

Features

- Excellent Package For Heat Dissipation
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant (Note2) ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

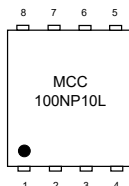
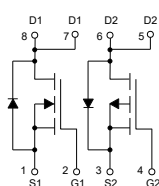
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 60°C/W Junction to Ambient (Note3)
- NMOS: Thermal Resistance: 3.2°C/W Junction to Case
- PMOS: Thermal Resistance: 2.8°C/W Junction to Case

Parameter	Symbol	Rating	Unit
N-Channel MOSFET			
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	$T_C=25^\circ\text{C}$	10	A
	$T_C=100^\circ\text{C}$	6.3	
Pulsed Drain Current (Note4)	I_{DM}	40	A
Total Power Dissipation (Note5)	P_D	39	W
Single Pulsed Avalanche Energy (Note6)	E_{AS}	12	mJ
P-Channel MOSFET			
Drain-Source Voltage	V_{DS}	-100	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	$T_C=25^\circ\text{C}$	-12	A
	$T_C=100^\circ\text{C}$	-7.6	
Pulsed Drain Current (Note4)	I_{DM}	-48	A
Total Power Dissipation (Note5)	P_D	44	W
Single Pulsed Avalanche Energy (Note6)	E_{AS}	49	mJ

Note:

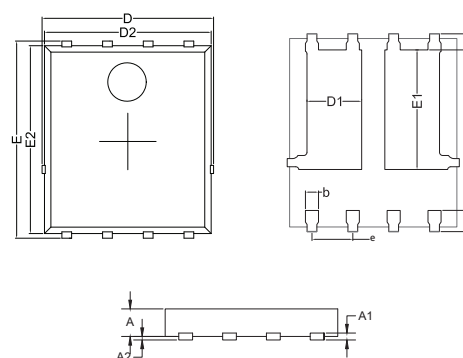
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. High Temperature Solder Exemption Applied, see EU Directive Annex 7a.
3. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$.
4. Repetitive rating; pulse width limited by max. junction temperature.
5. P_D is based on max. junction temperature, using junction-case thermal resistance.
6. NMOS: $T_J=25^\circ\text{C}$, $V_{DD}=95\text{V}$, $V_{GS}=10\text{V}$, $R_G=25\Omega$, $L=0.5\text{mH}$.
PMOS: $T_J=25^\circ\text{C}$, $V_{DD}=-95\text{V}$, $V_{GS}=-10\text{V}$, $R_G=25\Omega$, $L=0.5\text{mH}$.

Internal Structure and Marking Code



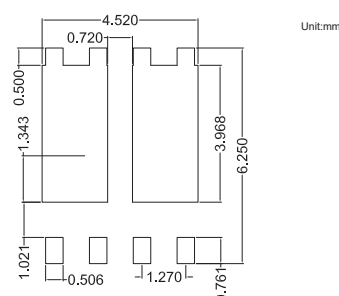
Dual N&P-CHANNEL MOSFET

PDFN5060-8D



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
D	0.203	0.218	5.15	5.55	
D2	0.197	0.213	5.00	5.40	
E	0.234	0.250	5.95	6.35	
E2	0.223	0.238	5.66	6.06	
A	0.039	0.047	1.00	1.20	
A1	0.010		0.254		BSC
A2	0.000	0.004	0.00	0.10	
D1	0.059	0.075	1.50	1.90	
E1	0.139	0.154	3.52	3.92	
L1	0.022	0.030	0.56	0.76	
L2	0.019		0.50		BSC
b	0.012	0.020	0.31	0.51	
e	0.050		1.27		BSC

Suggested Solder Pad Layout



N-Channel 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	100			V
Gate-Source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V			1	μA
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.1	1.8	3.0	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =10A		77	100	mΩ
		V _{GS} =4.5V, I _D =6A		82	107	
Gate Resistance	R _G	f=1MHz, Open Drain		1.7		Ω
Diode Characteristics						
Continuous Body Diode Current	I _S				10	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =10A			1.2	V
Reverse Recovery Time	t _{rr}	I _F =10A, dI _F /dt=100A/μs		32		ns
Reverse Recovery Charge	Q _{rr}			38		nC
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =50V, V _{GS} =0V, f=1MHz		850		pF
Output Capacitance	C _{oss}			31		
Reverse Transfer Capacitance	C _{rss}			29		
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =50V, I _D =10A		23		nC
Gate-Source Charge	Q _{gs}			2.8		
Gate-Drain Charge	Q _{gd}			6.7		
Turn-On Delay Time	t _{d(on)}	V _{GS} =10V, V _{DD} =50V I _{DS} =10A, R _G =2.2Ω		8.6		ns
Turn-On Rise Time	t _r			20.4		
Turn-Off Delay Time	t _{d(off)}			21.6		
Turn-Off Fall Time	t _f			2.2		

