

Features

- Trench Power LV MOSFET Technology
- High Dense Cell Design for Extremely Low $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device^(Note1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

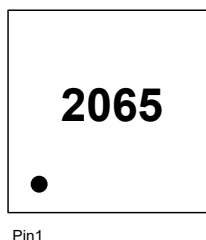
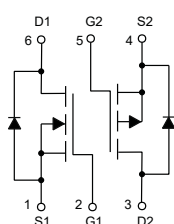
Maximum Ratings

- Operating Junction Temperature Range: -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Typical Thermal Resistance: 78°C/W Junction to Ambient^(Note2)

Parameter		Symbol	Rating	Unit
Total Power Dissipation ^(Note 4)		P _D	1.6	W
N-Channel MOSFET				
Drain-Source Voltage		V _{DS}	20	V
Gate-Source Voltage		V _{GS}	±10	V
Continuous Drain Current	T _A =25°C	I _D	6	A
	T _A =100°C		3.8	
Pulsed Drain Current ^(Note 3)		I _{DM}	24	A
P-Channel MOSFET				
Drain-Source Voltage		V _{DS}	-20	V
Gate-Source Voltage		V _{GS}	±10	V
Continuous Drain Current	T _A =25°C	I _D	-6	A
	T _A =100°C		-3.8	
Pulsed Drain Current ^(Note 3)		I _{DM}	-24	A

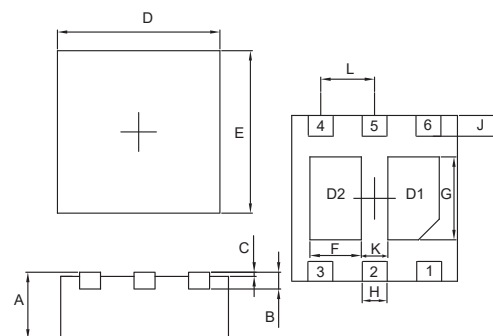
1. Halogen free "Green" products are defined as those which contain <900ppm bromine,
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$.
3. Repetitive rating; pulse width limited by max. junction temperature.
4. P_D is based on max. junction temperature, using junction-ambient thermal resistance.

Internal Structure and Marking Code



Dual N&P-Channel MOSFET

DFN2020-6L



DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.030	0.034	0.750	0.850	
B	0.008		0.200		TYP.
C	0.000	0.002	0.000	0.050	
D	0.077	0.081	1.950	2.050	
E	0.077	0.081	1.950	2.050	
F	0.017	0.027	0.440	0.690	
G	0.033	0.043	0.840	1.090	
H	0.010	0.014	0.250	0.350	
J	0.007	0.015	0.175	0.375	
K	0.010	0.014	0.250	0.350	
L	0.026		0.650		TYP.

N-Channel MOSFET Electrical Characteristics @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	20			V
Gate-Source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±10V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V, V _{GS} =0V			1	μA
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.4	0.6	1.0	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =4.5V, I _D =5A		20	25	mΩ
		V _{GS} =2.5V, I _D =4A		25	32	
		V _{GS} =1.8V, I _D =2A		33	49	
Gate Resistance	R _g	f=1MHz, Open drain		2.5		Ω
Diode Characteristics						
Continuous Body Diode Current	I _S				6	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =6A			1.2	V
Reverse Recovery Time	t _{rr}	I _F =20A, dI/dt=100A/μs		43		ns
Reverse Recovery Charge	Q _{rr}			51		nC
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =10V,V _{GS} =0V,f=1MHz		393		pF
Output Capacitance	C _{oss}			71		
Reverse Transfer Capacitance	C _{rss}			62		
Total Gate Charge	Q _g	V _{DS} =10V,V _{GS} =4.5V,I _D =4.5A		5.8		nC
Gate-Source Charge	Q _{gs}			0.5		
Gate-Drain Charge	Q _{gd}			1.7		
Turn-On Delay Time	t _{d(on)}	V _{DD} =10V, V _{GS} =4.5V, R _G =2.2Ω, I _D =4.5A		4		ns
Turn-On Rise Time	t _r			2.5		
Turn-Off Delay Time	t _{d(off)}			17		
Turn-Off Fall Time	t _f			3		

