

Features

- Trench Power LV MOSFET Technology
- Moisture Sensitivity Level 3
- 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

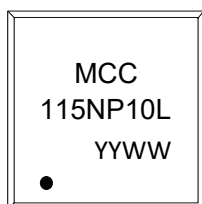
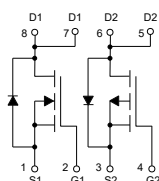
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 75°C/W Junction to Ambient^(Note2)
- NMOS: Thermal Resistance: 4°C/W Junction to Case
- PMOS: Thermal Resistance: 5.2°C/W Junction to Case

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°C	I _D	10	A
	T _C =100°C		6.3	
Pulsed Drain Current ^(Note 3)		I _{DM}	40	A
Total Power Dissipation ^(Note4)		P _D	31	W
Single Pulsed Avalanche Energy ^(Note5)		E _{AS}	8	mJ
P-Channel MOSFET				
Drain-Source Voltage		V _{DS}	-100	V
Gate-Source Voltage		V _{GS}	±20	V
Continuous Drain Current	T _C =25°C	I _D	-5.5	A
	T _C =100°C		-3.4	
Pulsed Drain Current ^(Note 3)		I _{DM}	-22	A
Total Power Dissipation ^(Note4)		P _D	24	W
Single Pulsed Avalanche Energy ^(Note5)		E _{AS}	6.1	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. 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-case thermal resistance.
5. NMOS: $T_J=25$, $V_{DD}=50\text{V}$, $V_{GS}=10\text{V}$, $R_G=25\Omega$, $L=0.5\text{mH}$.
PMOS: $T_J=25$, $V_{DD}=-50\text{V}$, $V_{GS}=-10\text{V}$, $R_G=25\Omega$, $L=0.5\text{mH}$.

Internal Structure and Marking Code

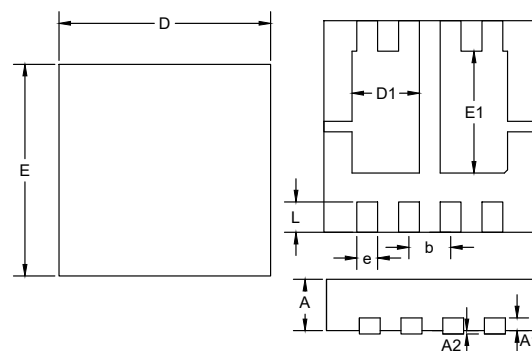


pin1

4 codes in total
YY is the year
WW is the week

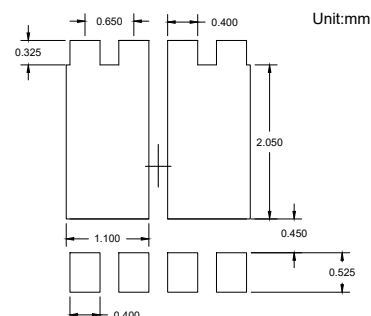
Dual N&P-CHANNEL MOSFET

DFN3333-D



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.030	0.033	0.750	0.850	
A1	0.008		0.200		TYP
A2	-	0.002	-	0.050	
D	0.128	0.132	3.250	3.350	
E	0.128	0.132	3.250	3.350	
D1	0.039	0.043	1.000	1.100	
E1	0.073	0.077	1.850	1.950	
b	0.026		0.650		BSC
e	0.012	0.014	0.300	0.350	
L	0.017	0.021	0.425	0.525	

