

Features

- ESD Protected Up To 2KV (HBM)
- Trench LV MOSFET Technology
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

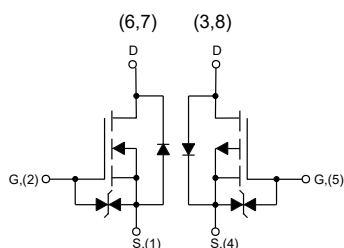
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 360°C/W Junction to Ambient (Note 2)

Parameter	Symbol	Rating	Unit
Total Power Dissipation (Note 4)	P_D	0.35	W
N-Channel MOSFET			
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±10	V
Continuous Drain Current	$T_A=25^\circ\text{C}$	0.75	A
	$T_A=100^\circ\text{C}$	0.47	
Pulsed Drain Current (Note 3)	I_{DM}	3	A
P-Channel MOSFET			
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±10	V
Continuous Drain Current	$T_A=25^\circ\text{C}$	-0.52	A
	$T_A=100^\circ\text{C}$	-0.33	
Pulsed Drain Current (Note 3)	I_{DM}	-2.08	A

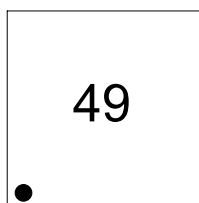
Note:

1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
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



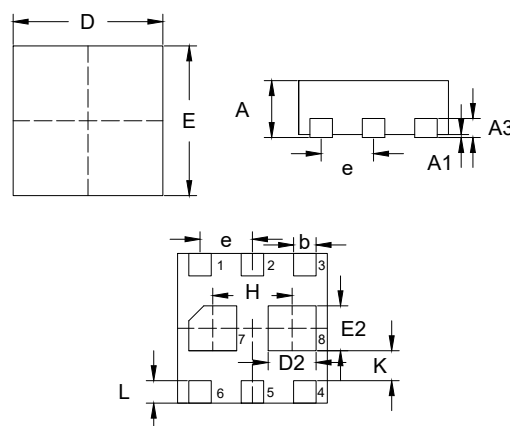
1,4. Source
2,5. Gate
3,6,7,8. Drain



PIN1

Dual N&P-Channel MOSFET

DFN1010B-6



DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.012	0.016	0.31	0.40	
A1	0.000	0.002	0.00	0.05	
A3	0.005		0.127		TYP.
b	0.004	0.008	0.10	0.20	
D	0.037	0.041	0.95	1.05	
E	0.037	0.041	0.95	1.05	
e	0.014		0.350		TYP.
D2	0.011	0.015	0.27	0.37	
E2	0.010	0.014	0.25	0.35	
H	0.021		0.530		TYP.
L	0.004	0.008	0.10	0.20	
K	0.008	-	0.20	-	

N-Channel ELECTRICAL CHARACTERISTICS (Ta=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-Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.35	0.7	1.2	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V, V _{GS} =0V			1.0	μA
Gate-body Leakage Current	I _{GSS}	V _{GS} =± 10V, V _{DS} =0V			±10	μA
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =4.5V, I _D =0.5A		173	250	mΩ
		V _{GS} =2.5V, I _D =0.4A		250	340	
		V _{GS} =1.8V, I _D =0.2A		405	950	
Gate Resistance	R _g	f=1 MHz, Open drain		44		Ω
Diode Characteristics						
Continuous Body Diode Current	I _S				0.75	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =0.5A			1.2	V
Reverse Recovery Time	t _{rr}	I _F =0.1A, dI _F /dt=100A/μs		5.5		ns
Reverse Recovery Charge	Q _{rr}			0.8		nC
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =16V,V _{GS} =0V, f=1MHz		33		pF
Output Capacitance	C _{oss}			10		
Reverse Transfer Capacitance	C _{rss}			5.6		
Total Gate Charge	Q _g	V _{DS} =10V,V _{GS} =4.5V,I _D =0.1A		1.2		nC
Gate-Source Charge	Q _{gs}			0.2		
Gate-Drain Charge	Q _{gd}			0.2		
Turn-on Delay Time	t _{d(on)}	V _{DD} =10V,V _{GS} =4.5V I _D =0.5A, R _G =10Ω		5.4		ns
Turn-on Rise Time	t _r			5.2		
Turn-off Delay Time	t _{d(off)}			10.5		
Turn-off Fall Time	t _f			5.7		