P-Channel 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	-100			V
Gate-Source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-100V, V _{GS} =0V			-1	μA
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-1.0	-1.8	-2.5	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-10A		79	110	mΩ
		V _{GS} =-4.5V, I _D =-6A		87	120	
Gate Resistance	R _G	f=1MHz, Open Drain		10		Ω
Diode Characteristics						
Continuous Body Diode Current	I _S				-12	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =-12A			-1.2	V
Reverse Recovery Time	t _{rr}	I _F =-10A, dI _F /dt=100A/μs		59		ns
Reverse Recovery Charge	Q _{rr}			90		nC
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =-50V, V _{GS} =0V, f=1MHz		1060		pF
Output Capacitance	C _{oss}			110		
Reverse Transfer Capacitance	C _{rss}			8		
Total Gate Charge	Q _g	V _{GS} =-10V, V _{DS} =-50V, I _D =-10A		19.5		nC
Gate-Source Charge	Q _{gs}			4.4		
Gate-Drain Charge	Q _{gd}			3.7		
Turn-On Delay Time	t _{d(on)}	V _{GS} =-10V, V _{DD} =-50V I _D =-10A, R _G =3Ω		7.4		ns
Turn-On Rise Time	t _r			31		
Turn-Off Delay Time	t _{d(off)}			48		
Turn-Off Fall Time	t _f			65		

Curve Characteristics(N-Channel)