Suggested Solder Pad Layout



N-Channel MOSFE 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	1.3	1.8	2.3	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =10A		87	115	mΩ
		V _{GS} =4.5V, I _D =5A		88	125	
Gate Resistance	R _g	f=1 MHz, 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}			37		nC
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =50V, V _{GS} =0V, f=1MHz		851		pF
Output Capacitance	C _{oss}			30		
Reverse Transfer Capacitance	C _{rss}			28		
Total Gate Charge	Q _g	V _{DS} =50V, V _{GS} =10V, 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 _{DD} =50V, V _{GS} =10V R _G =2.2Ω, I _D =10A		8.5		ns
Turn-On Rise Time	t _r			20		
Turn-Off Delay Time	t _{d(off)}			21		
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	-1.5	-2	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-5A		250	325	mΩ
		V _{GS} =-4.5V, I _D =-3A		260	350	
Gate Resistance	R _g	f=1 MHz, Open Drain		5		Ω
Diode Characteristics						
Continuous Body Diode Current	I _S				-5.5	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =-5A			-1.2	V
Reverse Recovery Time	t _{rr}	I _F =-5A, dI _F /dt=100A/μs		28.4		ns
Reverse Recovery Charge	Q _{rr}			48.7		nC
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =-50V, V _{GS} =0V, f=1MHz		949		pF
Output Capacitance	C _{oss}			24		
Reverse Transfer Capacitance	C _{rss}			21		
Total Gate Charge	Q _g	V _{DS} =-50V, V _{GS} =-10V, I _D =-5A		18.4		nC
Gate-Source Charge	Q _{gs}			1.4		
Gate-Drain Charge	Q _{gd}			2.2		
Turn-On Delay Time	t _{d(on)}	V _{DD} =-50V, V _{GS} =-10V R _G =2.7Ω, I _D =-5A		7		ns
Turn-On Rise Time	t _r			32.4		
Turn-Off Delay Time	t _{d(off)}			26.2		
Turn-Off Fall Time	t _f			6.4		

