VGS=0 V	C_{iss}		1613		pF
Output capacitance f=1MHz, VDS=10 V, VGS=0 V	C_{oss}		228		pF
Reverse transfer capacitance f=1MHz, VDS=10 V, VGS=0 V	C_{rss}		200		pF
Total Gate Charge VDD= 10V, ID= 10A, VGS= 0 to 4.5V	Q_G		17		nC
Gate to Source Charge VDD= 10V, ID= 10A, VGS= 0 to 4.5V	Q_{GS}		4		nC
Gate to Drain Charge VDD= 10V, ID= 10A, VGS= 0 to 4.5V	Q_{GD}		4.7		nC
Turn-on delay time VDD= 10V, VGS= 4.5V, ID= 10A, R_{GEN}=3Ω	$td_{(ON)}$		9		ns
Rise time VDD= 10V, VGS= 4.5V, ID= 10A, R_{GEN}=3Ω	tr		32		ns
Turn-off delay time VDD= 10V, VGS= 4.5V, ID= 10A, R_{GEN}=3Ω	$td_{(OFF)}$		37		ns
Fall time VDD= 10V, VGS= 4.5V, ID= 10A, R_{GEN}=3Ω	tf		15		ns

Body Diode

ELECTRICAL CHARATERISTICS (at T_J = 25 °C, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Diode Forward Voltage VGS = 0V, I_S = 20A	V_{SD}			1.2	V
Maximum Continuous Body Diode Forward Current	I_S			20	A
Maximum Pulsed Body Diode Forward Current	I_{SM}			80	A
Revers Recovery Time IF=10A, di/dt = 100A/us	Trr		12		ns
Revers Recovery Charge IF=10A, di/dt = 100A/us	Qrr		4.7		nC