Fig. 1 - Typical Output Characteristics

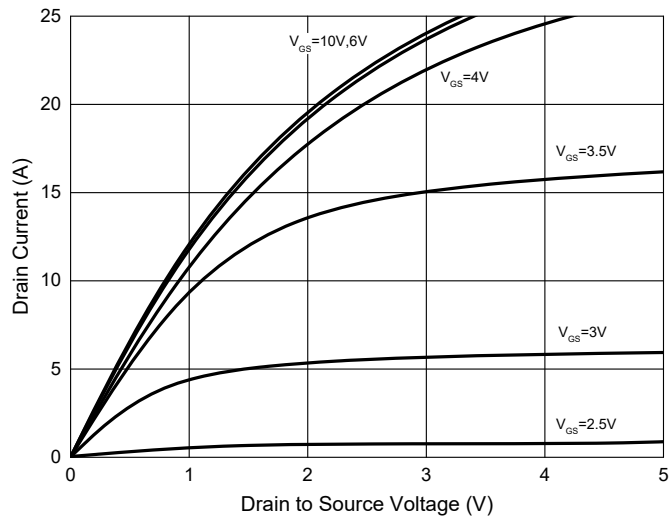


Fig. 2 - Transfer Characteristics

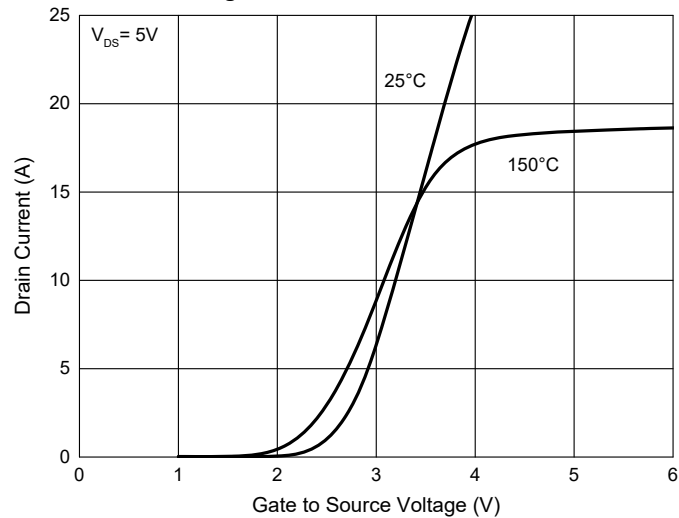


Fig. 3 - $R_{DS(ON)}-V_{GS}$

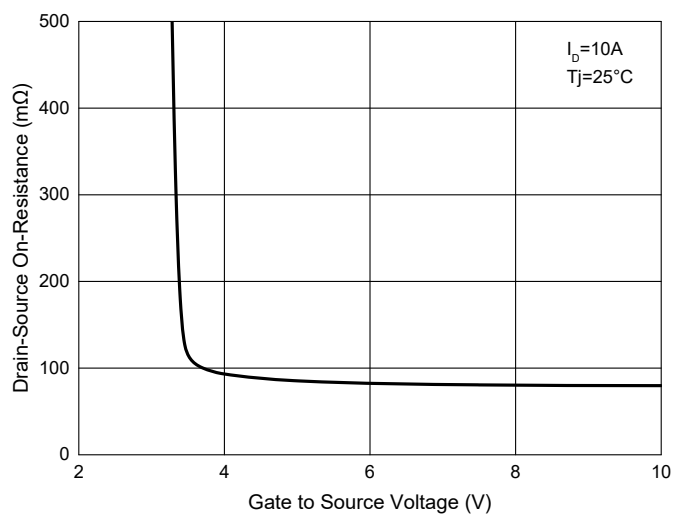


Fig. 4 - $R_{DS(ON)}-I_D$

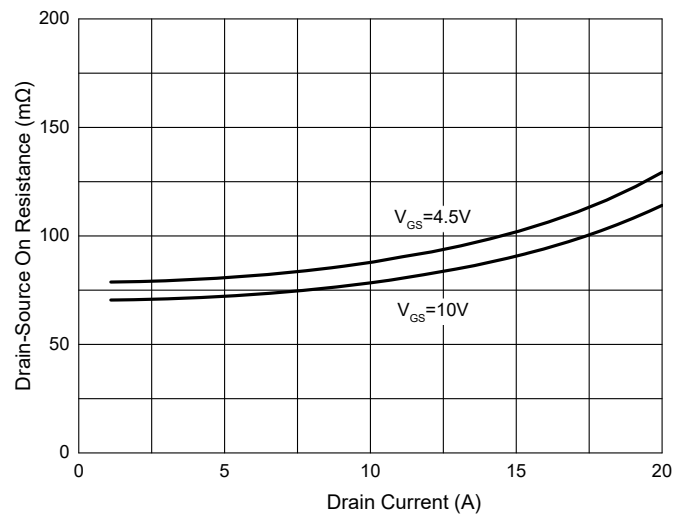


Fig. 5 - Capacitance Characteristics

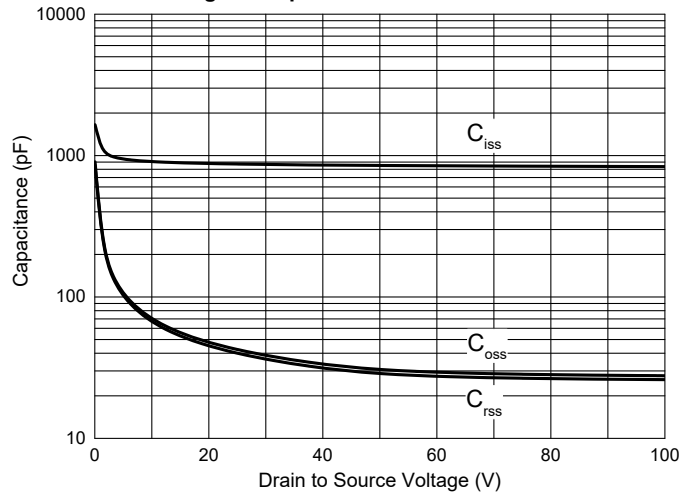
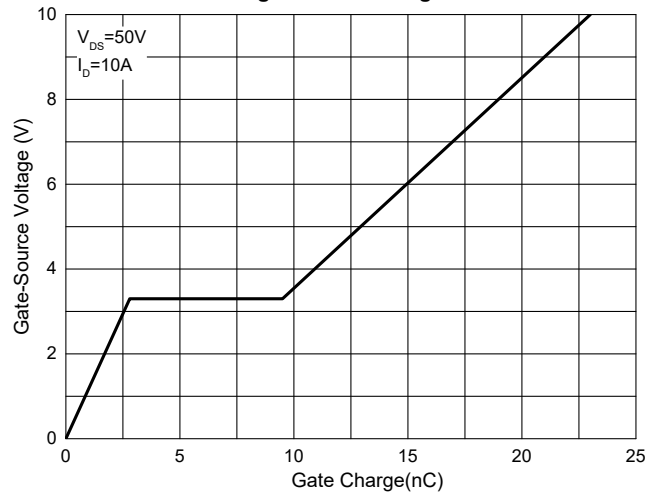


Fig. 6 - Gate Charge



Curve Characteristics(N-Channel)