N-MOSFET Curve Characteristics

Fig. 1 - Typical Output Characteristics

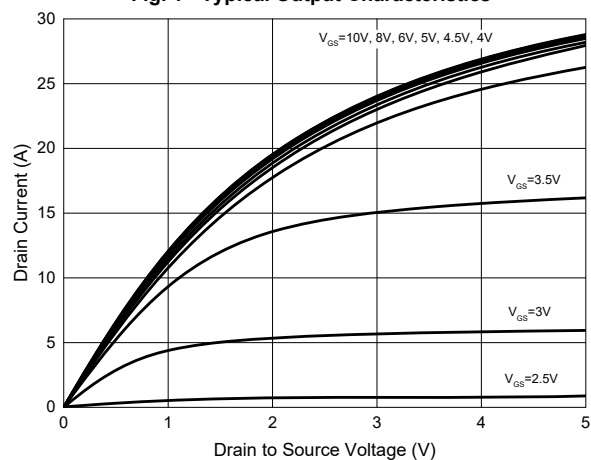


Fig. 2 - Transfer Characteristics

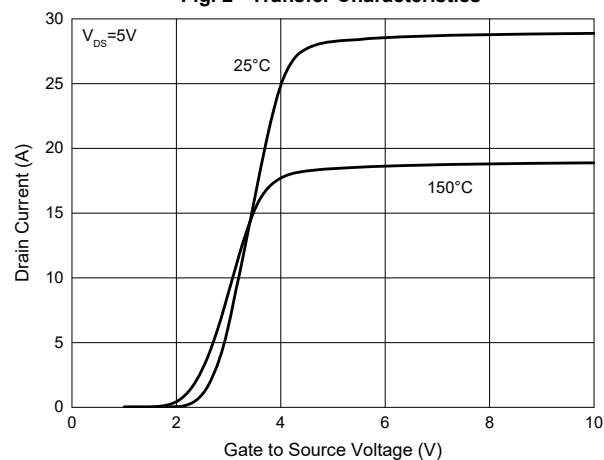


Fig. 3 - $R_{DS(ON)}$ - V_{GS}

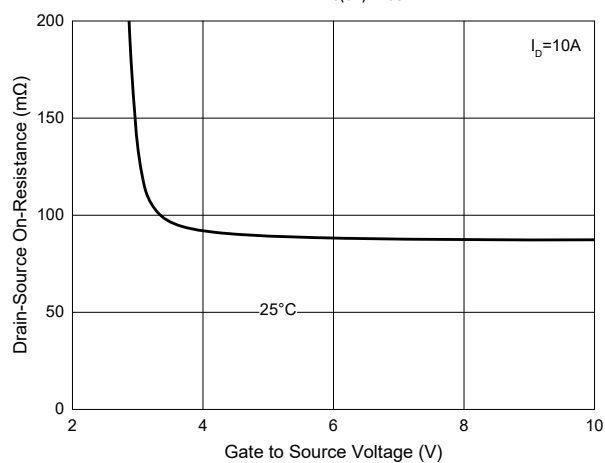


Fig. 4 - $R_{DS(ON)}$ - I_D

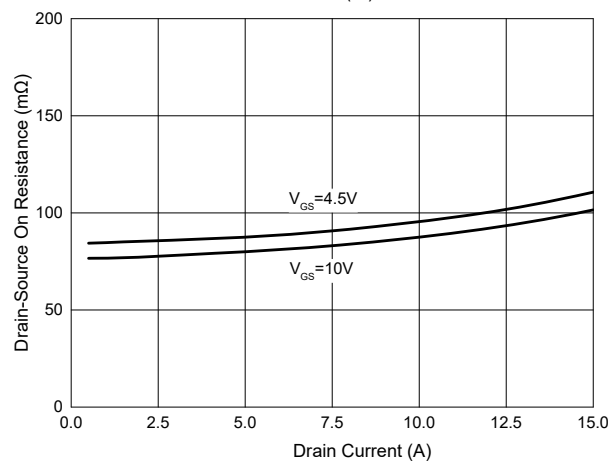


Fig. 5 - Capacitance Characteristics

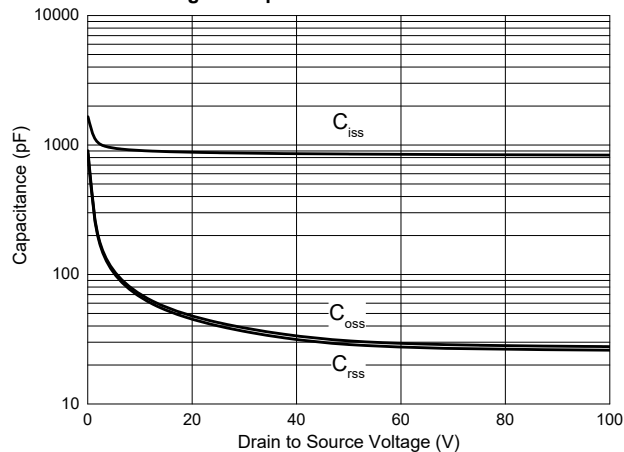
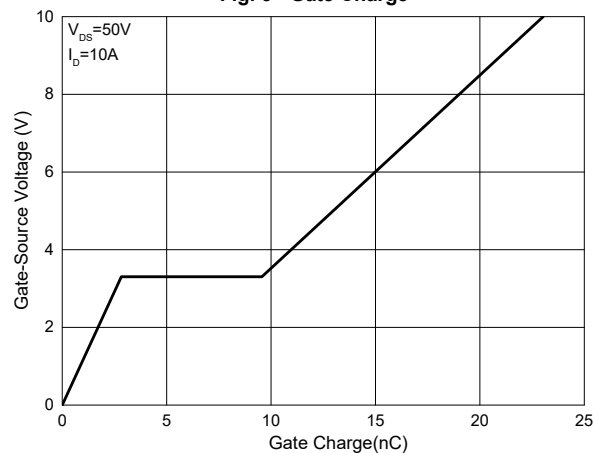