P-Channel ELECTRICAL CHARACTERISTICS (Ta=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			± 10	μA
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	-0.35	-0.62	-1.2	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =-4.5V, I _D =-0.5A		580	850	mΩ
		V _{GS} =-2.5V, I _D =-0.3A		855	1200	
		V _{GS} =-1.8V, I _D =-0.2A		1350	2000	
Gate Resistance	R _g	f=1 MHz, Open drain		85		Ω
Diode Characteristics						
Continuous Body Diode Current	I _S				-0.65	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =-0.5A			-1.2	V
Reverse Recovery Time	t _{rr}	I _F =-1A, dI _F /dt=20A/μs		32		ns
Reverse Recovery Charge	Q _{rr}			3.1		nC
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = -10V,V _{GS} =0V,f=1MHz		36		pF
Output Capacitance	C _{oss}			12		
Reverse Transfer Capacitance	C _{rss}			6.4		
Total Gate Charge	Q _g	V _{DD} = -10V,V _{GS} = -4.5V,I _D = -1A		1.4		nC
Gate-Source Charge	Q _{gs}			0.4		
Gate-Drain Charge	Q _{gd}			0.3		
Turn-On Delay Time	t _{d(on)}	V _{DD} =-10V, V _{GS} =-4.5V, R _G =3Ω, I _D =-0.5A		3.2		ns
Turn-On Rise Time	t _r			18.6		
Turn-Off Delay Time	t _{d(off)}			8.3		
Turn-Off Fall Time	t _f			21.4		

Curve Characteristics (N-Channel)