P-Channel MOSFET Electrical Characteristics @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =-250μA	-20			V
Gate-Source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±10V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-20V, V _{GS} =0V			-1	μA
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-0.4	-0.6	-1.0	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =-4.5V, I _D =-5A		33	42	mΩ
		V _{GS} =-2.5V, I _D =-4A		39	55	
		V _{GS} =-1.8V, I _D =-3A		49	75	
Gate Resistance	R _g	f=1MHz, Open drain		2.5		Ω
Diode Characteristics						
Continuous Body Diode Current	I _S				-6	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =-5.4A			-1.2	V
Reverse Recovery Time	t _{rr}	I _F =-20A, dI/dt=100A/μs		38		ns
Reverse Recovery Charge	Q _{rr}			23		nC
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =-10V, V _{GS} =0V, f=1MHz		762		pF
Output Capacitance	C _{oss}			105		
Reverse Transfer Capacitance	C _{rss}			90		
Total Gate Charge	Q _g	V _{DS} =-10V, V _{GS} =-4.5V, I _D =-4A		9		nC
Gate-Source Charge	Q _{gs}			1.1		
Gate-Drain Charge	Q _{gd}			2.5		
Turn-On Delay Time	t _{d(on)}	V _{DD} =-10V, V _{GS} =-4.5V, R _G =3Ω, I _D =-4.5A		9.1		ns
Turn-On Rise Time	t _r			13		
Turn-Off Delay Time	t _{d(off)}			69		
Turn-Off Fall Time	t _f			38		

