

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)

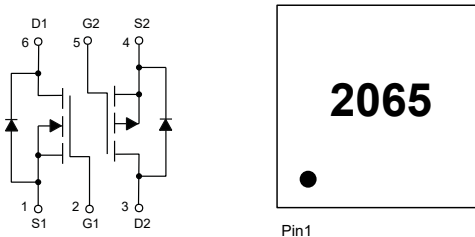
Maximum Ratings

- 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	I_D	$T_A=25^\circ\text{C}$	6
		$T_A=100^\circ\text{C}$	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	I_D	$T_A=25^\circ\text{C}$	-6
		$T_A=100^\circ\text{C}$	-3.8
Pulsed Drain Current ^(Note 3)	I_{DM}	-24	A

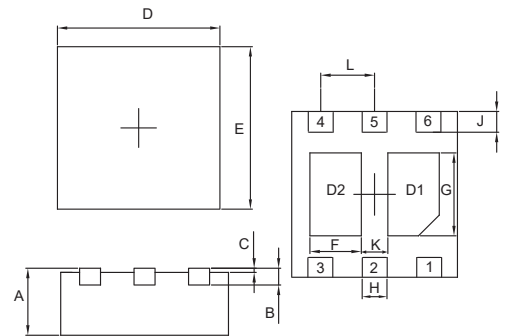
1. Halogen free "Green" products are defined as those which contain <900ppm bromine,
2. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$.
3. Repetitive rating; pulse width limited by max. junction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



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	20			V
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 10V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=20V, V_{GS}=0V$			1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4	0.6	1.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=5A$		20	25	m Ω
		$V_{GS}=2.5V, I_D=4A$		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}	$I_F=20A, di/dt=100A/\mu s$		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	$t_{d(on)}$	$V_{DD}=10V, V_{GS}=4.5V, R_G=2.2\Omega, I_D=4.5A$		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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20			V
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 10V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-20V, V_{GS}=0V$			-1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4	-0.6	-1.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-5A$		33	42	m Ω
		$V_{GS}=-2.5V, I_D=-4A$		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}	$I_F=-20A, dI/dt=100A/\mu s$		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	$t_{d(on)}$	$V_{DD}=-10V, V_{GS}=-4.5V, R_G=3\Omega, I_D=-4.5A$		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