Fig. 1 - Typical Output Characteristics

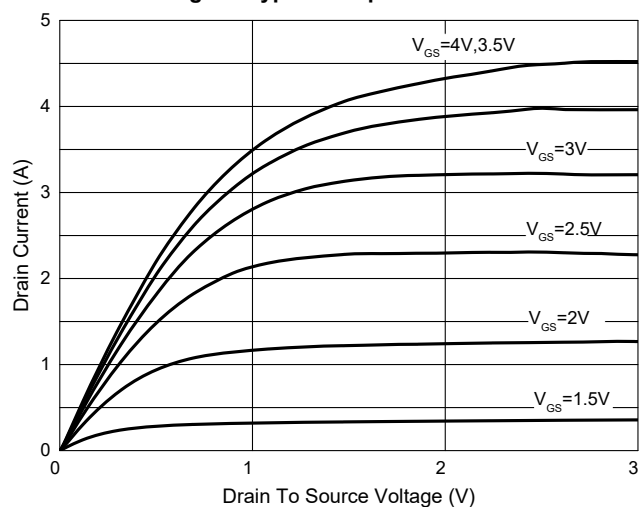


Fig. 2 - Transfer Characteristics

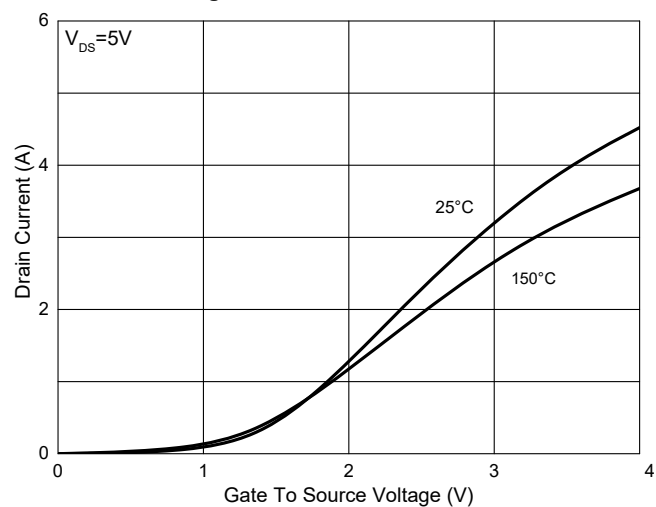


Fig. 3 - $R_{DS(ON)}$ - V_{GS}

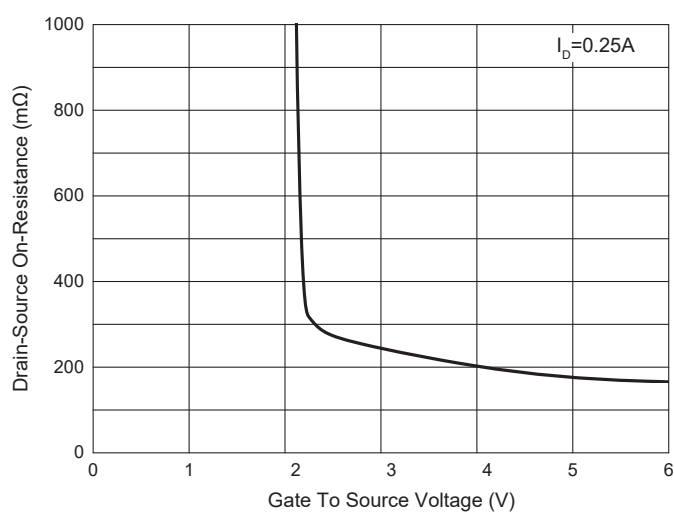


Fig. 4 - $R_{DS(ON)}$ - I_D

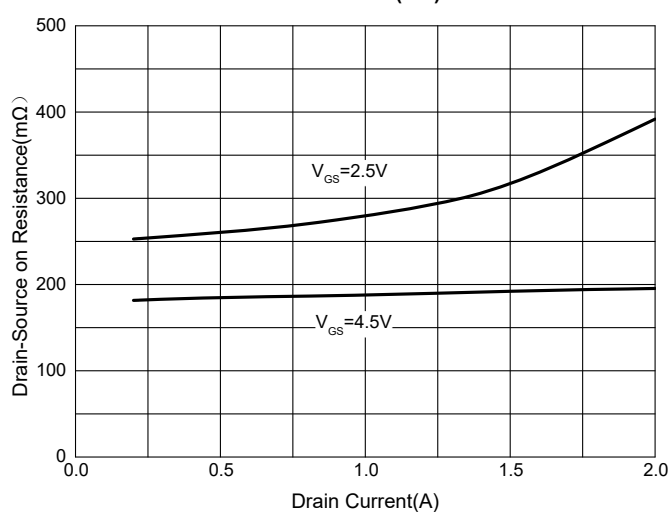


Fig. 5 - Capacitance Characteristics

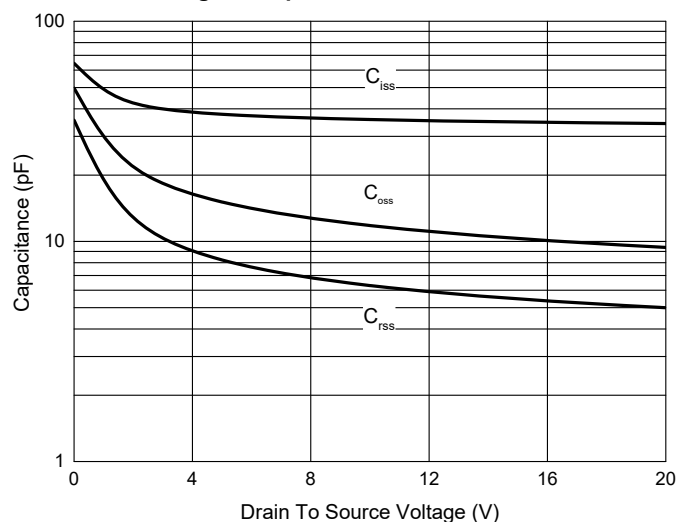
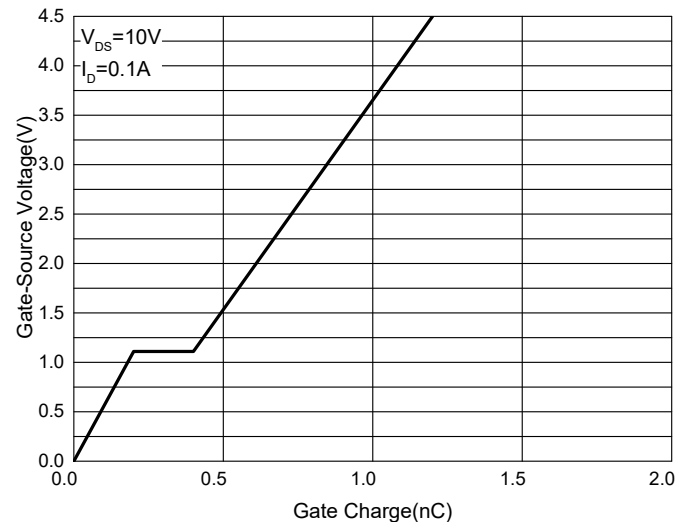


Fig. 6 - Gate Charge



Curve Characteristics (N-Channel)

