

## Features

- Trench MOSFET Technology
- Excellent Package For Heat Dissipation
- 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

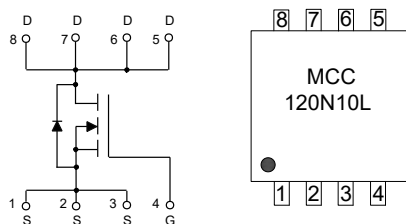
- Operating Junction Temperature Range : -55°C to +175°C
- Storage Temperature Range: -55°C to +175°C
- Thermal Resistance: 60°C/W Junction to Ambient (Note2)
- Thermal Resistance: 4.2°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	10
		$T_C=100^\circ\text{C}$	7
Pulsed Drain Current (Note3)	$I_{DM}$	40	A
Total Power Dissipation (Note4)	$P_D$	35	W
Single Pulsed Avalanche Energy (Note5)	$E_{AS}$	18	mJ

Note:

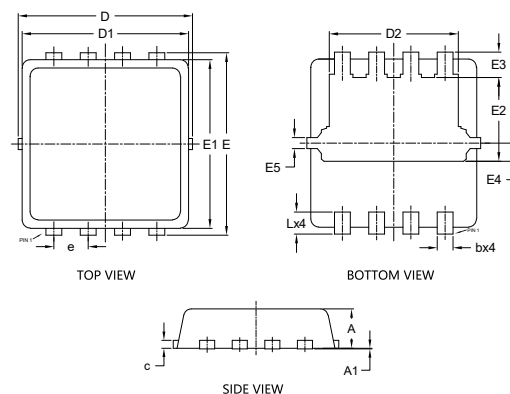
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment 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.  $T_J=25^\circ\text{C}, V_{DD}=55\text{V}, V_{GS}=10\text{V}, R_G=25\Omega, L=0.5\text{mH}$ .

## Internal Structure and Marking Code



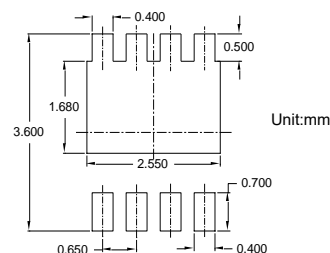
# N-CHANNEL MOSFET

## PDFN3333



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.028	0.033	0.70	0.85	
A1	0.000	0.002	0.00	0.05	
b	0.008	0.016	0.20	0.40	
c	0.004	0.010	0.10	0.25	
D	0.124	0.136	3.15	3.45	
D1	0.118	0.130	3.00	3.30	
D2	0.089	0.104	2.25	2.65	
E	0.124	0.136	3.15	3.45	
E1	0.114	0.126	2.90	3.20	
E2	0.052	0.068	1.32	1.72	
E3	0.011	0.026	0.28	0.65	
E4	0.013		0.330		TYP
E5	0.008		0.200		TYP
e	0.026		0.650		BSC
L	0.012	0.020	0.300	0.500	

### Suggested Solder Pad Layout



**Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	100			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V$			1	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.3	1.8	2.3	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=8A$		90	120	m $\Omega$
		$V_{GS}=4.5V, I_D=6A$		92	130	
Gate Resistance	$R_g$	f=1 MHz, Open drain		3.5		$\Omega$
<b>Diode Characteristics</b>						
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	$t_{rr}$	$I_F=10A, dI_F/dt=100A/\mu s$		27		ns
Reverse Recovery Charge	$Q_{rr}$			25		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=50V, V_{GS}=0V, f=1MHz$		998		pF
Output Capacitance	$C_{oss}$			28		
Reverse Transfer Capacitance	$C_{riss}$			22		
Total Gate Charge	$Q_g$	$V_{DS}=50V, V_{GS}=10V, I_D=10A$		19		nC
Gate-Source Charge	$Q_{gs}$			3		
Gate-Drain Charge	$Q_{gd}$			3.6		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=50V, V_{GS}=10V, R_{GEN}=2.2\Omega, I_D=10A$		6.5		ns
Turn-On Rise Time	$t_r$			21		
Turn-Off Delay Time	$t_{d(off)}$			21		
Turn-Off Fall Time	$t_f$			2.2		