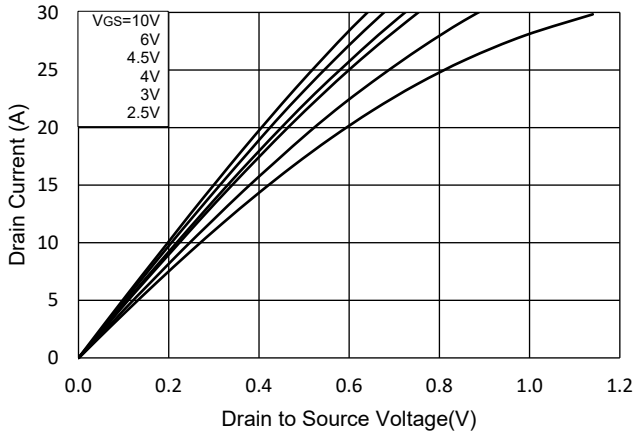


Fig.2 Transfer Characteristic

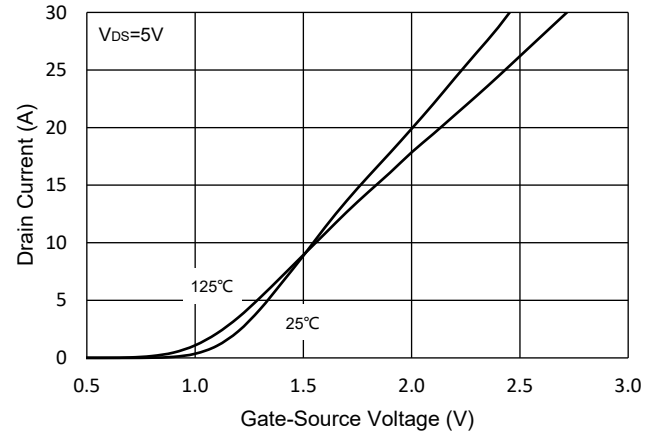


Fig.3 R_{ds(on)}-V_{gs}

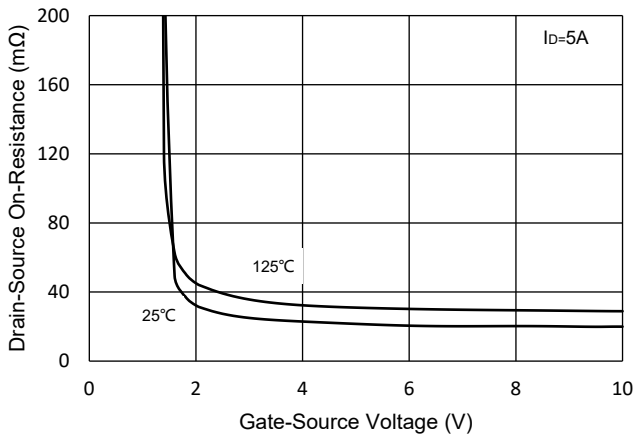


Fig.4 R_{DS(ON)}-I_D

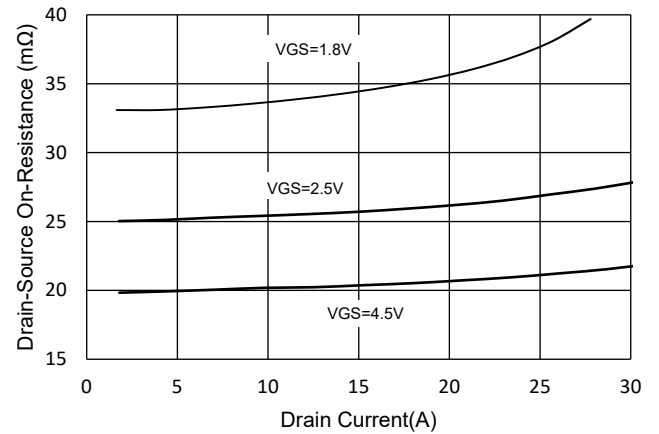


Fig.5 Capacitance Characteristics

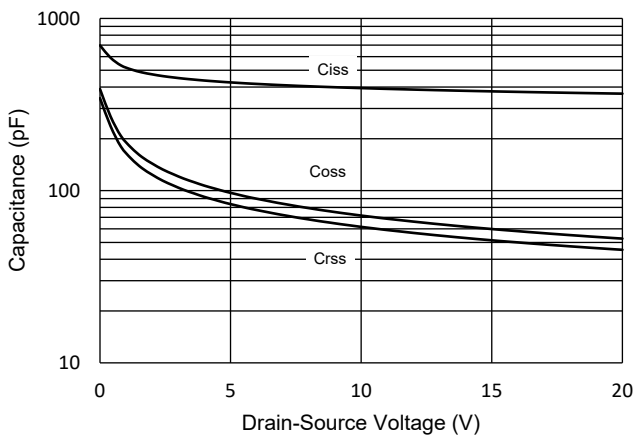
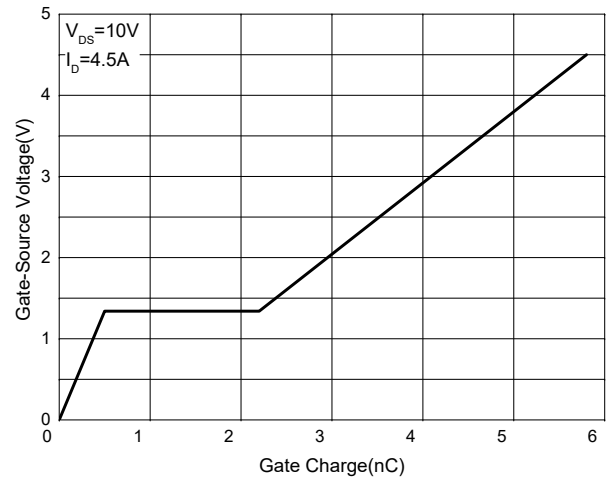