Fig. 7 - Normalized Threshold Voltage

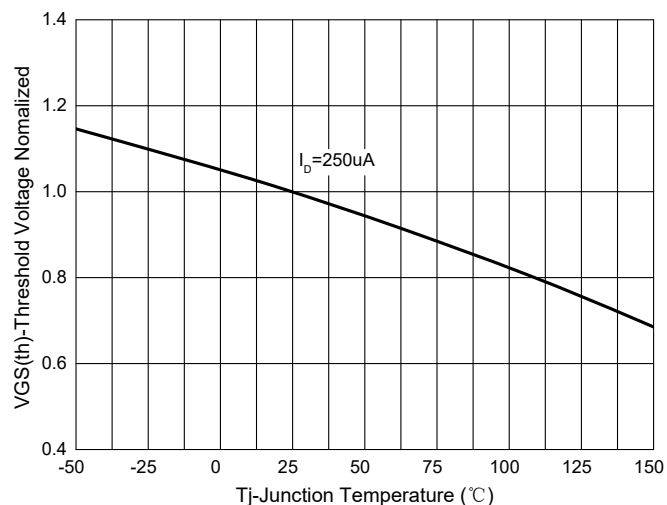


Fig.8-Normalized On Resistance Characteristics

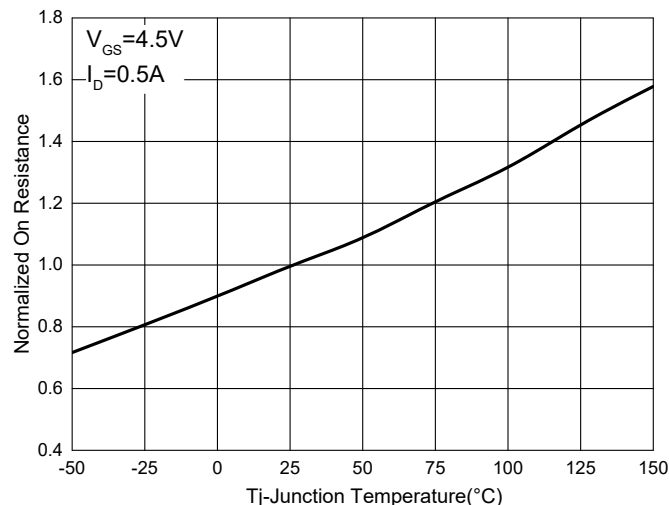


Fig.9 - $I_S - V_{SD}$

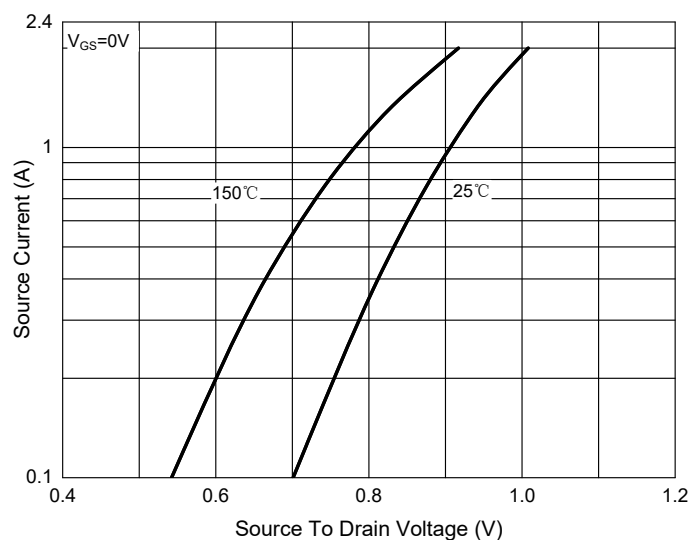


Fig. 10 - Drain Current

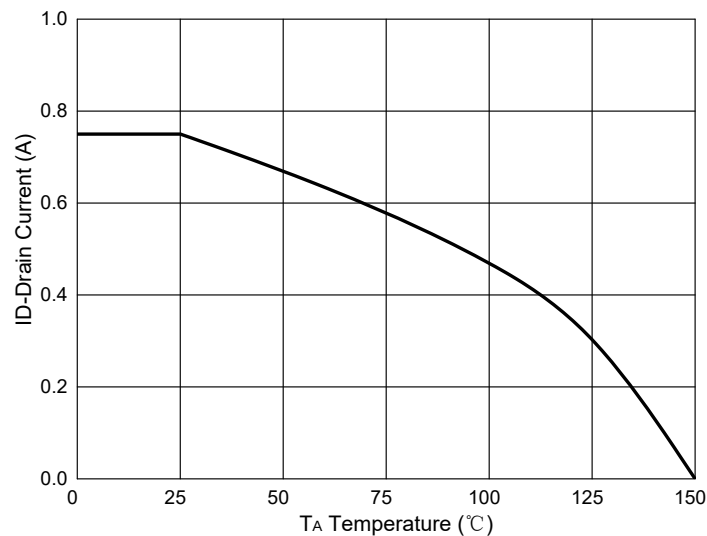
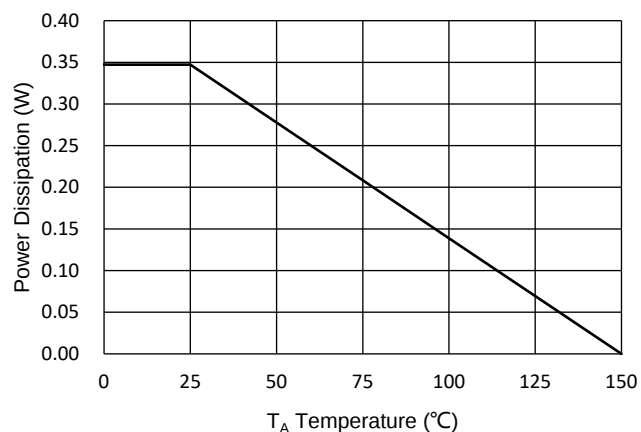


Fig.11 - PD Dissipation



Curve Characteristics (N-Channel)