Fig. 7 - Normalized Threshold Voltage

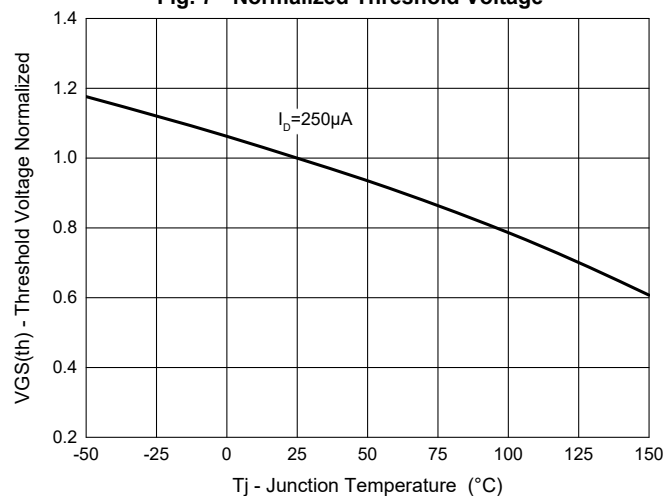


Fig. 8 - Normalized On Resistance Characteristics

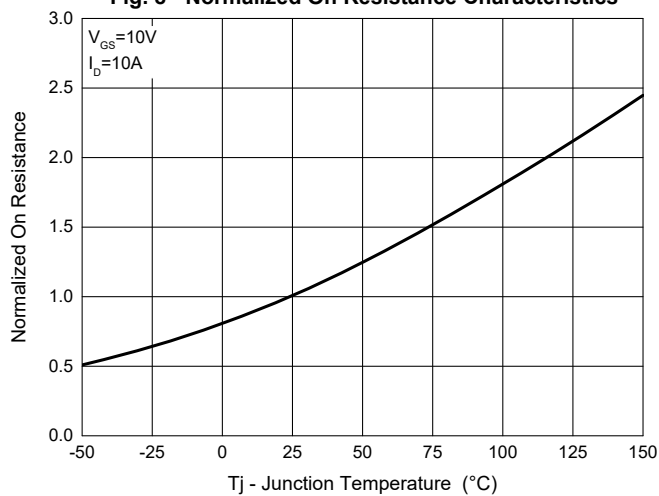


Fig. 9 - I_S - V_{SD}

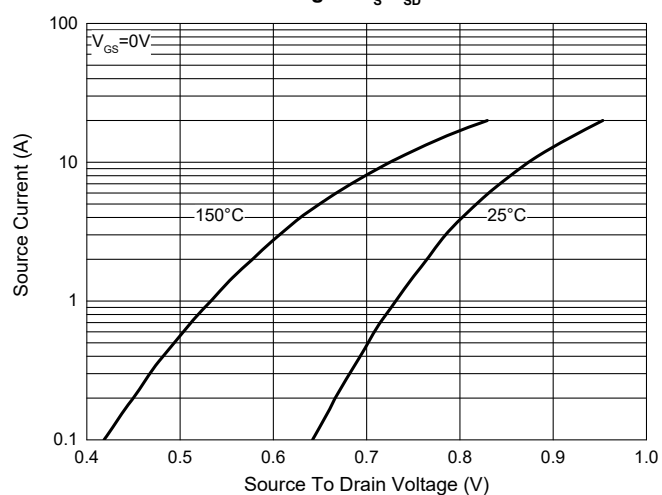


Fig. 10 - Drain Current

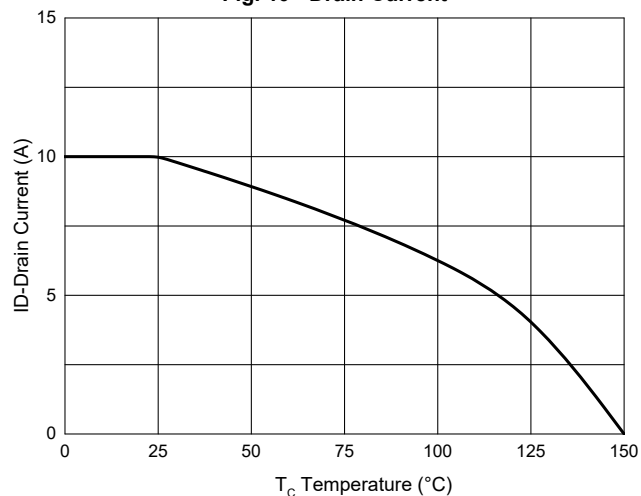
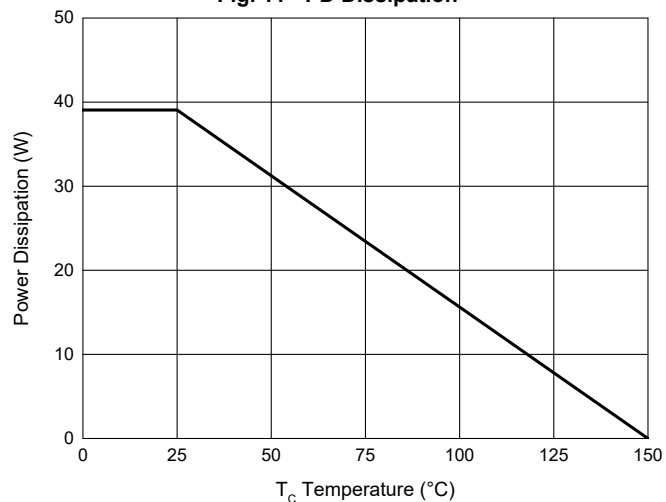