Fig. 6 - Gate Charge



N-Channel MOSFET Curve Characteristics

Fig.7 Normalized Threshold Voltage

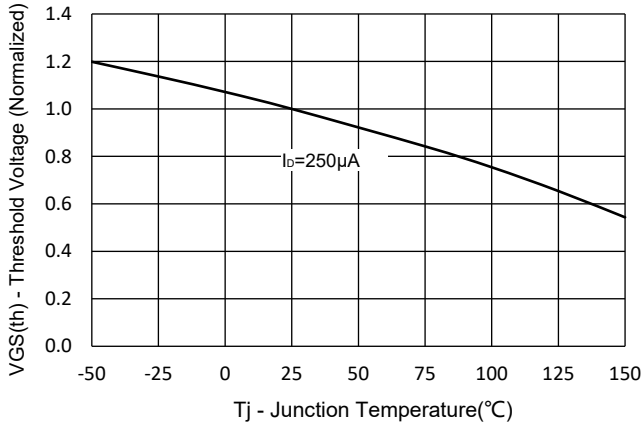


Fig.8 Normalized On Resistance Characteristics

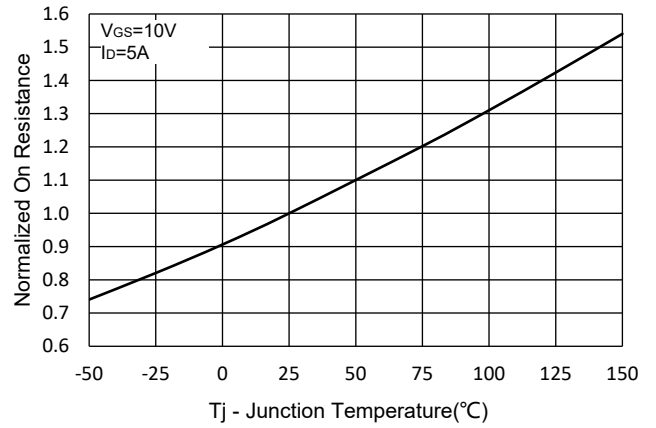


Fig.9 IS-VSD

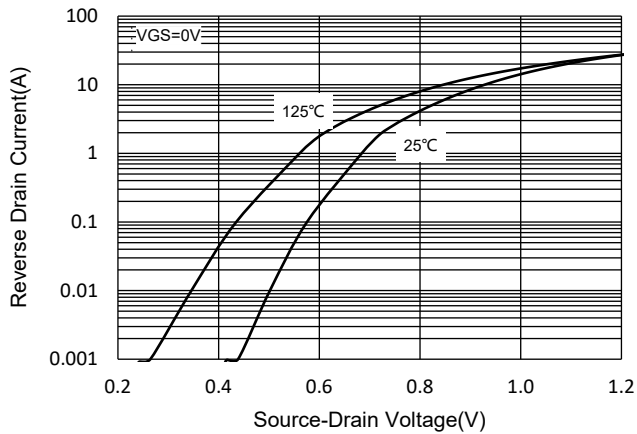


Fig.10 Drain Current

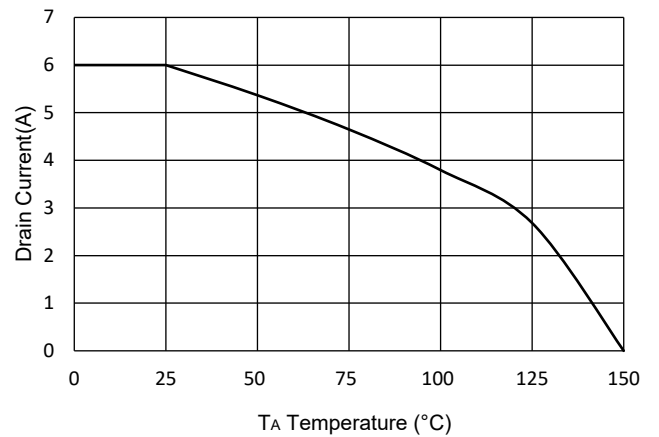
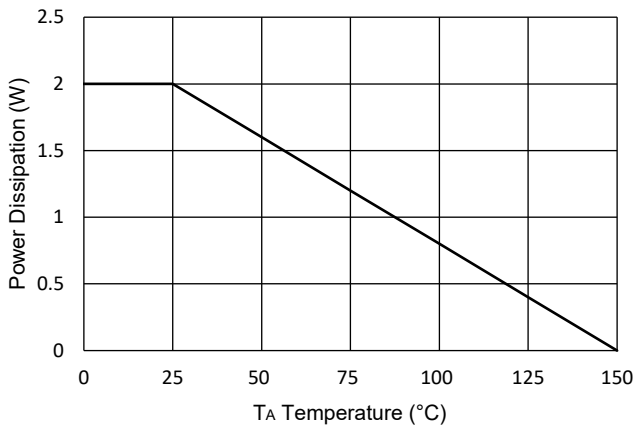