Fig. 12 - Safe Operation Area

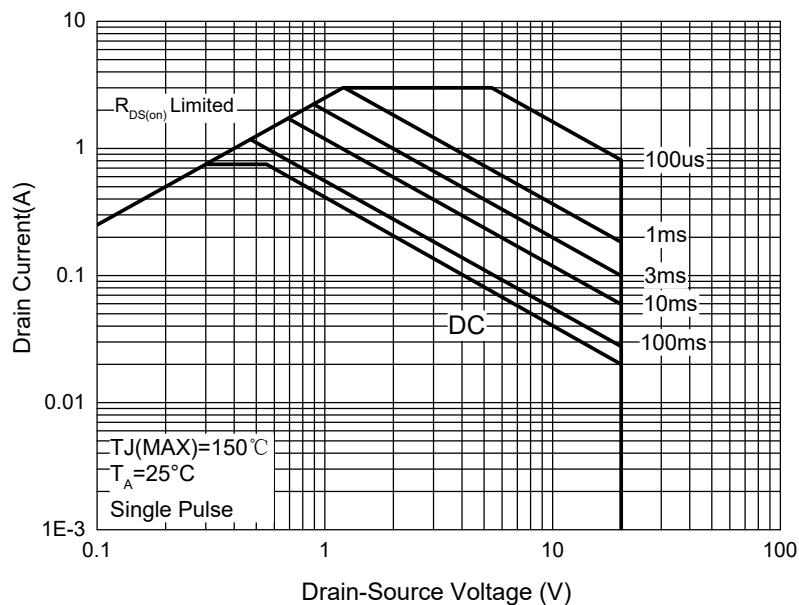
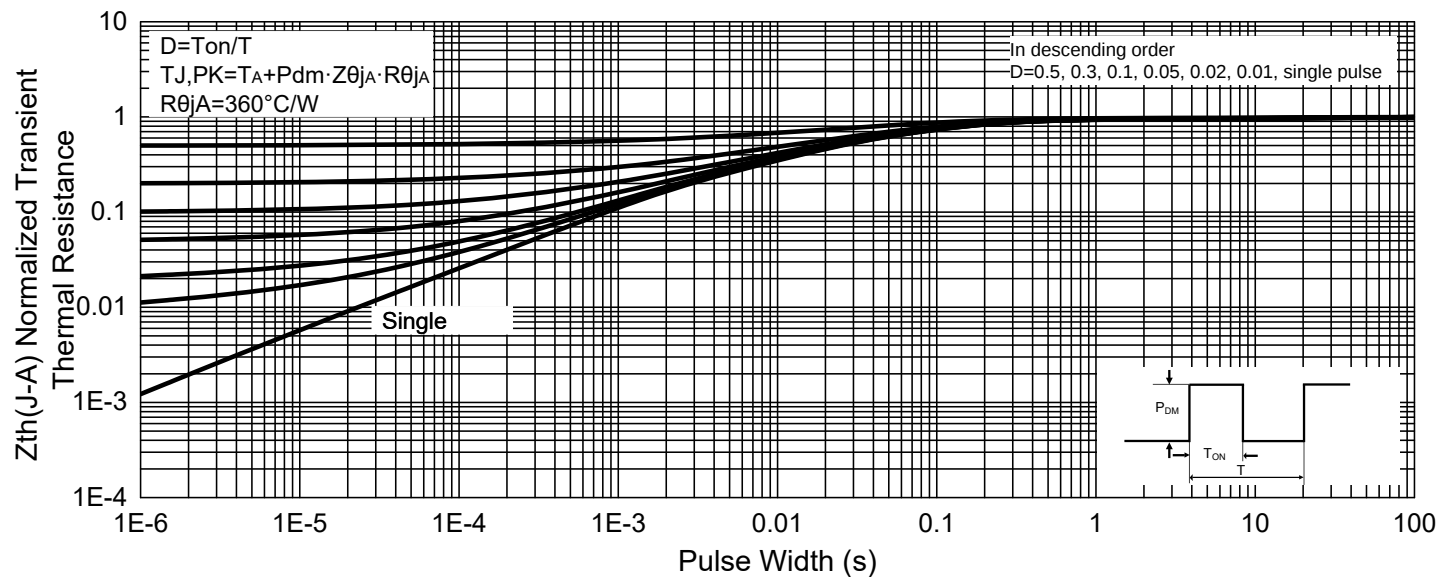


Fig. 13 - Normalized Transient Thermal Impedance



Curve Characteristics (P-Channel)