Fig. 11 - PD Dissipation



Curve Characteristics(N-Channel)

Fig. 12 - Safe Operation Area

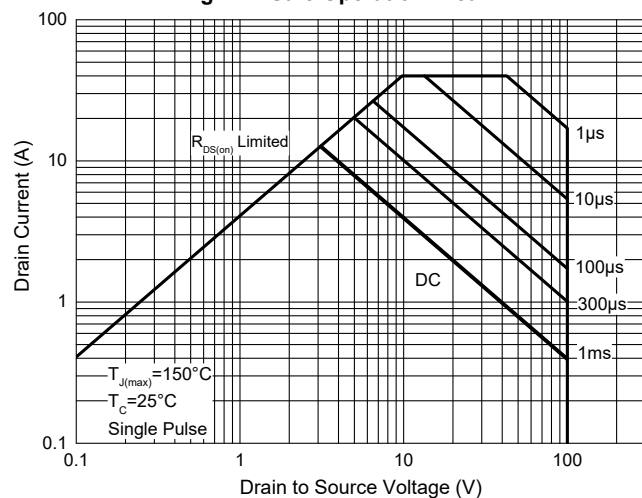
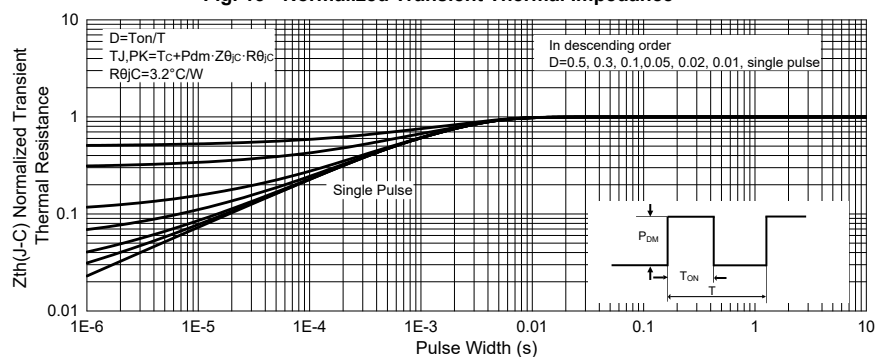


Fig. 13 - Normalized Transient Thermal Impedance



Curve Characteristics(P-Channel)