Fig.11 Power Dissipation



N-Channel MOSFET Curve Characteristics

Fig.12 - Safe Operation Area

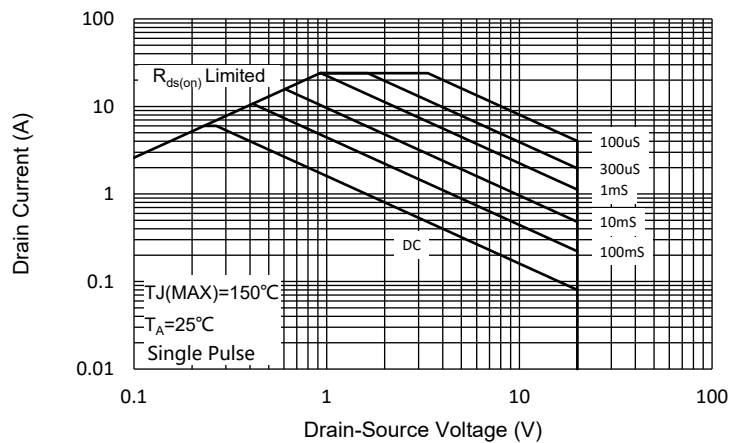
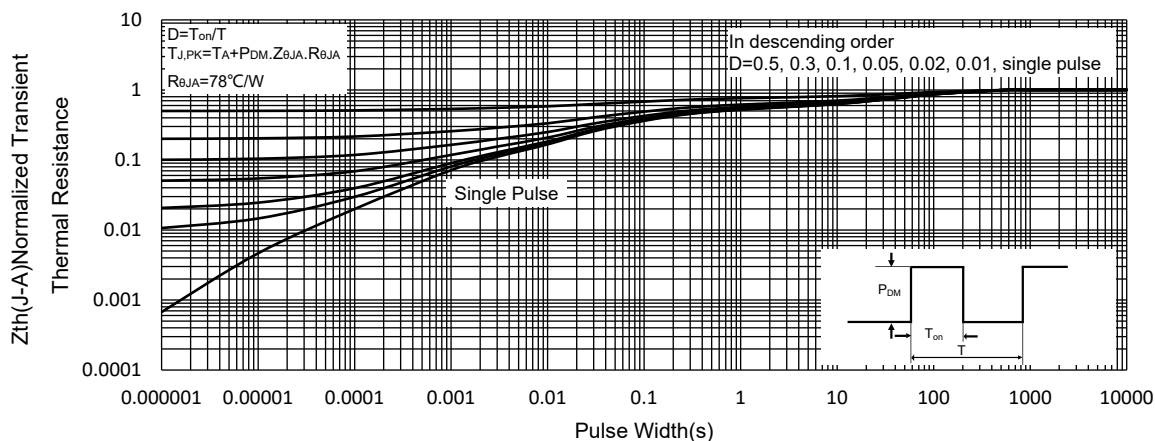