Typical Performance Characteristics

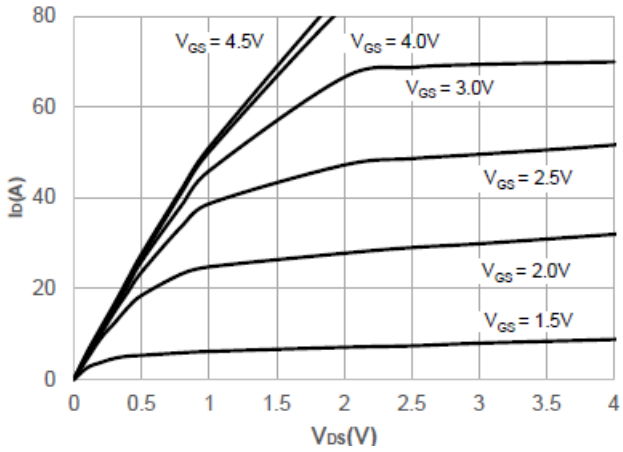


Figure 1. Output Characteristics

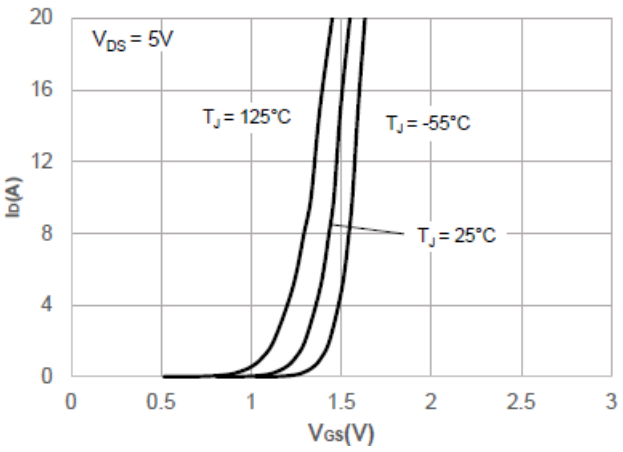


Figure 2. Transfer Characteristics

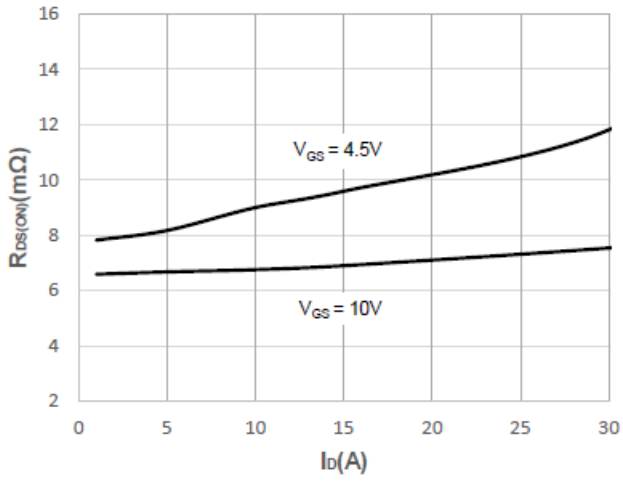


Figure 3. On-resistance vs. Drain Current

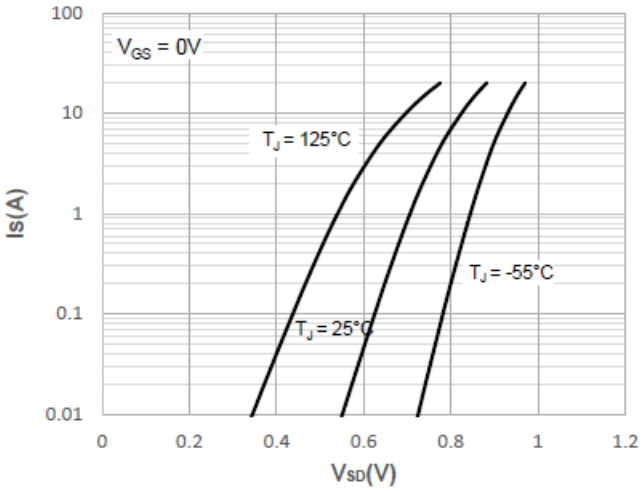


Figure 4. Body-Diode Characteristics

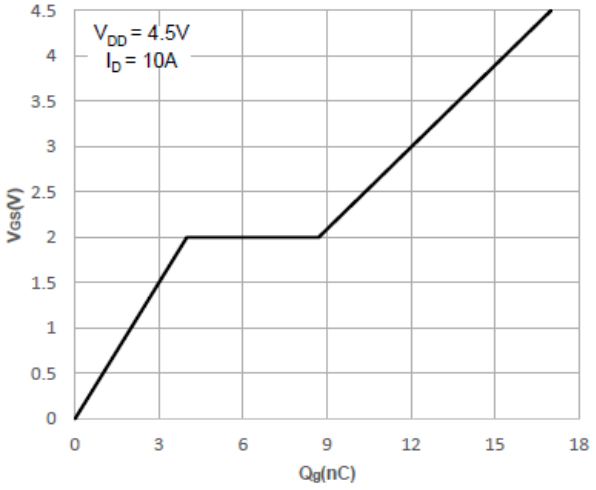


Figure 5. Gate Charge Characteristics

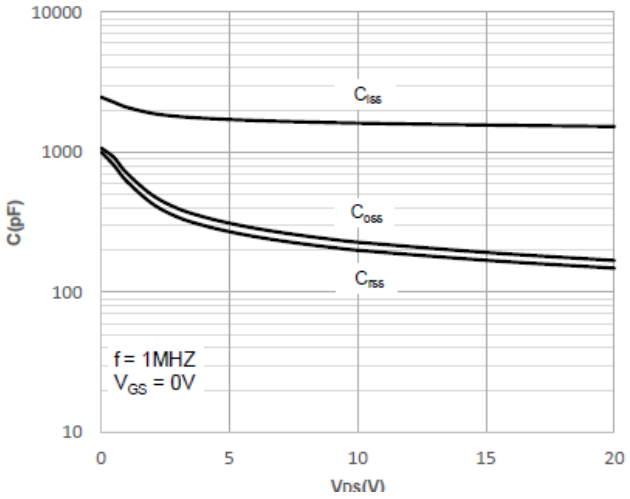


Figure 6. Capacitance Characteristics

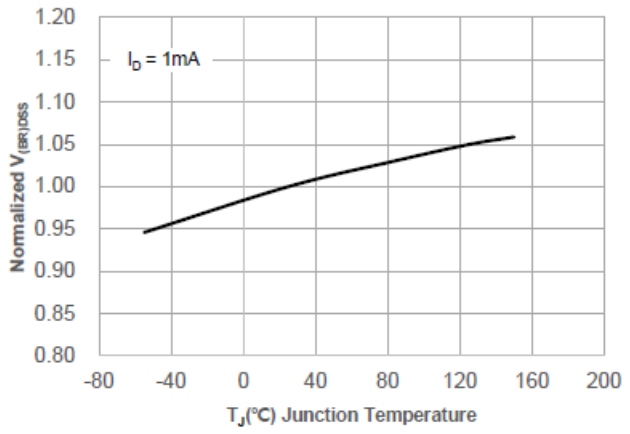


Figure 7. Normalized Breakdown voltage vs. Junction Temperature

