

## Features

- Split Gate Trench MOSFET Technology
- High Density Cell Design for Low RDS(ON)
- 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

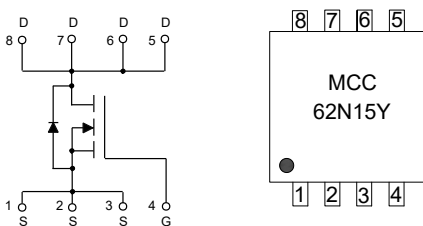
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 60°C/W Junction to Ambient(Note3)
- Thermal Resistance: 2.4°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	150	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	14
		$T_C=100^\circ\text{C}$	8.8
Pulsed Drain Current(Note4)	$I_{DM}$	56	A
Total Power Dissipation(Note5)	$P_D$	52	W
Single Pulsed Avalanche Energy(Note6)	$E_{AS}$	7	mJ

Note:

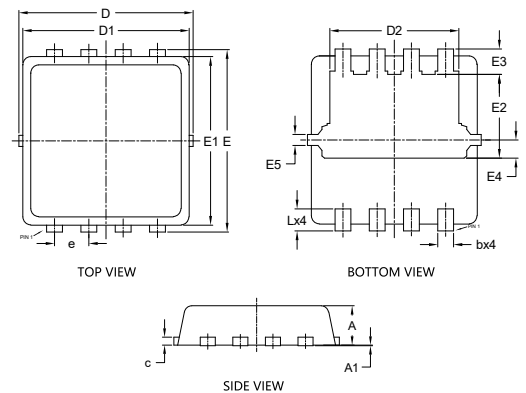
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. High Temperature Solder Exemption Applied, see EU Directive Annex 7a.
3. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> 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.  $T_J=25^\circ\text{C}, V_{DD}=150\text{V}, V_{GS}=10\text{V}, R_G=25\Omega, L=0.5\text{mH}$ .

## Internal Structure and Marking Code



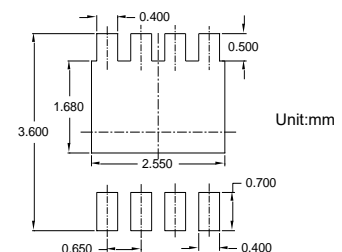
# N-CHANNEL MOSFET

## PDFN3333



DIM	DIMENSIONS				NOTE
	INCHES		MM		
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

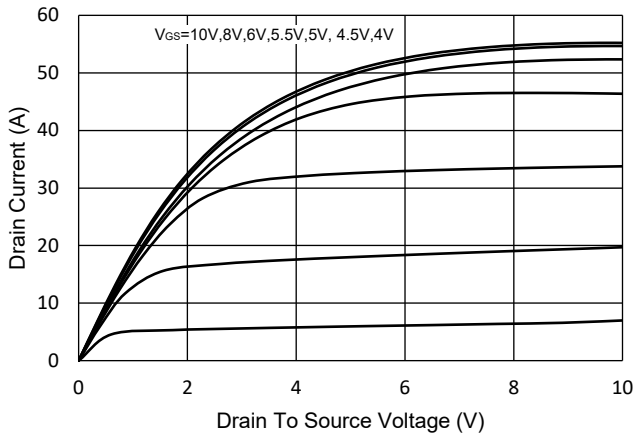


**Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

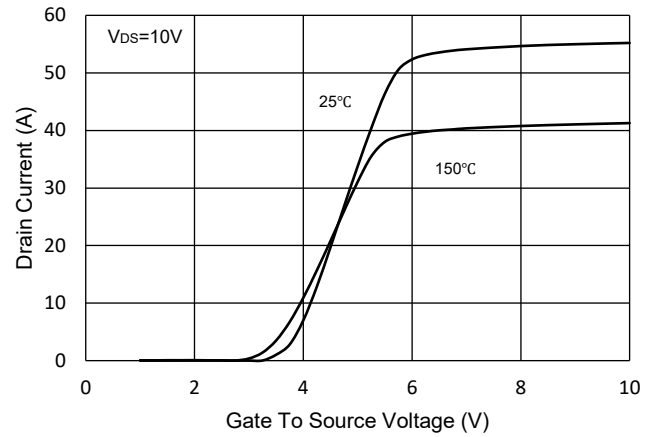
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	150			V
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=150V, V_{GS}=0V$			1	$\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	2.8	4.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=5A$		50	62	m $\Omega$
		$V_{GS}=6V, I_D=3A$		55	80	
Gate Resistance	$R_g$	f=1MHz, Open Drain		1.0		$\Omega$
<b>Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$				14	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=5A$			1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=5A, dI_F/dt=100A/\mu s$		41		ns
Reverse Recovery Charge	$Q_{rr}$			235		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=75V, V_{GS}=0V, f=1MHz$		784		pF
Output Capacitance	$C_{oss}$			55		
Reverse Transfer Capacitance	$C_{riss}$			4		
Total Gate Charge	$Q_g$	$V_{DS}=75V, V_{GS}=10V, I_D=5A$		16		nC
Gate-Source Charge	$Q_{gs}$			3		
Gate-Drain Charge	$Q_{gd}$			4		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=75V, V_{GS}=10V, I_{DS}=5A, R_G=2.2\Omega$		7		ns
Turn-On Rise Time	$t_r$			20		
Turn-Off Delay Time	$t_{d(off)}$			16		
Turn-Off Fall Time	$t_f$			14		