Fig. 1 - Typical Output Characteristics

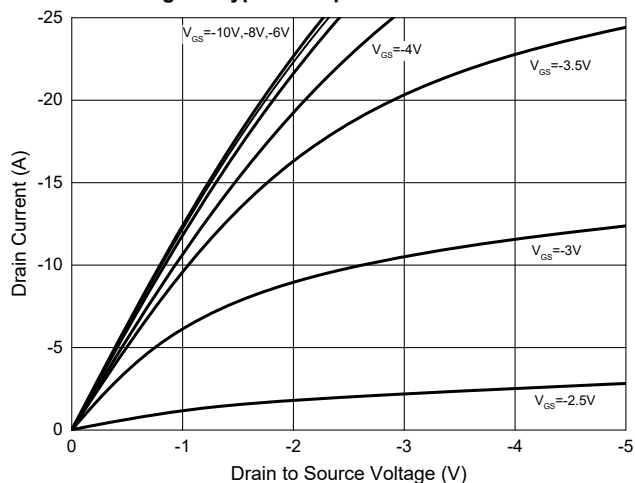


Fig. 2 - Transfer Characteristics

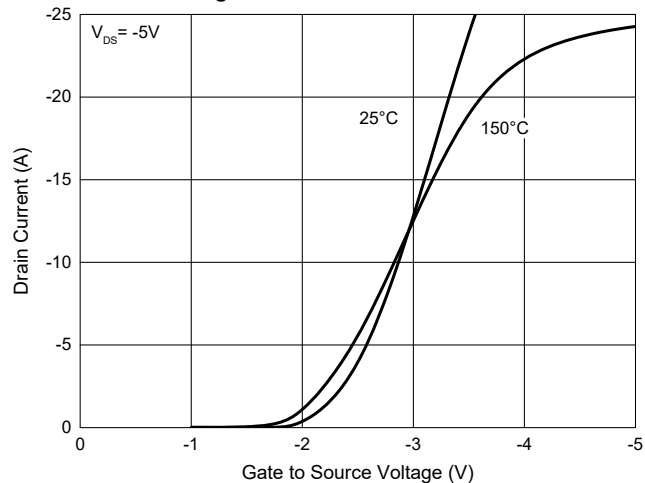


Fig. 3 - $R_{DS(ON)}$ - V_{GS}

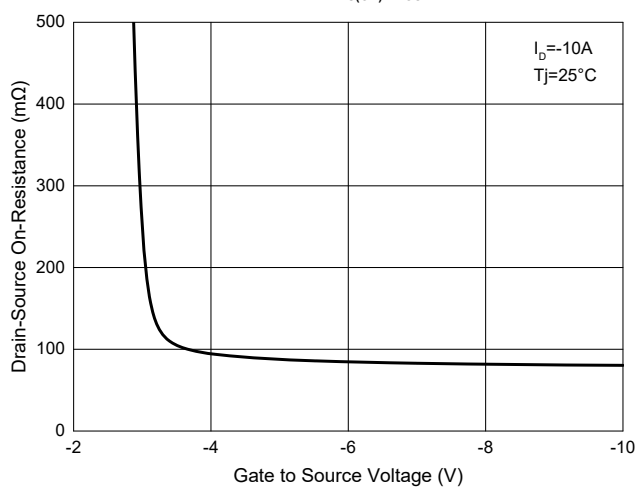


Fig. 4 - $R_{DS(ON)}$ - I_D

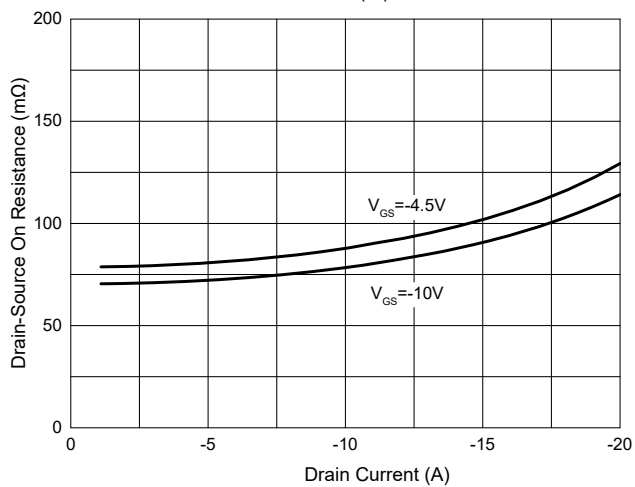


Fig. 5 - Capacitance Characteristics

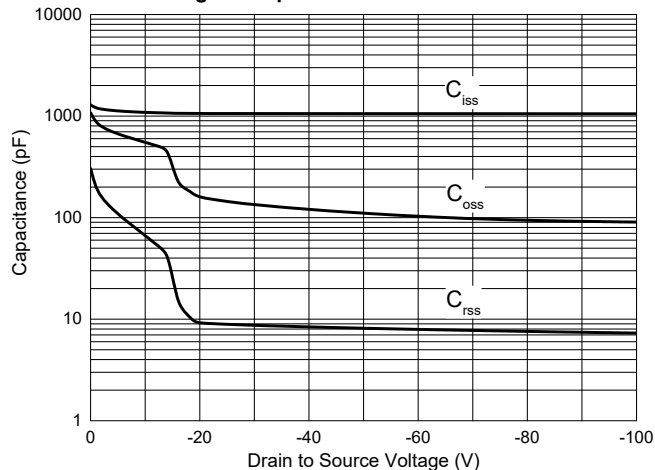
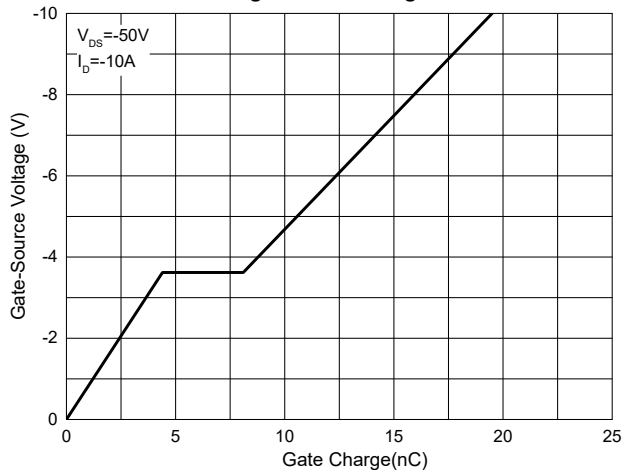