Fig. 1 - Typical Output Characteristics

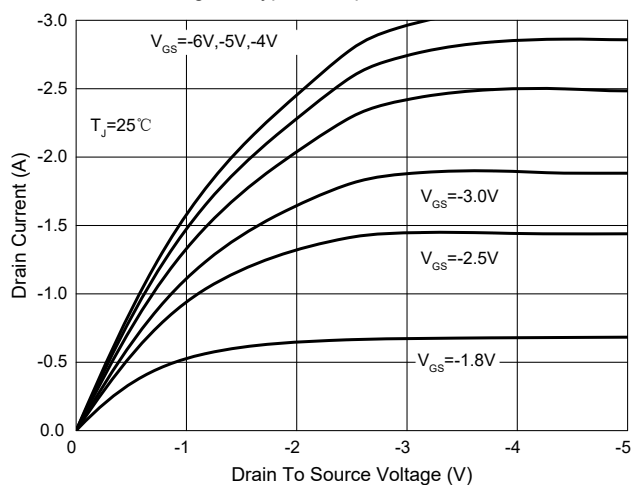


Fig. 2 - Transfer Characteristics

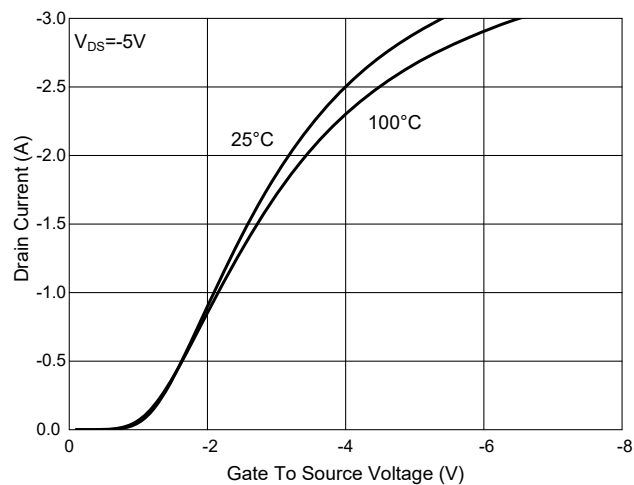


Fig. 3 - $R_{DS(ON)} - V_{GS}$

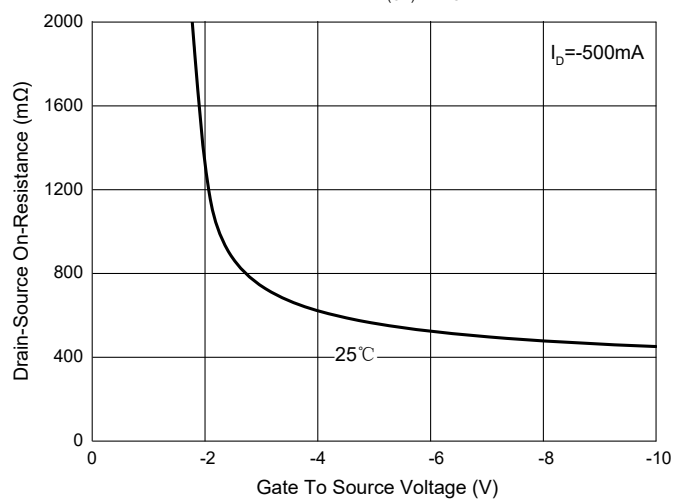


Fig. 4 - $R_{DS(ON)} - I_D$

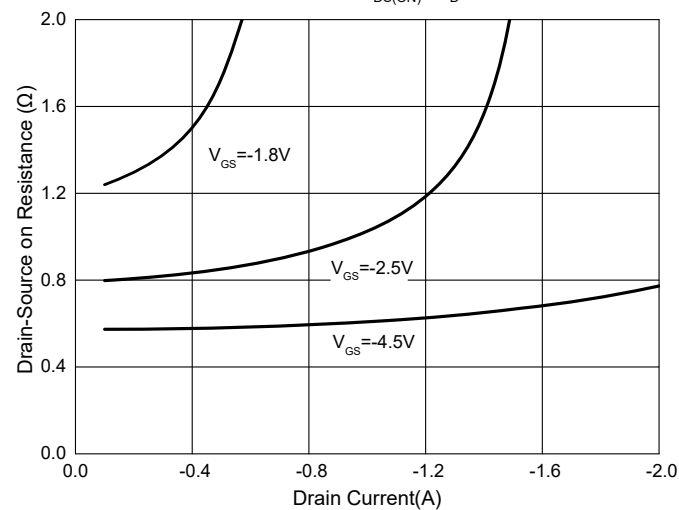


Fig. 5 - Capacitance Characteristics

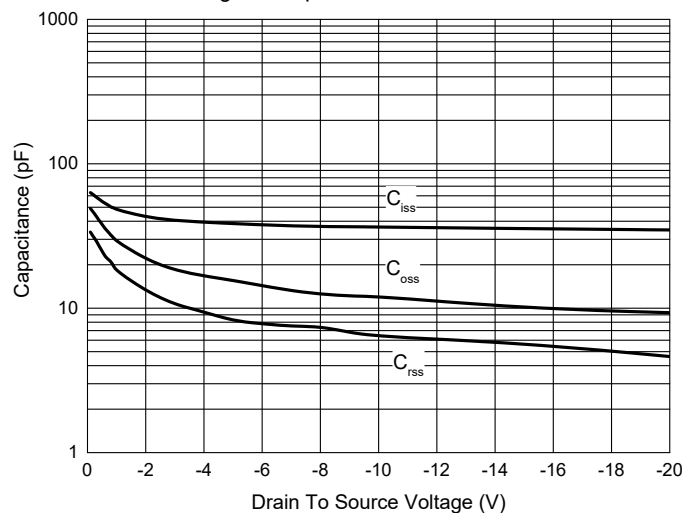
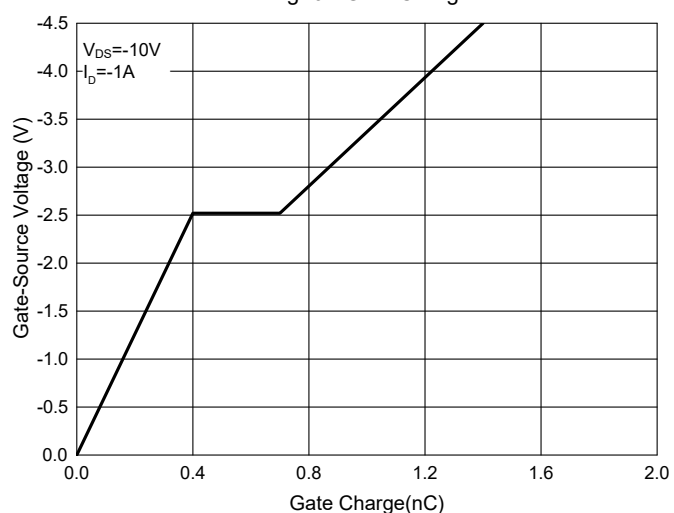