N-Channel MOSFET Curve Characteristics

Fig. 1 - Typical Output Characteristics

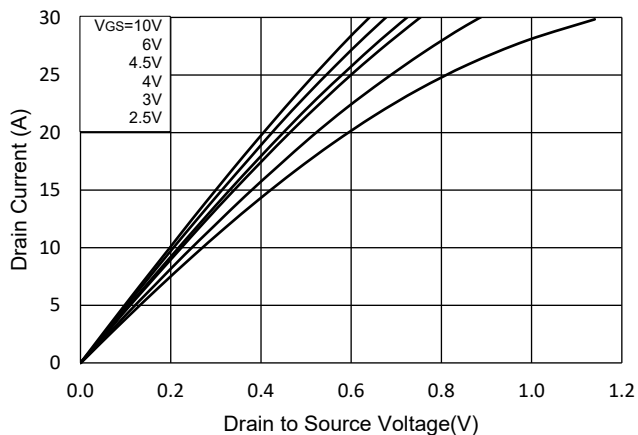


Fig.2 Transfer Characteristic

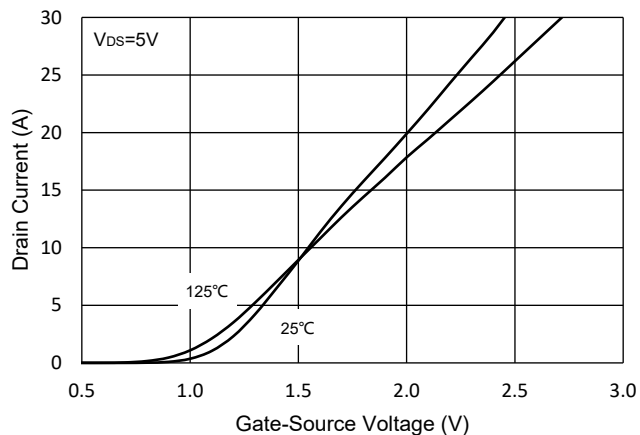


Fig.3 $R_{DS(on)}$ - V_{GS}

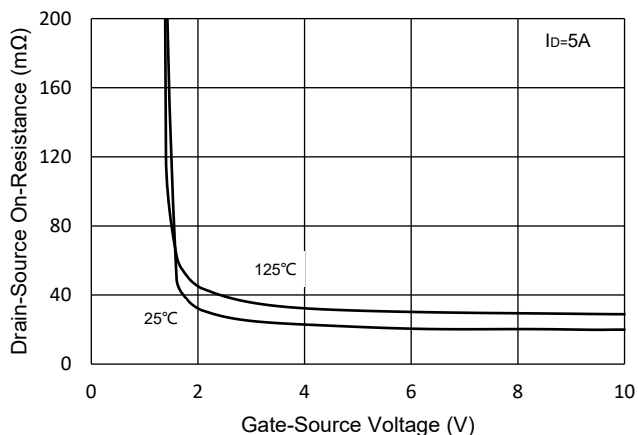


Fig.4 $R_{DS(ON)}$ - I_D

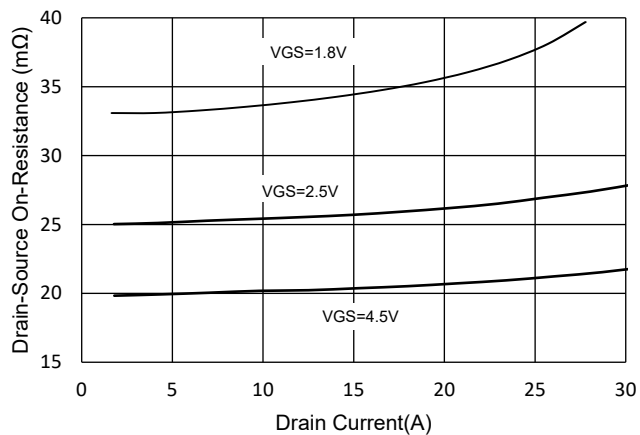


Fig.5 Capacitance Characteristics

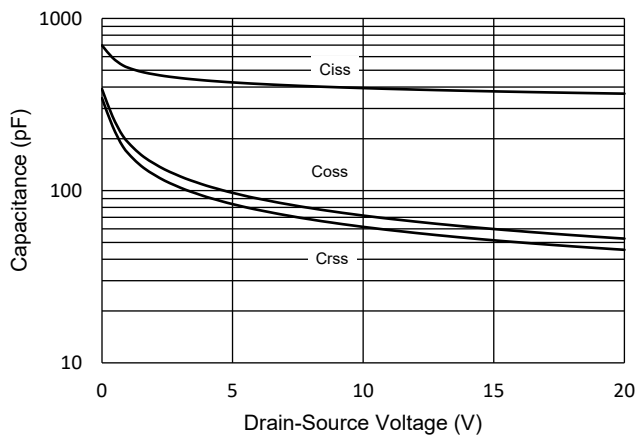
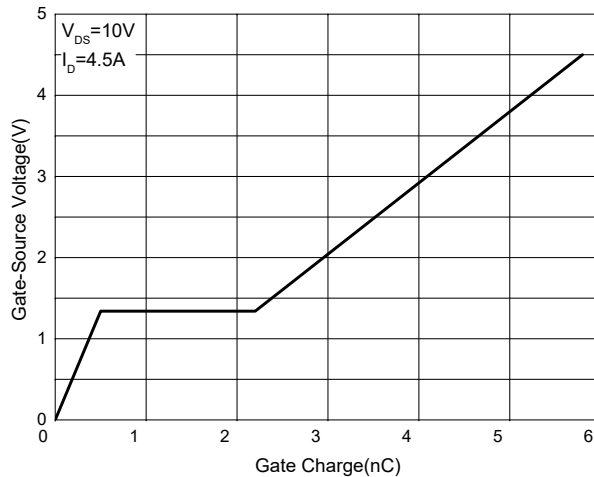