Fig. 6 - Gate Charge



N-MOSFET Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

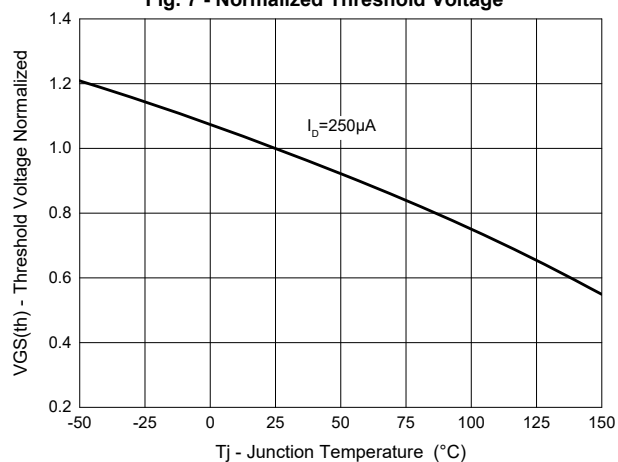


Fig. 8 - Normalized On Resistance Characteristics

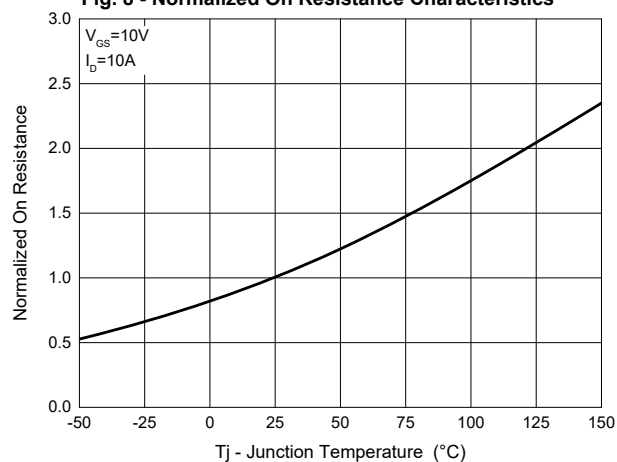


Fig. 9 - I_S - V_{SD}

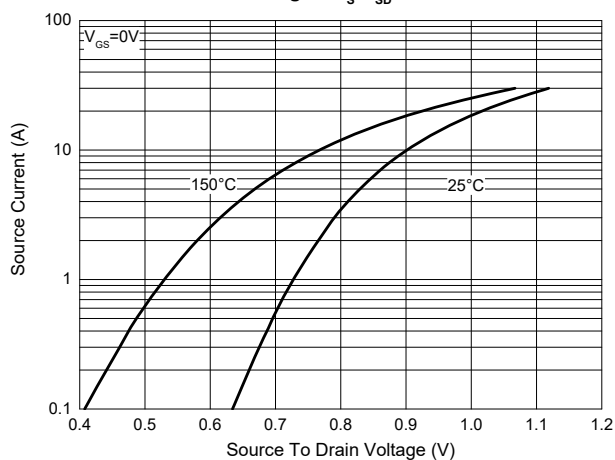


Fig. 10 - Drain Current

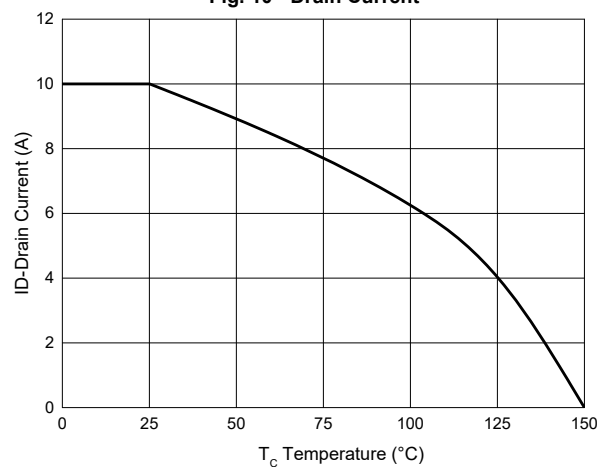
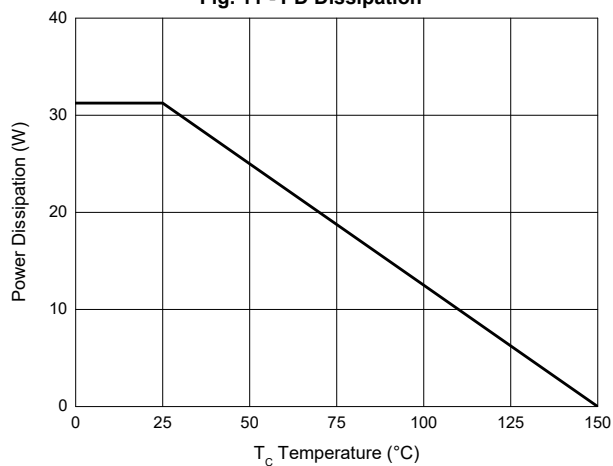