**Curve Characteristics**

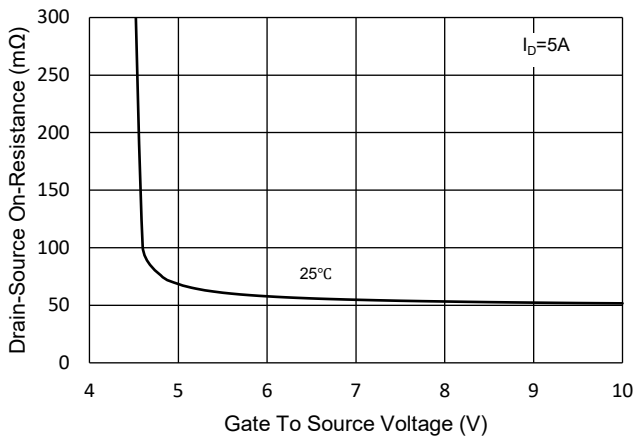
**Fig.1 - Typical Output Characteristics**



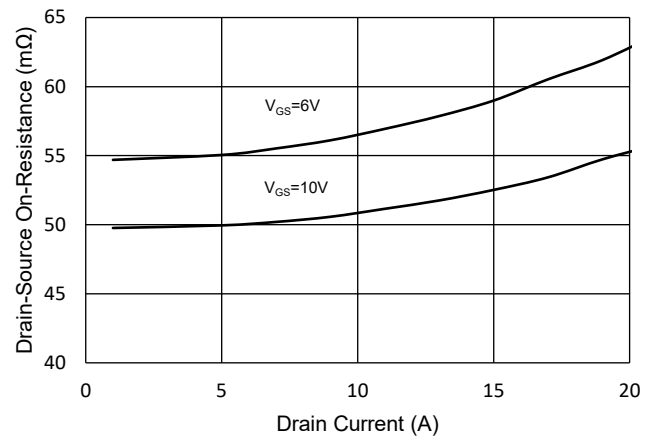
**Fig.2 - Transfer Characteristics**



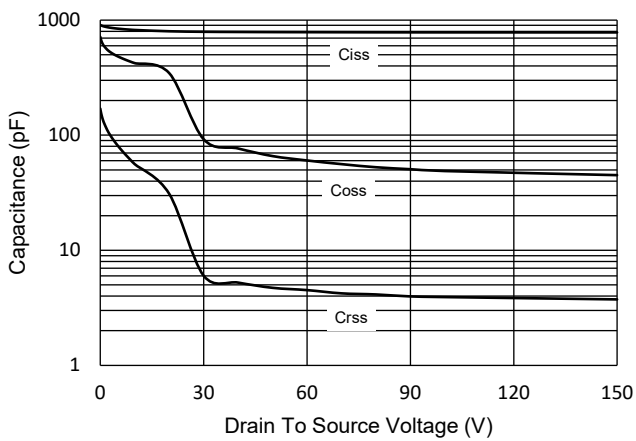
**Fig.3 -  $R_{DS(ON)}$  -  $V_{GS}$**



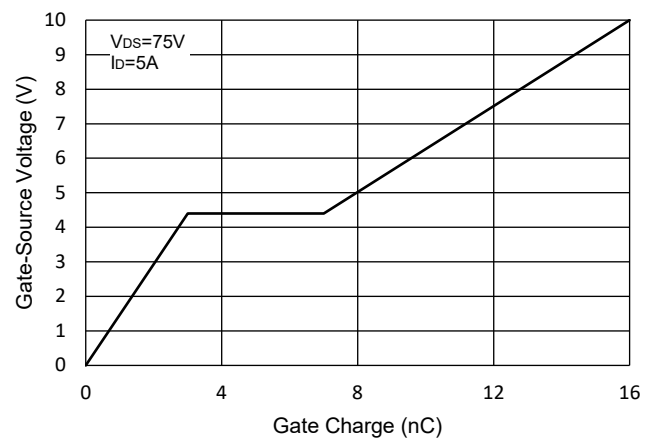
**Fig.4 -  $R_{DS(ON)}$  -  $I_D$**



**Fig.5 - Capacitance Characteristics**

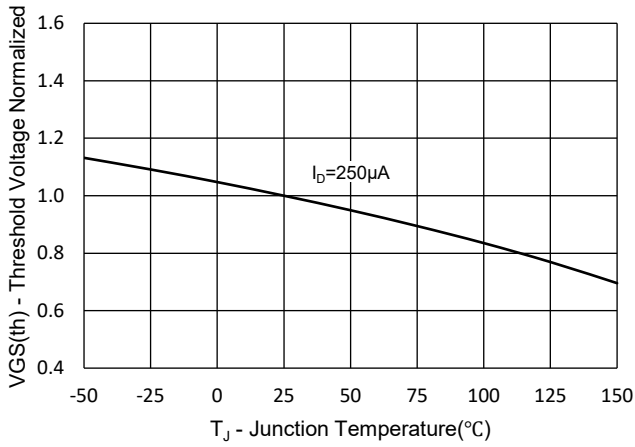