Fig. 6 - Gate Charge



N-Channel MOSFET Curve Characteristics

Fig.7 Normalized Threshold Voltage

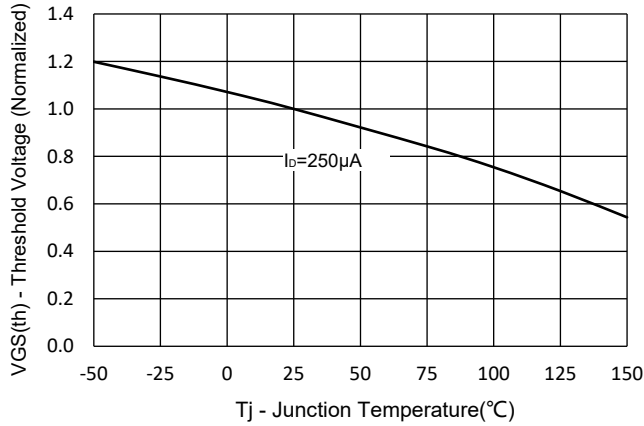


Fig.8 Normalized On Resistance Characteristics

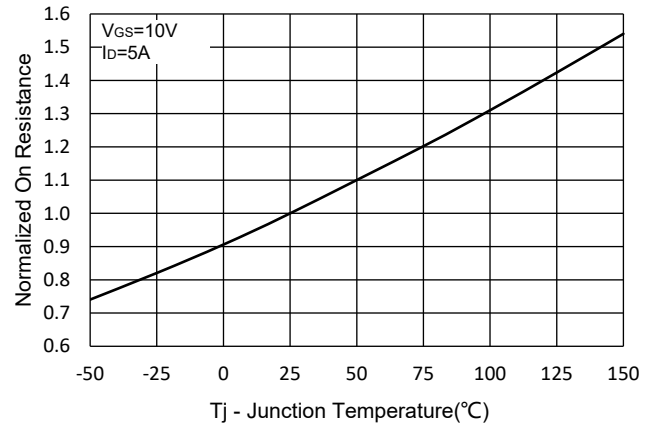


Fig.9 IS-VSD

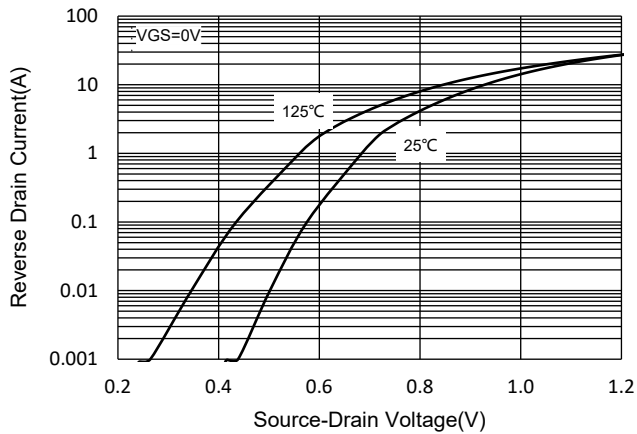


Fig.10 Drain Current

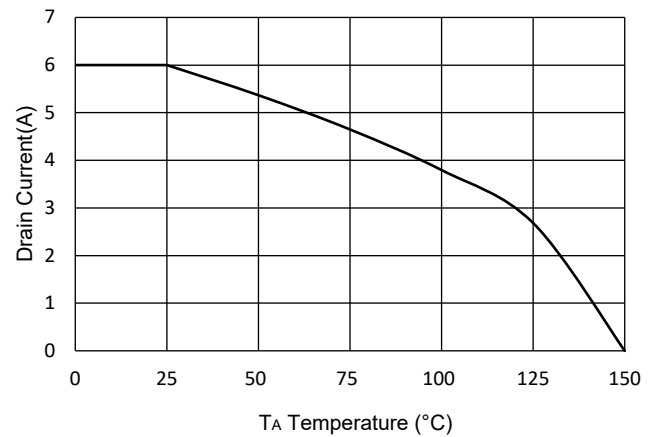
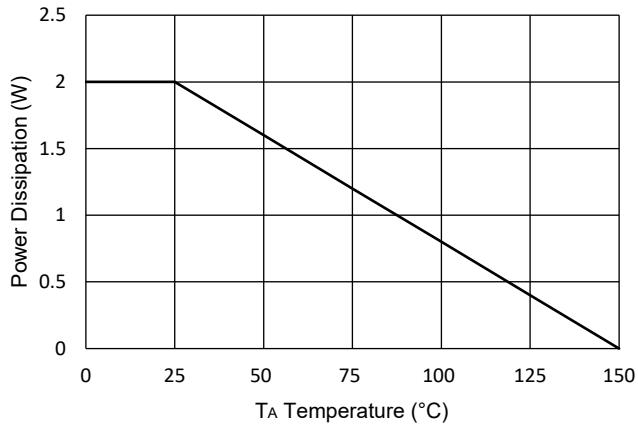