Fig. 11 - PD Dissipation



N-MOSFET Curve Characteristics

Fig. 12 - Safe Operation Area

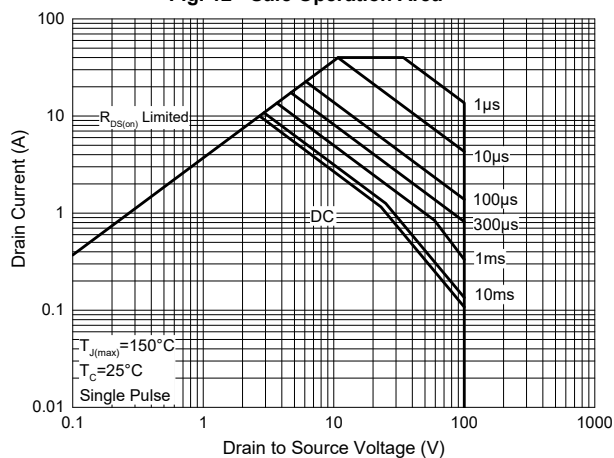
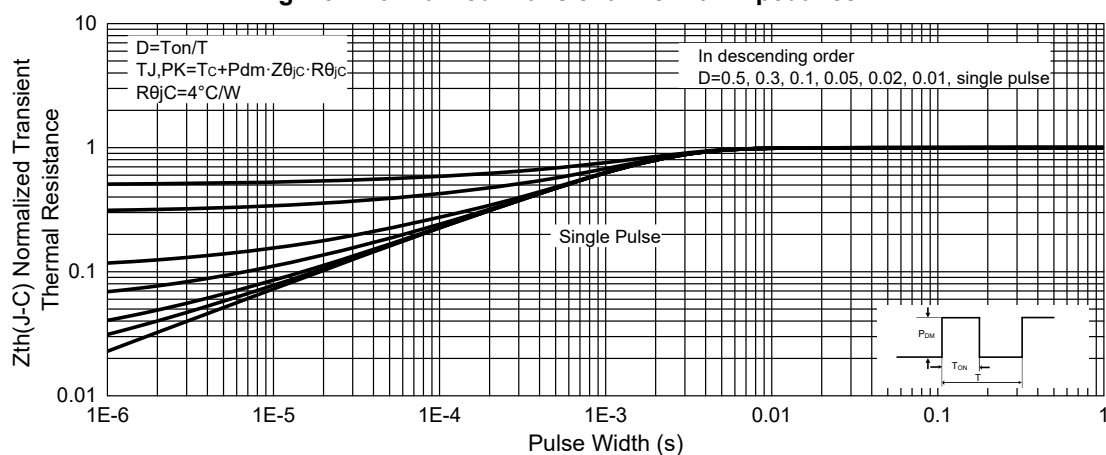