Curve Characteristics

Fig.1 - Typical Output Characteristics

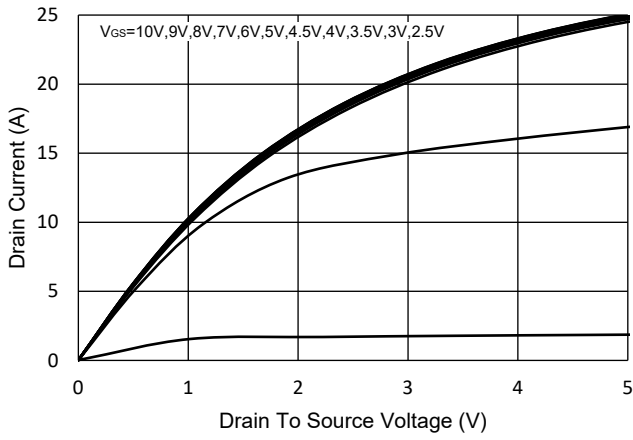


Fig.2 - Transfer Characteristic

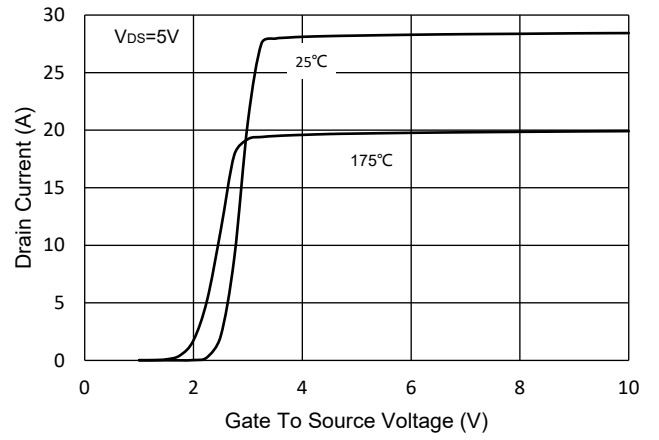


Fig. 3 -  $R_{DS(ON)} - V_{GS}$

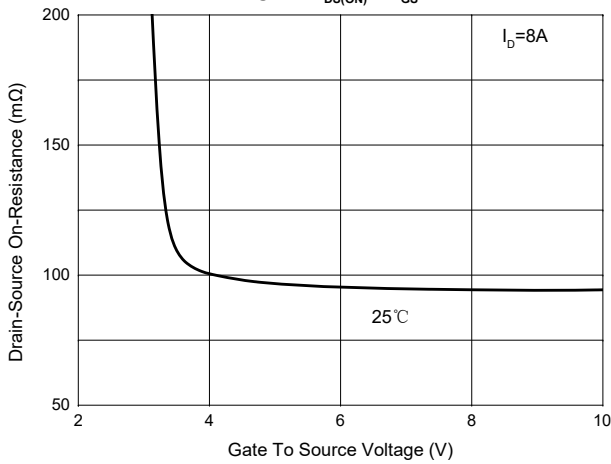


Fig. 4 -  $R_{DS(ON)} - I_D$

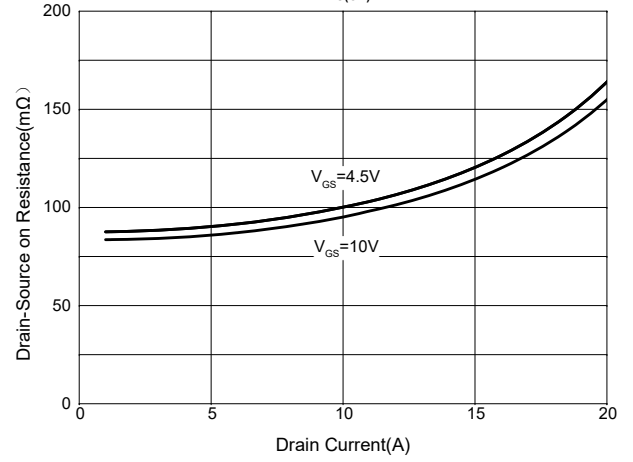