Fig. 6 - Gate Charge



Curve Characteristics(P-Channel)

Fig. 7 - Normalized Threshold Voltage

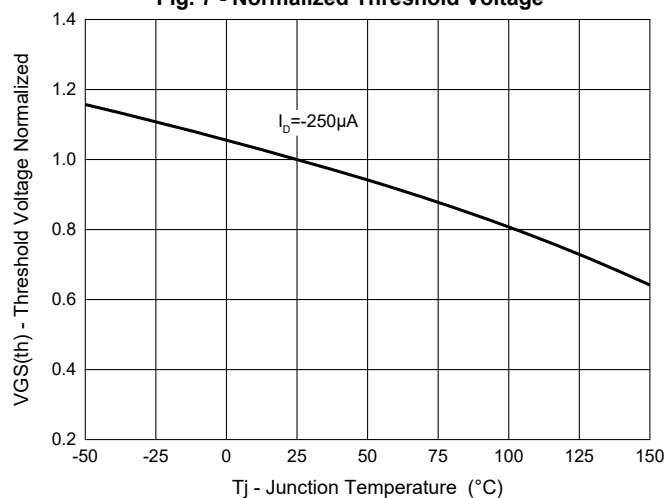


Fig. 8 - Normalized On Resistance Characteristics

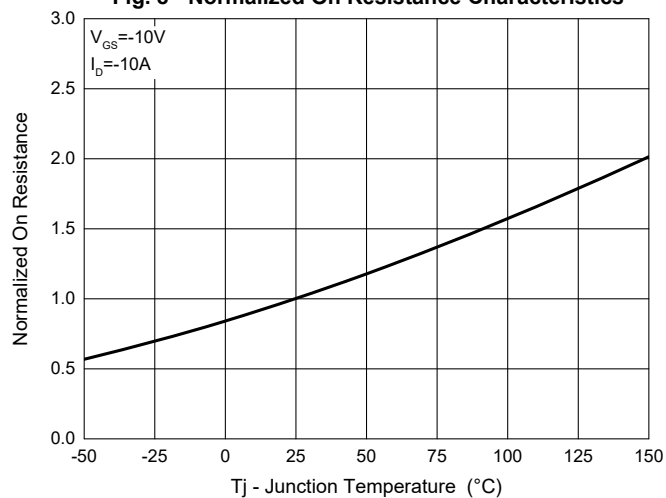


Fig. 9 - I_S - V_{SD}

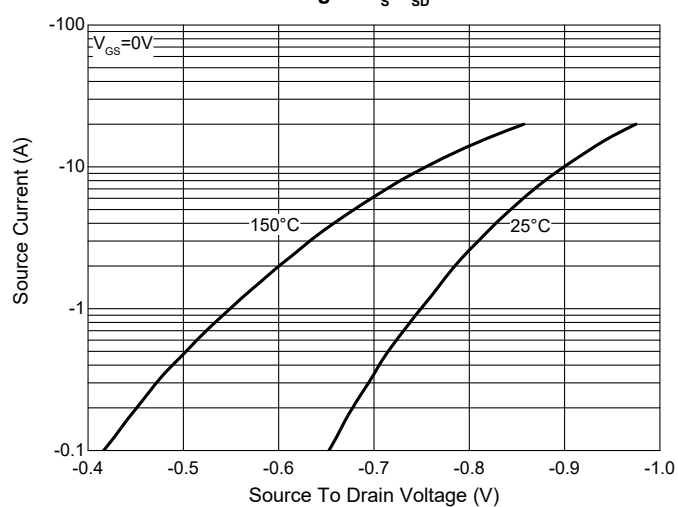


Fig. 10 - Drain Current

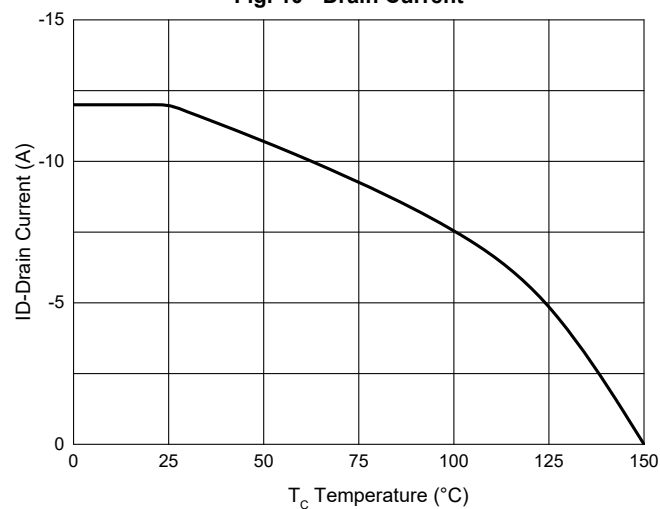