Fig. 13 - Normalized Transient Thermal Impedance



P-MOSFET Curve Characteristics

Fig. 1 - Typical Output Characteristics

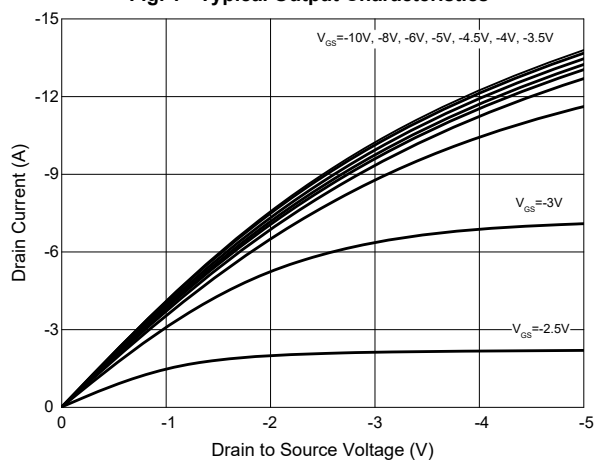


Fig. 2 - Transfer Characteristics

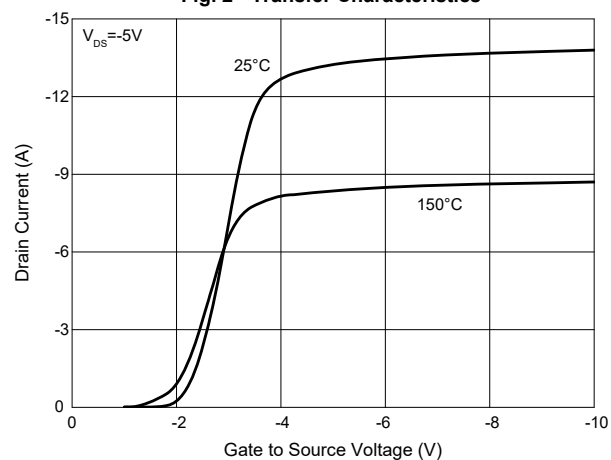


Fig. 3 - $R_{DS(ON)}$ - V_{GS}

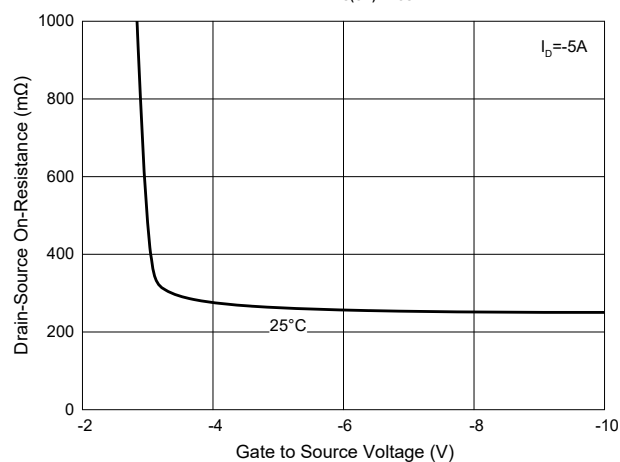


Fig. 4 - $R_{DS(ON)}$ - I_D

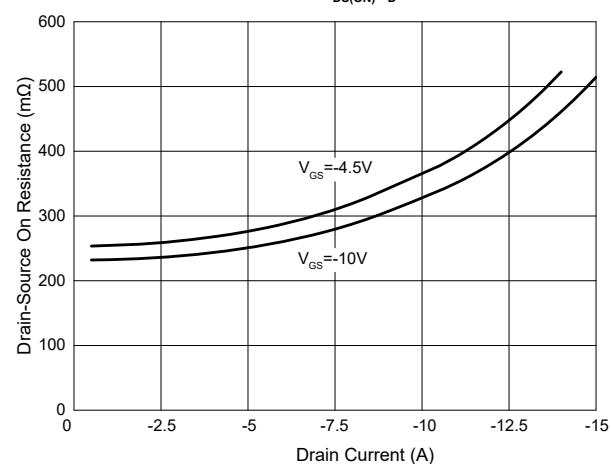


Fig. 5 - Capacitance Characteristics

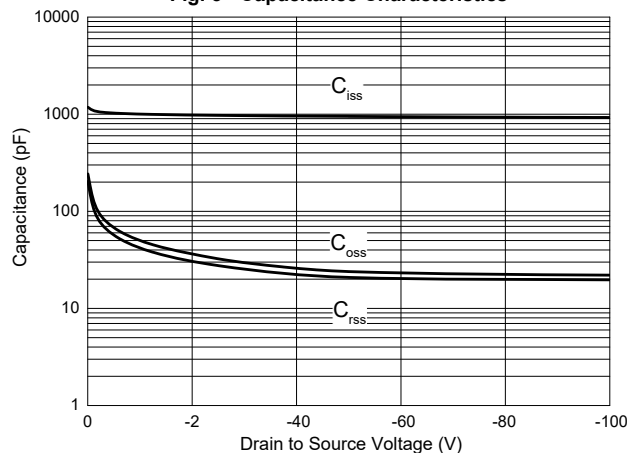
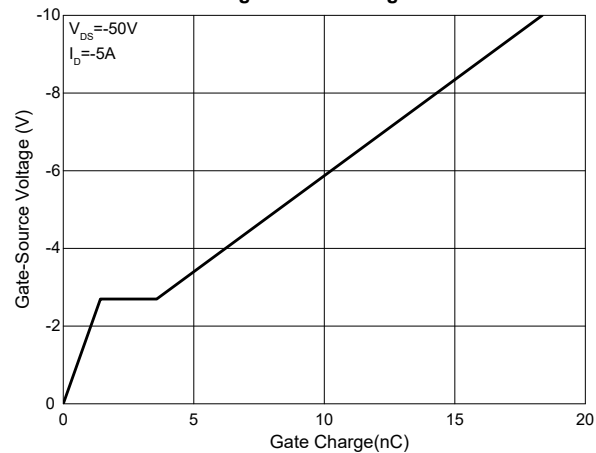