Fig.11 Power Dissipation



N-Channel MOSFET Curve Characteristics

Fig.12 - Safe Operation Area

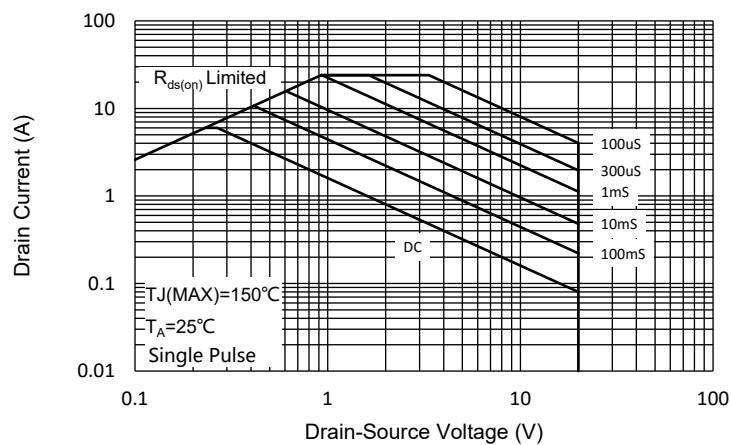
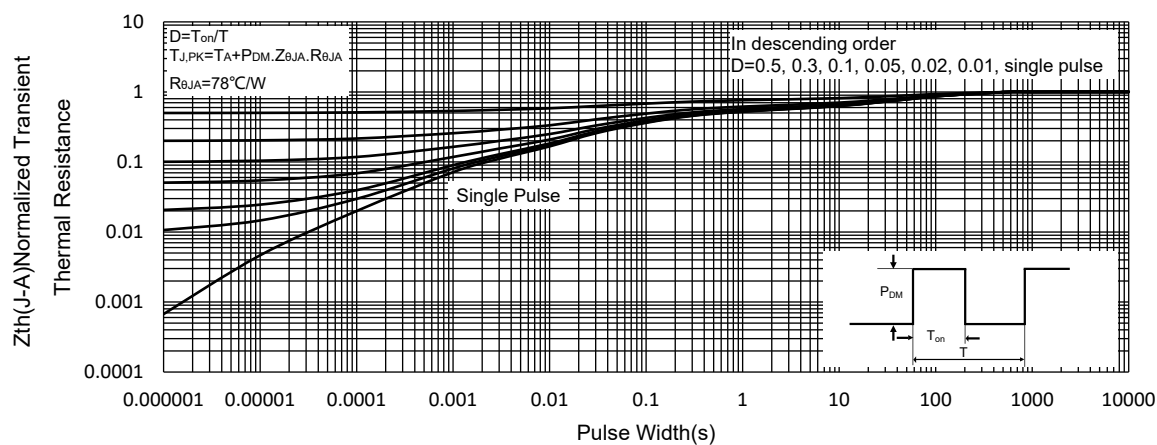