Fig. 6 - Gate Charge



Curve Characteristics (P-Channel)

Fig. 7 - Normalized Threshold voltage

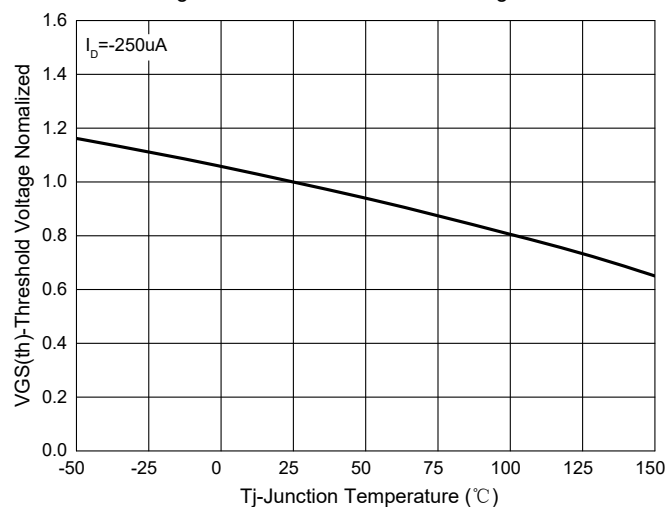


Fig. 8 - Normalized On Resistance Characteristics

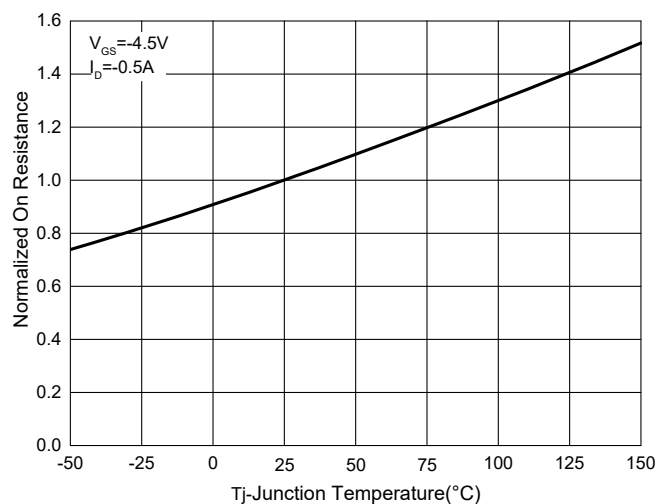


Fig. 9 - $I_S - V_{SD}$

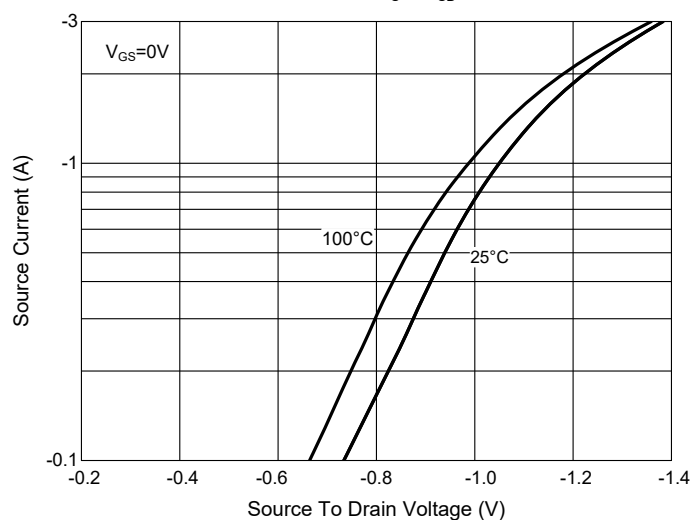


Fig.10 - Drain Current

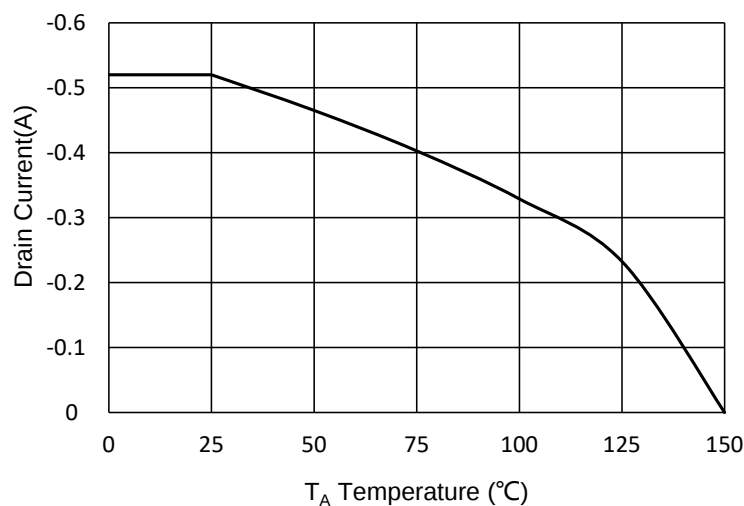