Fig. 6 - Gate Charge



P-MOSFET Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

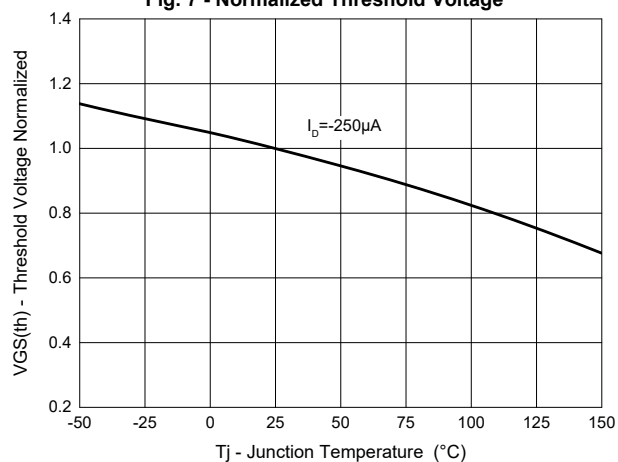


Fig. 8 - Normalized On Resistance Characteristics

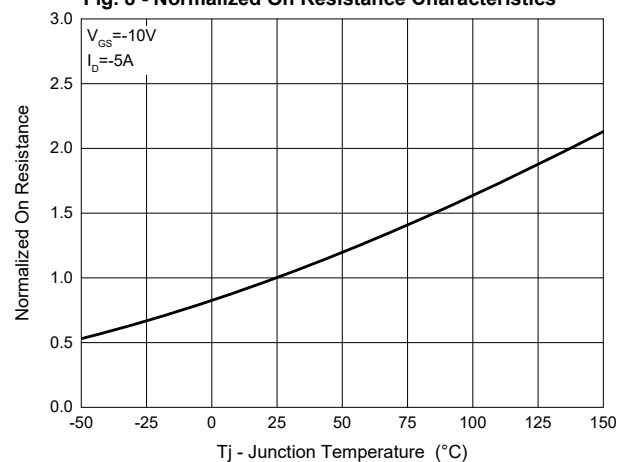


Fig. 9 - I_S - V_{SD}

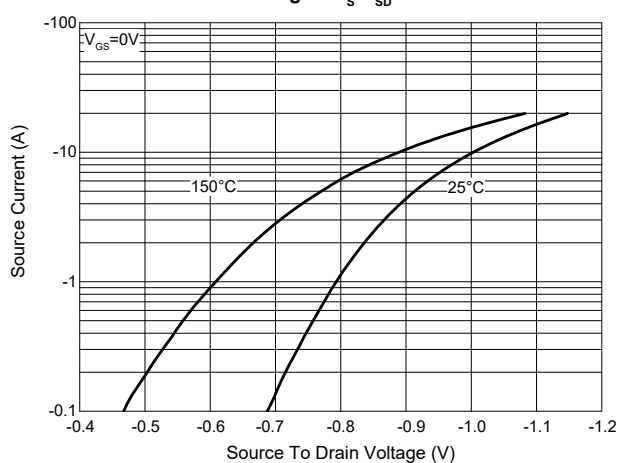


Fig. 10 - Drain Current

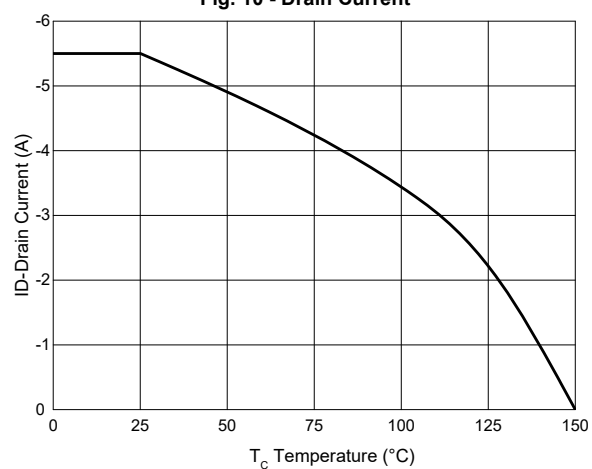
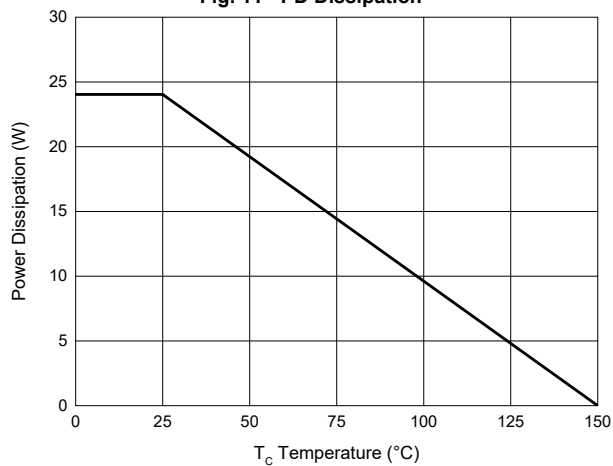