Fig.13 Normalized Transient Thermal Impedance



P-Channel MOSFET Curve Characteristics

Fig.1 - Typical Output Characteristics

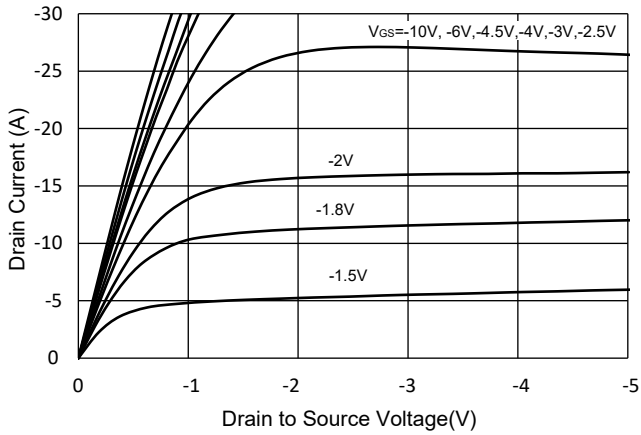


Fig.2 Transfer Characteristic

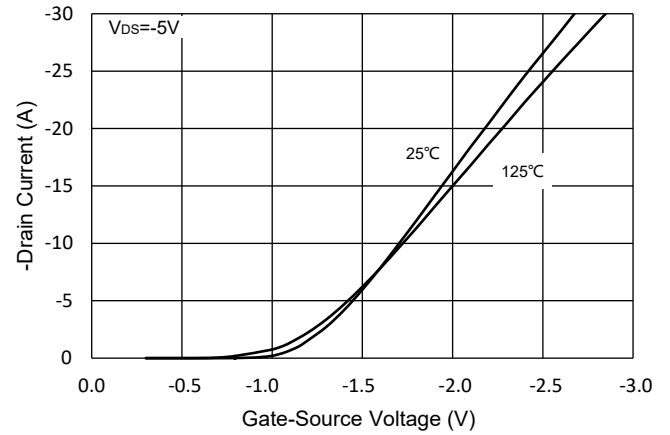


Fig.3 Rds(on)-Vgs

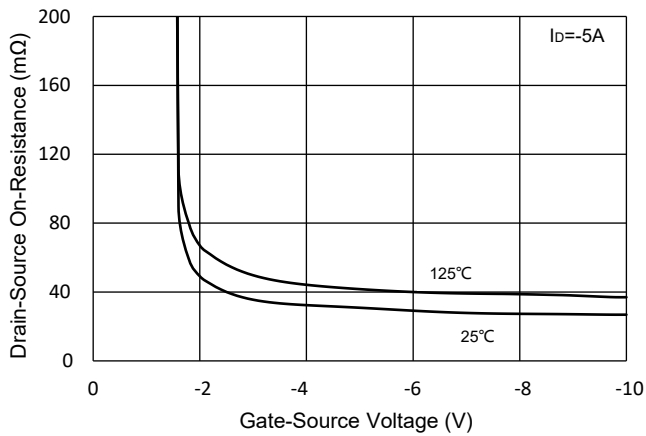


Fig.4 RDS(ON)-Id

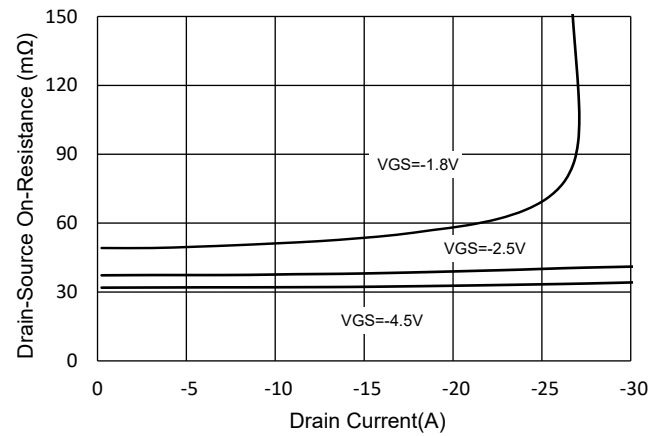


Fig.5 Capacitance Characteristics

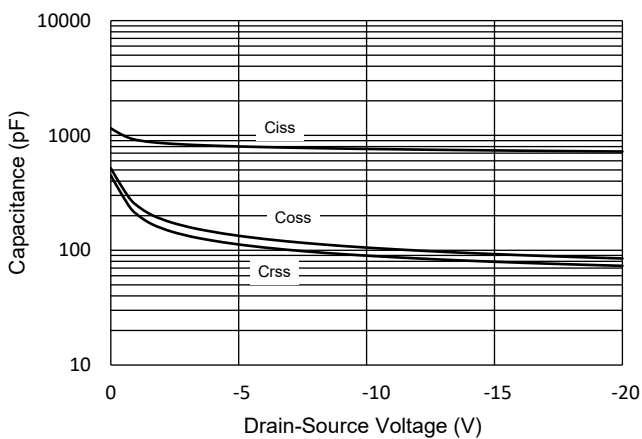
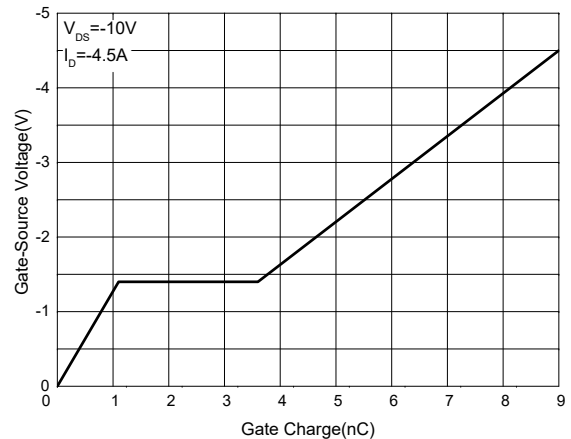