Fig.13 Normalized Transient Thermal Impedance



P-Channel MOSFET Curve Characteristics

Fig.1 - Typical Output Characteristics

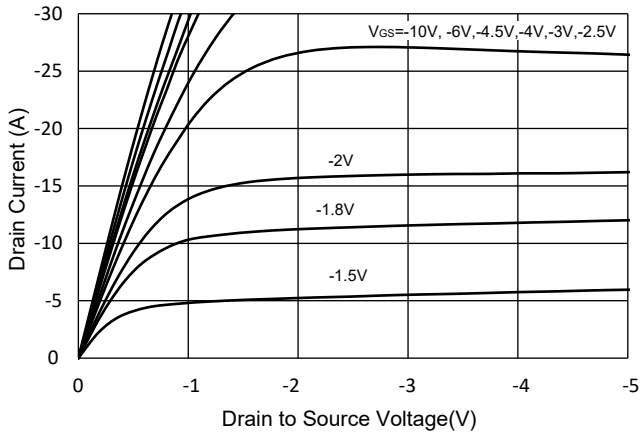


Fig.2 Transfer Characteristic

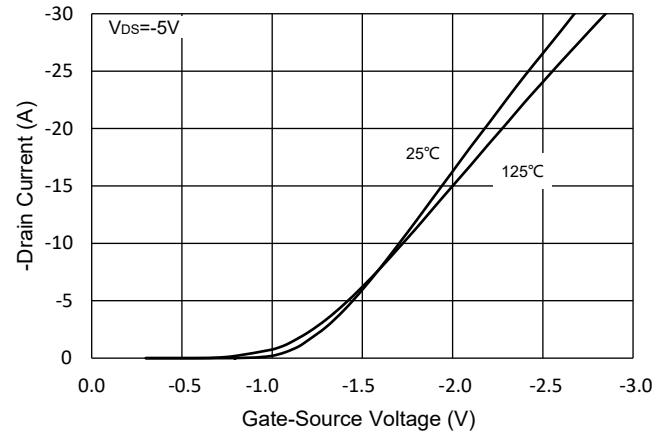


Fig.3 $R_{DS(on)}$ - V_{GS}

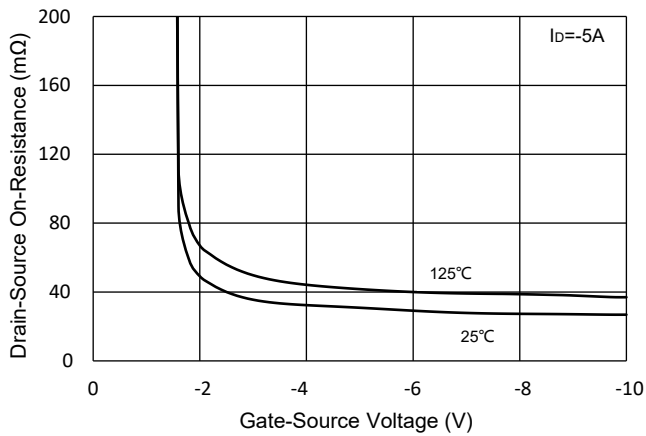


Fig.4 $R_{DS(on)}$ - I_D

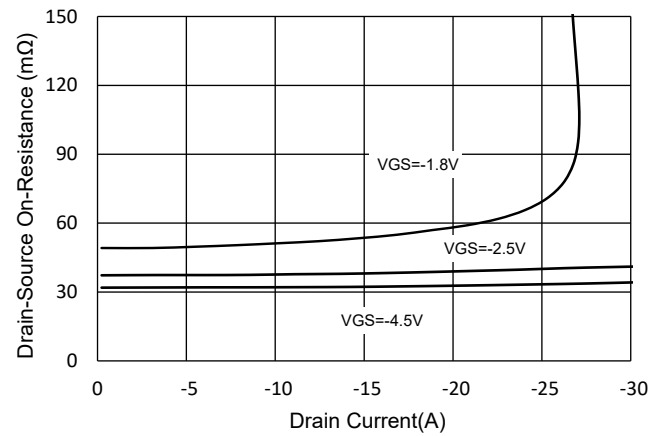


Fig.5 Capacitance Characteristics

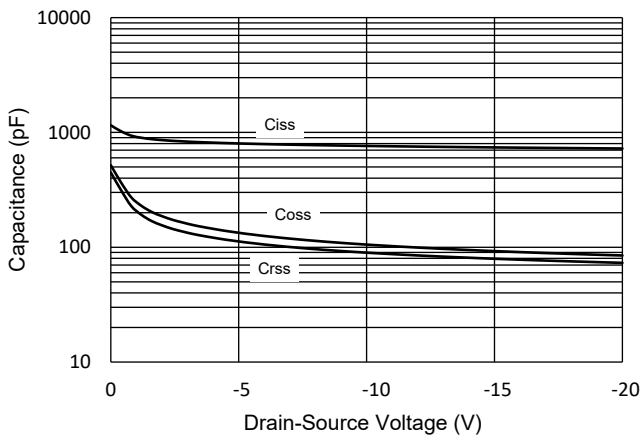
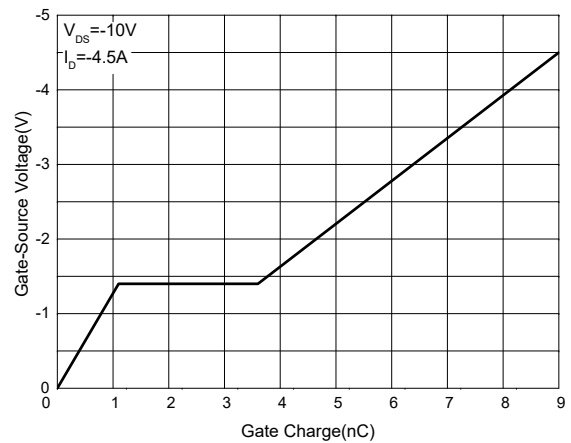