Fig.5 - Capacitance Characteristics

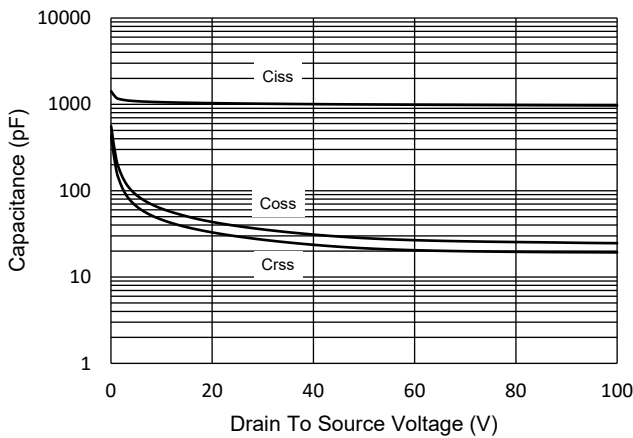
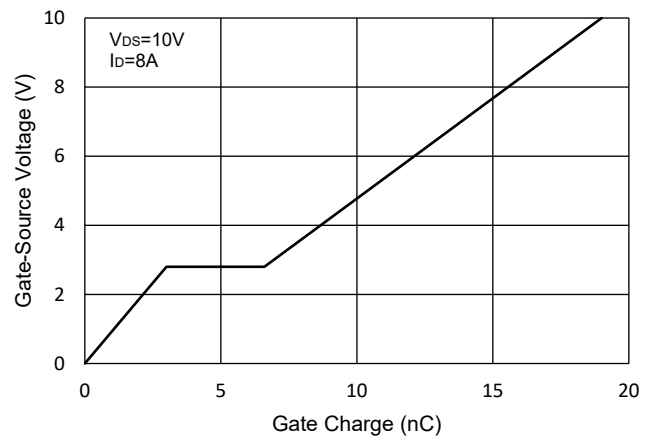
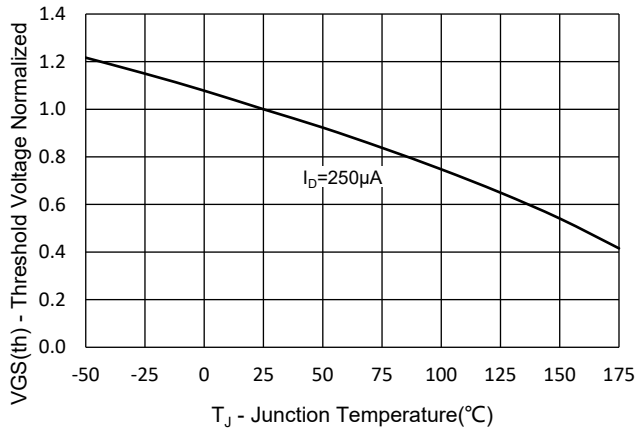


Fig.6 - Gate Charge

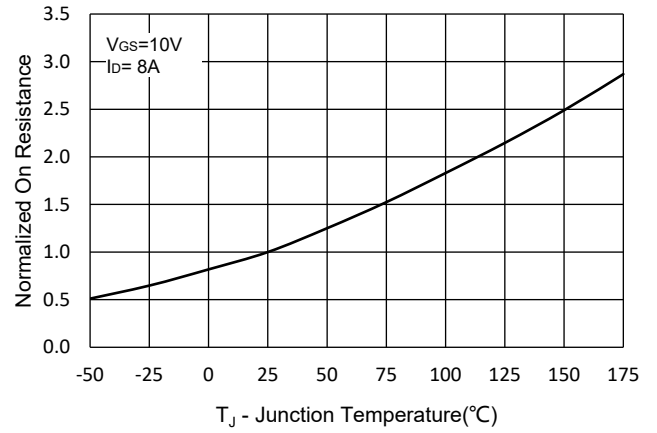


**Curve Characteristics**

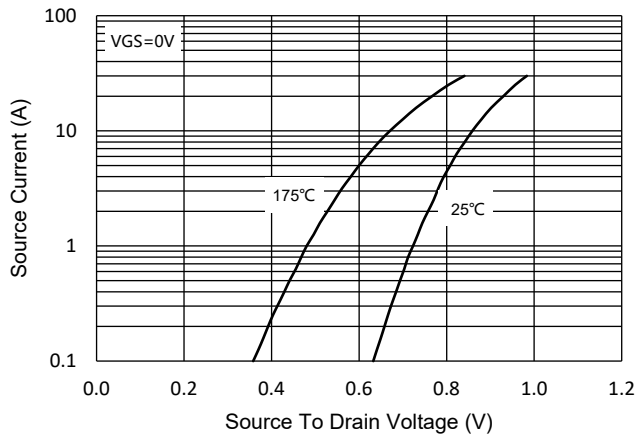
**Fig.7 - Normalized Threshold Voltage**