Fig. 6 - Gate Charge



P-Channel MOSFET Curve Characteristics

Fig.7 Normalized Threshold Voltage

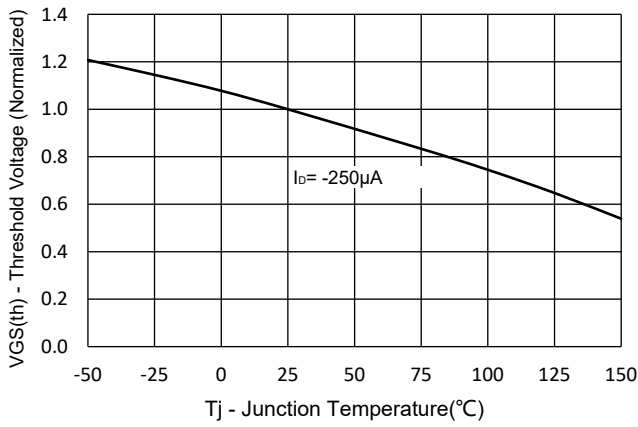


Fig.8 Normalized On Resistance Characteristics

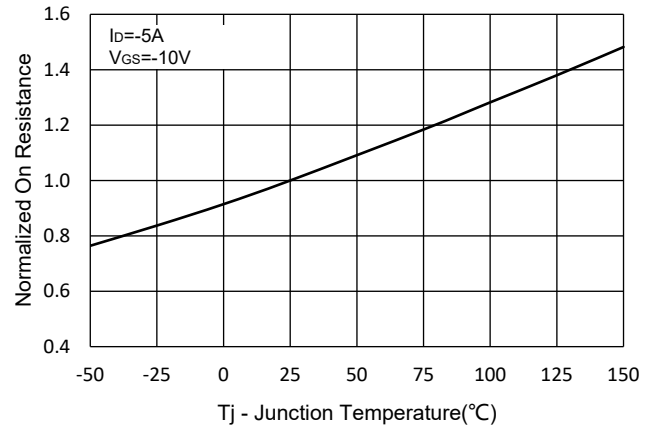


Fig.9 IS-VSD

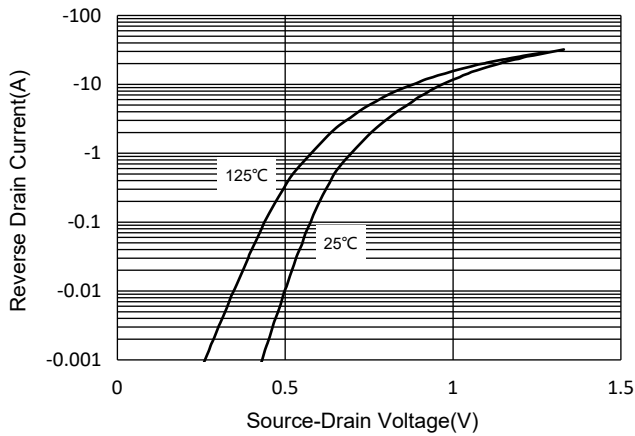


Fig.10 Drain Current

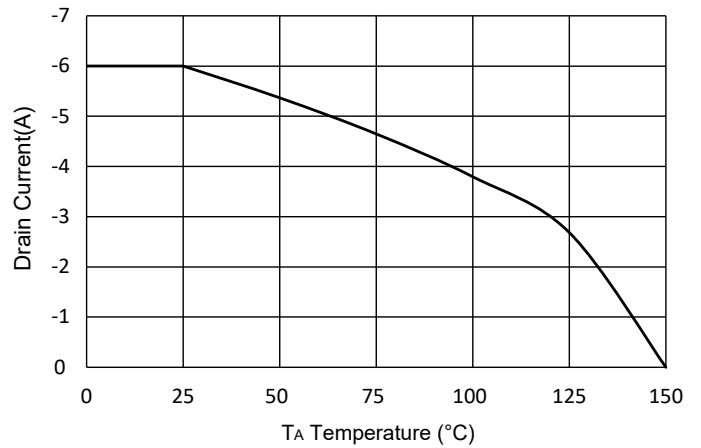
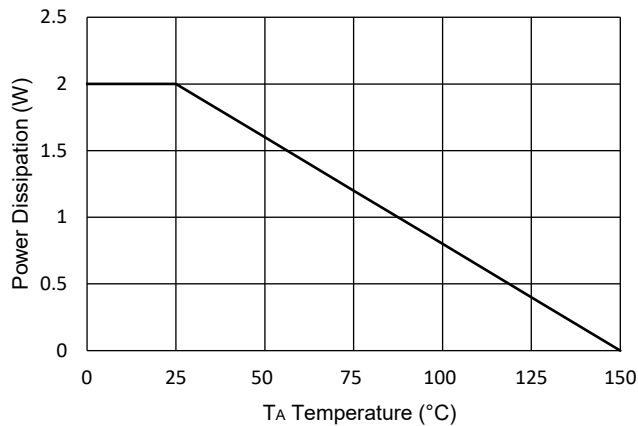