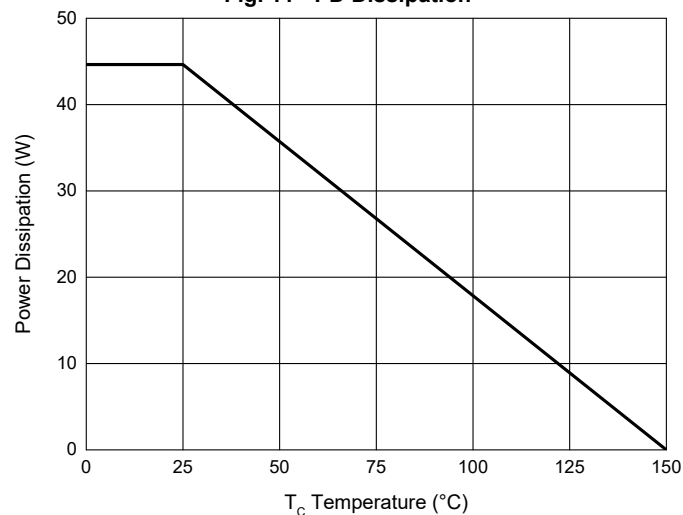


Fig. 11 - PD Dissipation



Curve Characteristics(P-Channel)

Fig. 12 - Safe Operation Area

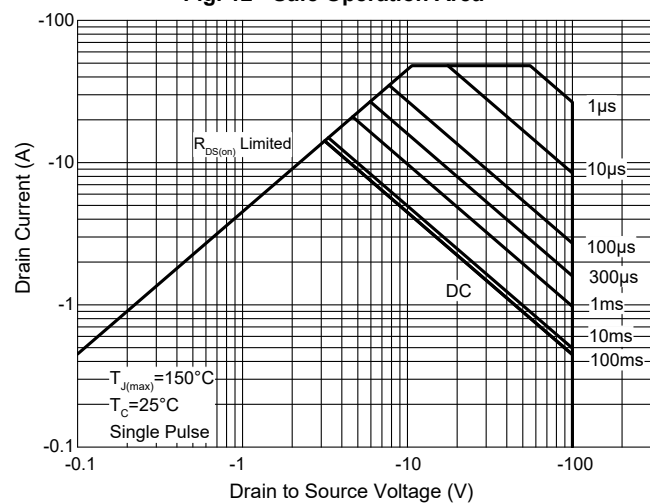
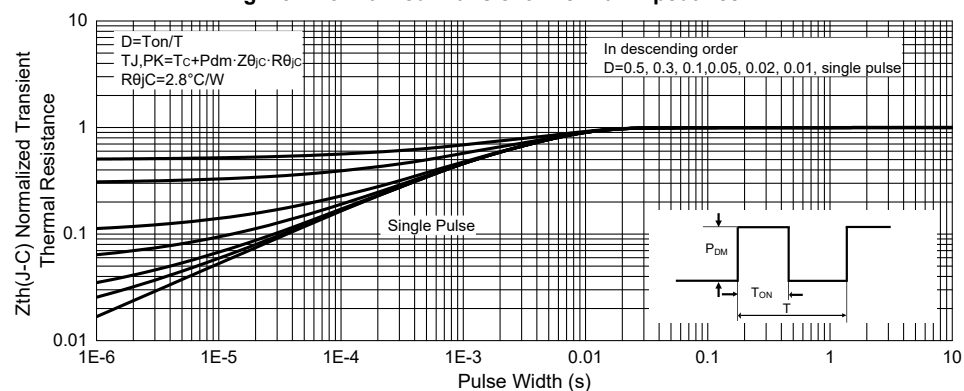


Fig. 13 - Normalized Transient Thermal Impedance



Ordering Information

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

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