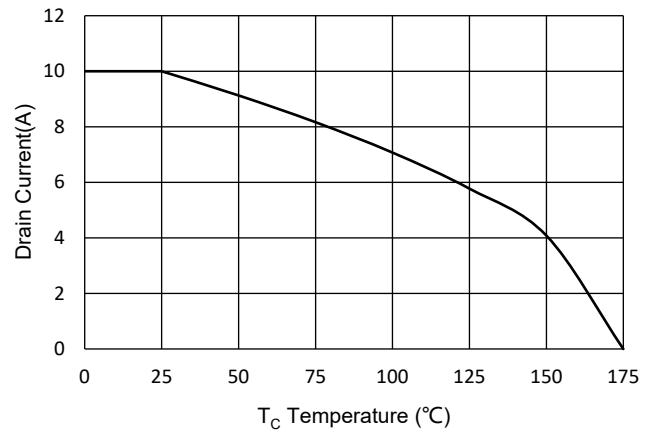
**Fig.8 - Normalized On Resistance Characteristics**



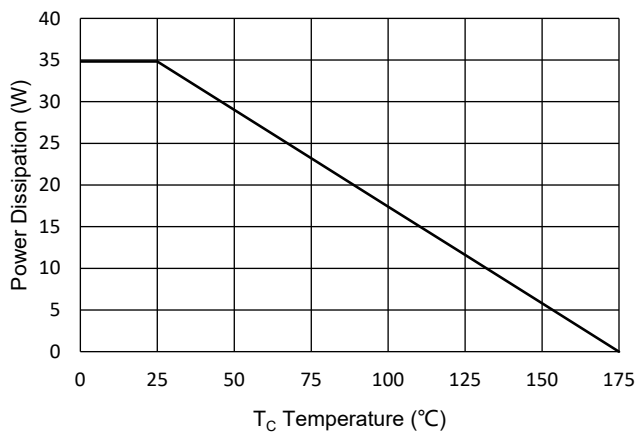
**Fig.9 - I<sub>S</sub> - V<sub>SD</sub>**



**Fig.10 - Drain Current**



**Fig.11 - PD Dissipation**



Curve Characteristics

Fig.12 - Safe Operation Area

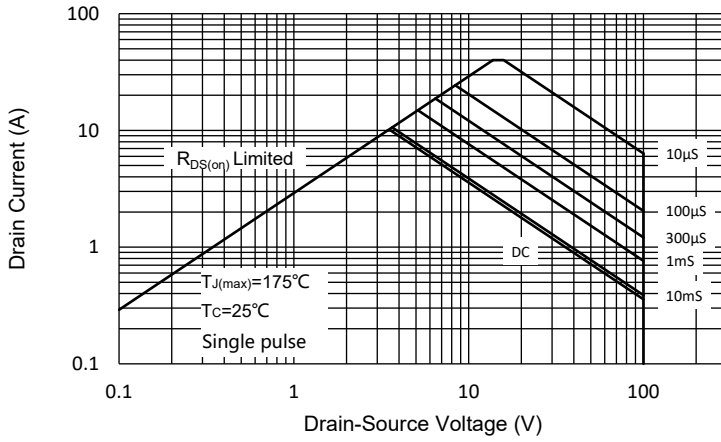
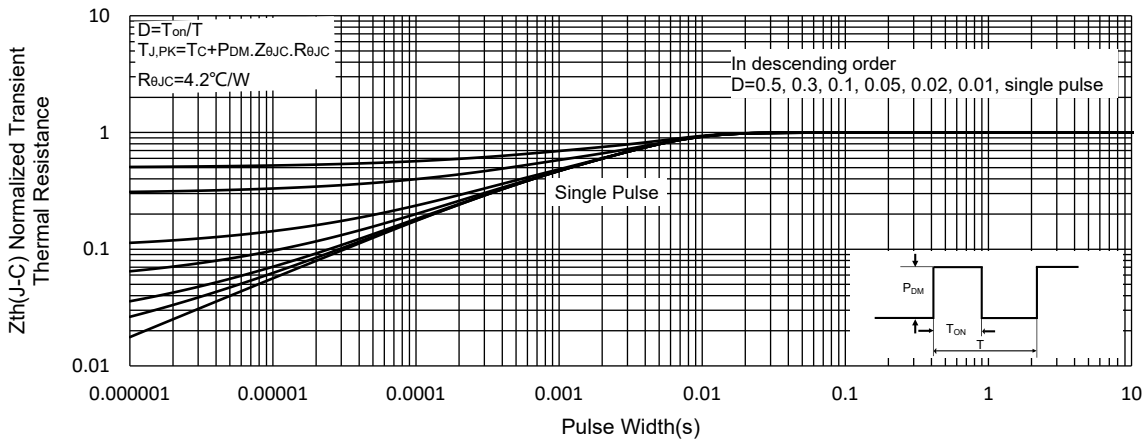


Fig.13 - Normalized Transient Thermal Impedance



## Ordering Information

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

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