Fig. 6 - Gate Charge



P-Channel MOSFET Curve Characteristics

Fig.7 Normalized Threshold Voltage

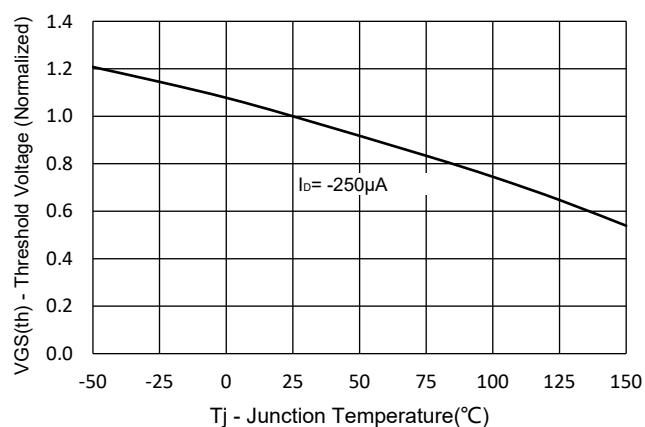


Fig.8 Normalized On Resistance Characteristics

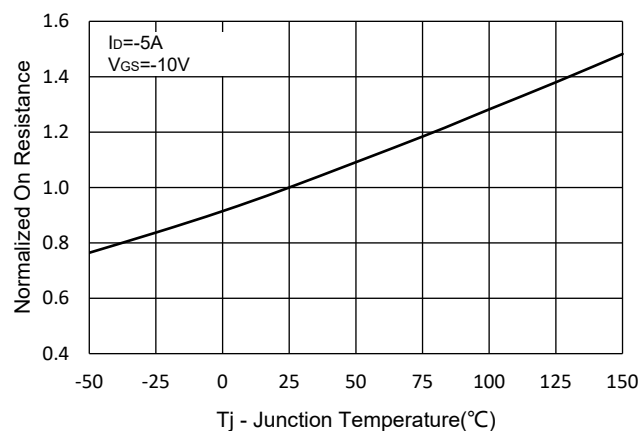


Fig.9 IS-VSD

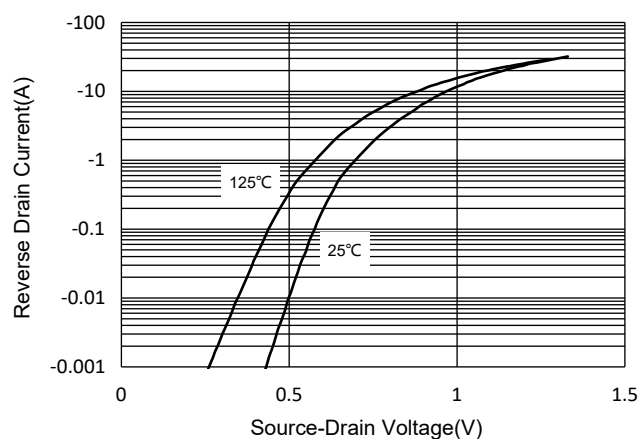


Fig.10 Drain Current

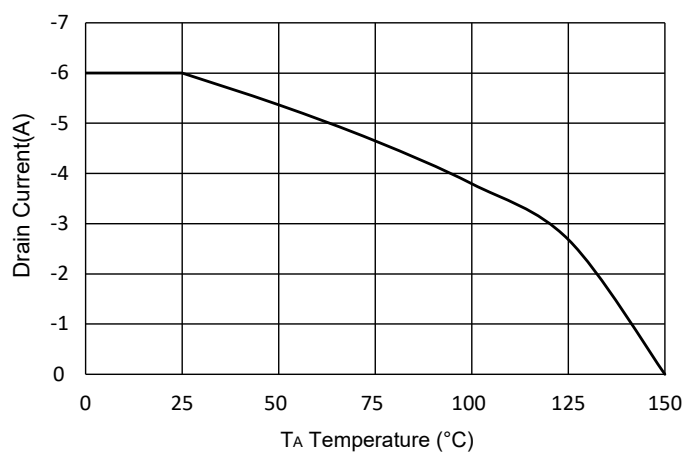
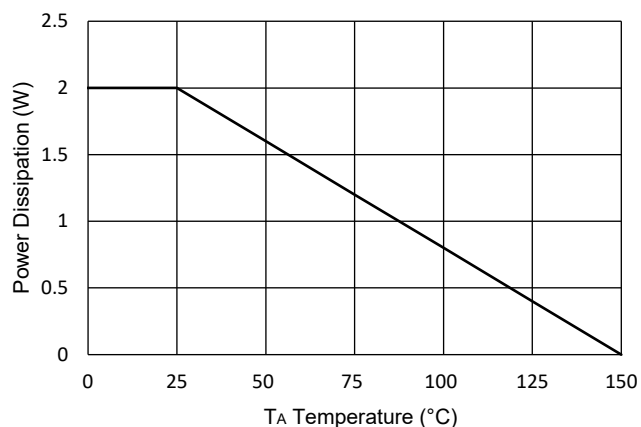


Fig.11 Power Dissipation



P-Channel MOSFET Curve Characteristics