Fig.11 Power Dissipation



P-Channel MOSFET Curve Characteristics

Fig.12 - Safe Operation Area

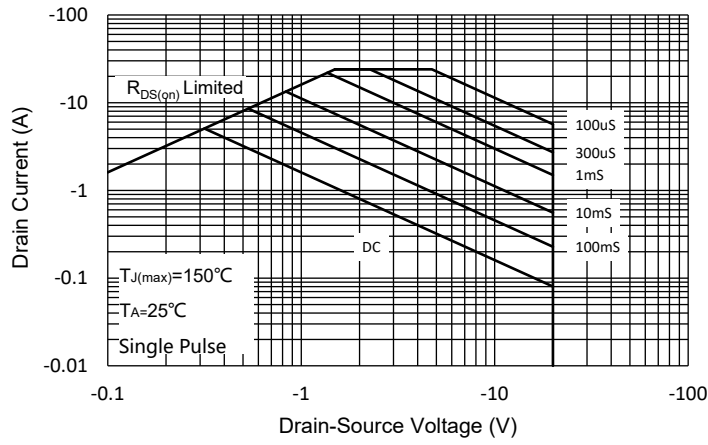
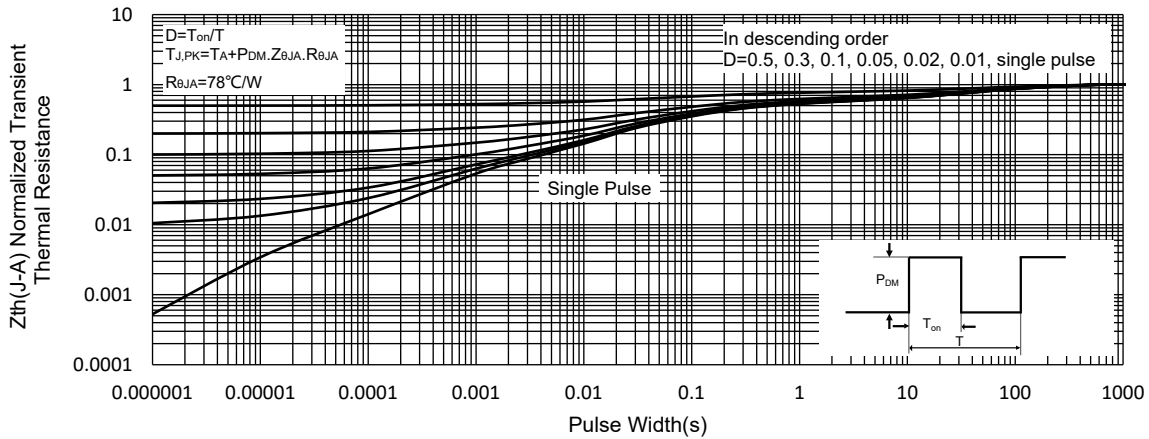


Fig.13 - Normalized Transient Thermal Impedance



Ordering Information

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

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