Fig. 11 - PD Dissipation



P-MOSFET Curve Characteristics

Fig. 12 - Safe Operation Area

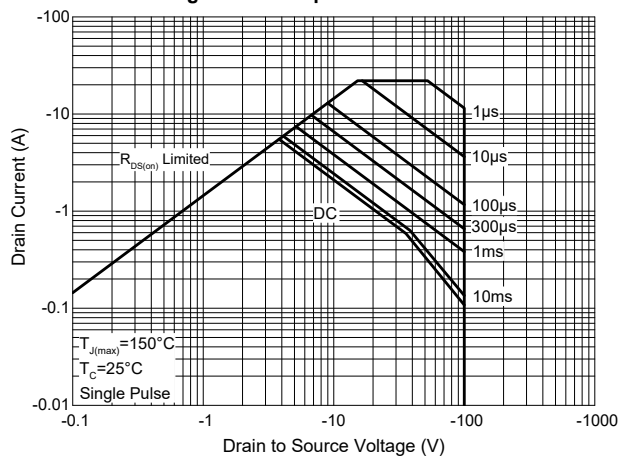
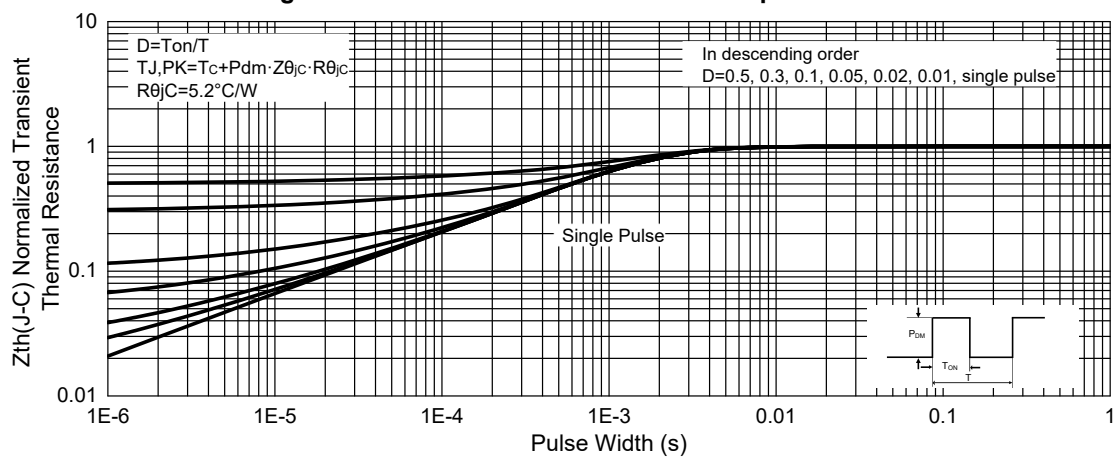


Fig. 13 - Normalized Transient Thermal Impedance



Ordering Information

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

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