Fig.12 - Safe Operation Area

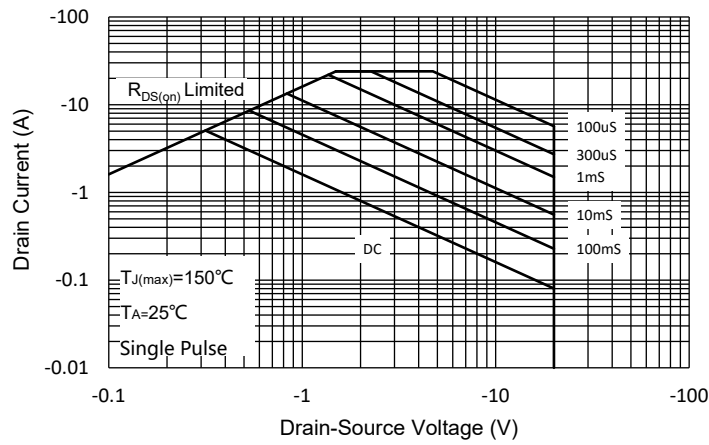
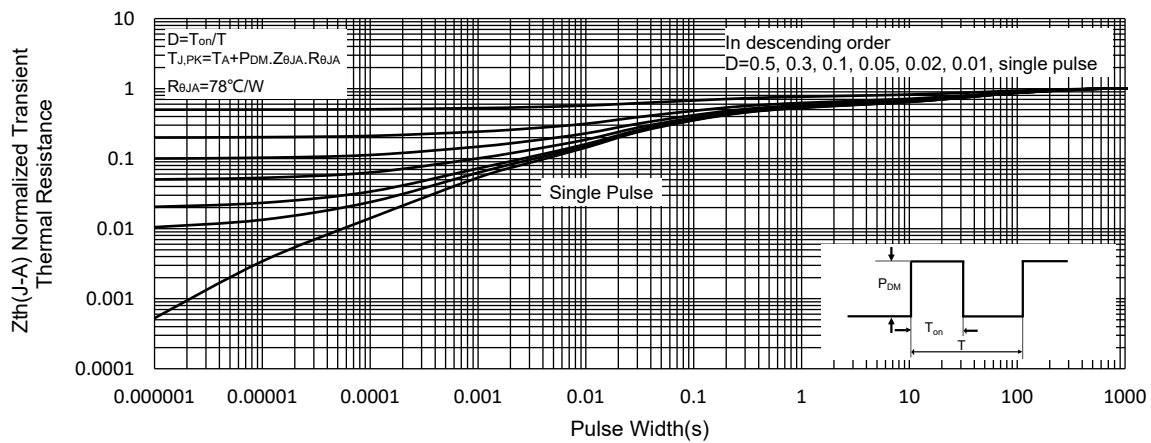


Fig.13 - Normalized Transient Thermal Impedance



Ordering Information

Device	Packing
Part Number-TP	Tape&Reel:3Kpcs/Reel
Part Number-13P	Tape&Reel:10Kpcs/Reel

For packaging details, go to our website at <https://www.mccsemi.com/pdf/productpackaging/DFN2020-6L%20Package.pdf>

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