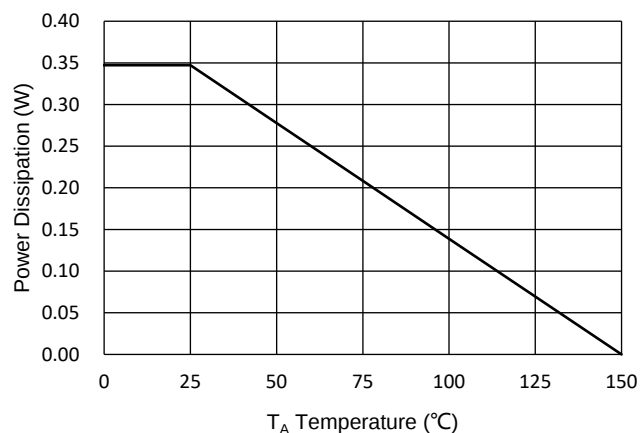


Fig.11 - PD Dissipation



Curve Characteristics (P-Channel)

Fig.12 - Safe Operation Area

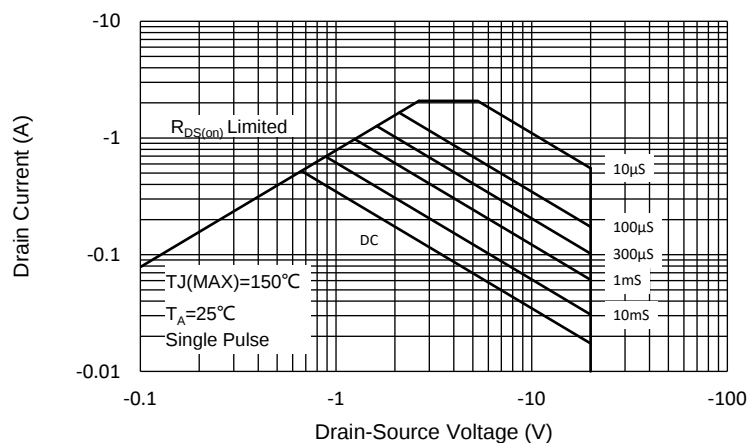
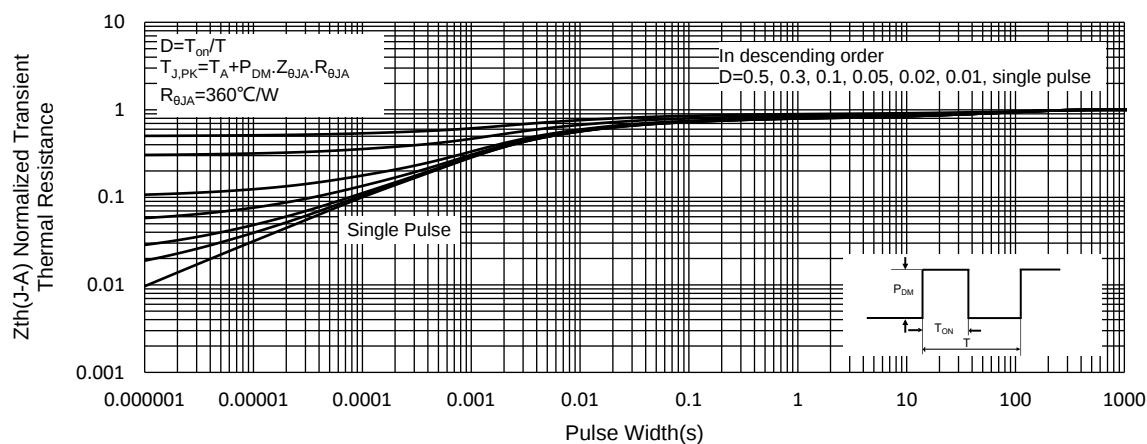


Fig.13 - Normalized Transient Thermal Impedance



Ordering Information

Device	Packing
Part Number-TP	Tape&Reel:5Kpcs/Reel

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