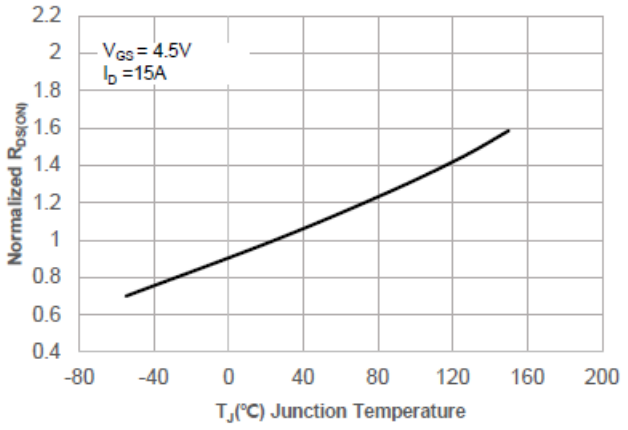


Figure 8. Normalized on Resistance vs. Junction Temperature

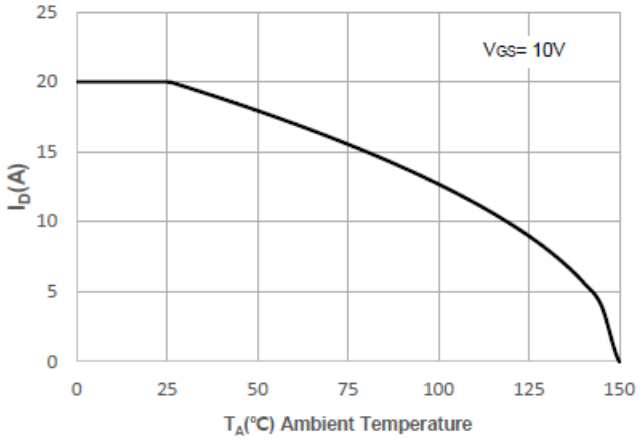


Figure 9. Maximum Continuous Drian Current vs. Case Temperature

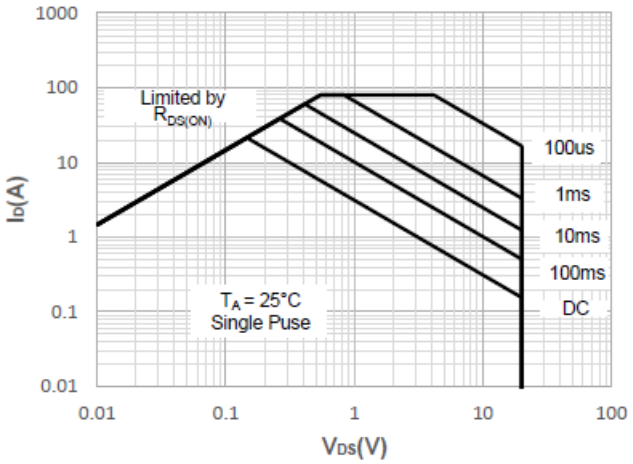


Figure 10. Maximum Safe Operating Area

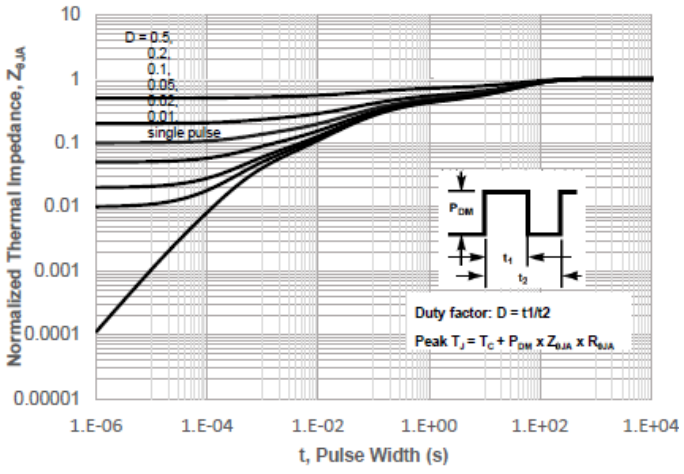


Figure 11. Normalized Maximum Transient Thermal Impedance

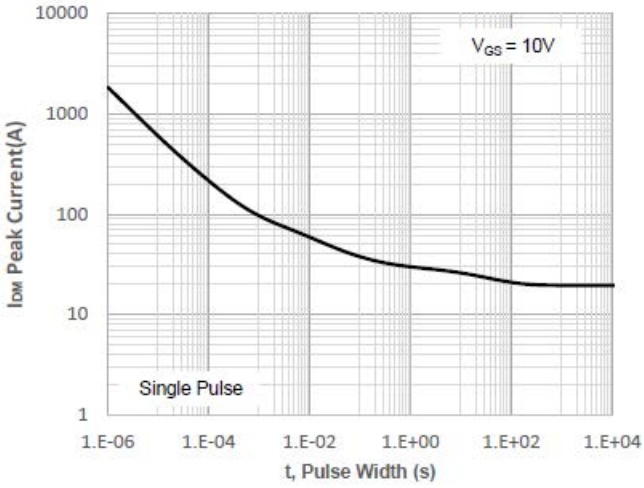
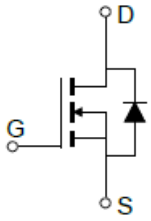
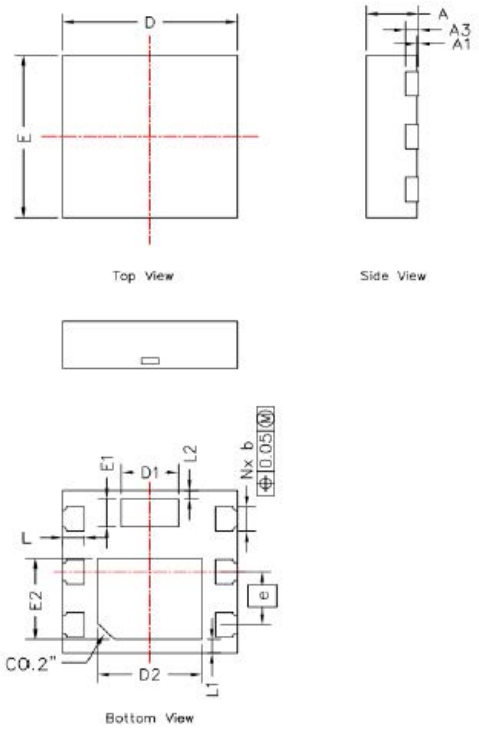


Figure 12. Peak Current Capacity

- Circuit diagram



- Package outlines :



SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.700	0.750	0.800	0.028	0.030	0.031
A1	---	---	0.050	----	----	0.002
A3	0.195	0.203	0.211	0.008	0.008	0.008
b	0.250	0.300	0.350	0.010	0.012	0.014
e	0.65BSC			0.026 BSC		
D	1.900	2.000	2.100	0.075	0.079	0.083
E	1.900	2.000	2.100	0.075	0.079	0.083
D1	0.560	0.660	0.760	0.022	0.026	0.030
E1	0.250	0.350	0.450	0.010	0.014	0.018
D2	1.100	1.200	1.300	0.043	0.047	0.051
E2	0.900	1.000	1.100	0.035	0.039	0.043
L	0.150	0.250	0.350	0.006	0.010	0.014
L1	0.065	0.165	0.265	0.003	0.006	0.010
L2	0.000	0.100	0.200	0.000	0.004	0.008

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