**Fig.6 - Gate Charge**

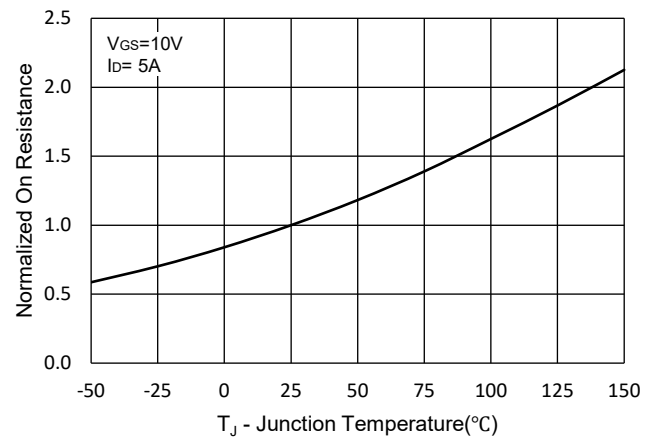


**Curve Characteristics**

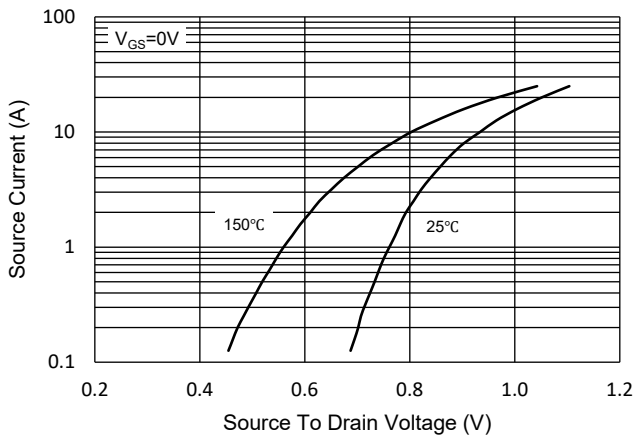
**Fig.7 - Normalized Threshold Voltage**



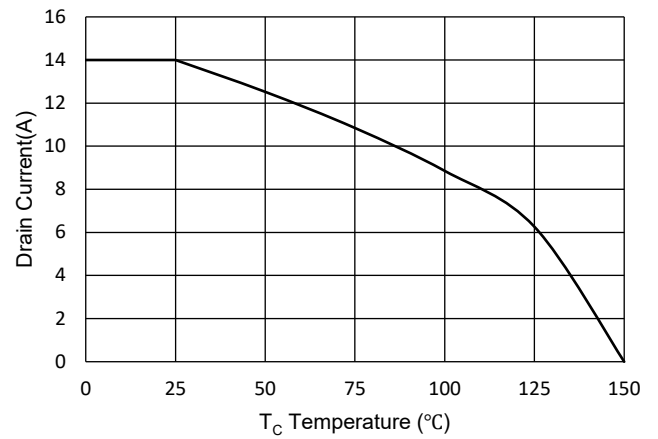
**Fig.8 - Normalized On Resistance Characteristics**



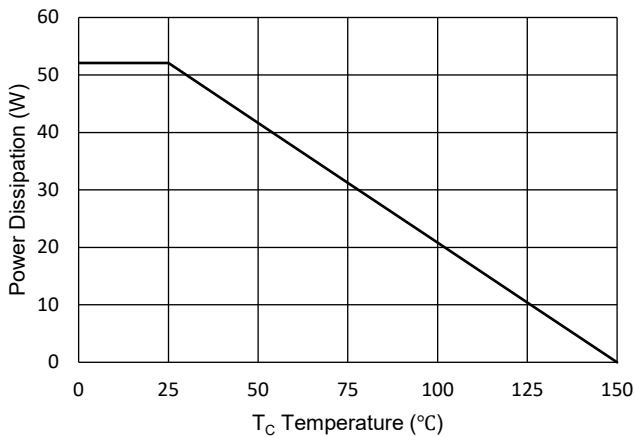
**Fig.9 - I<sub>S</sub> - V<sub>SD</sub>**



**Fig.10 - Drain Current**

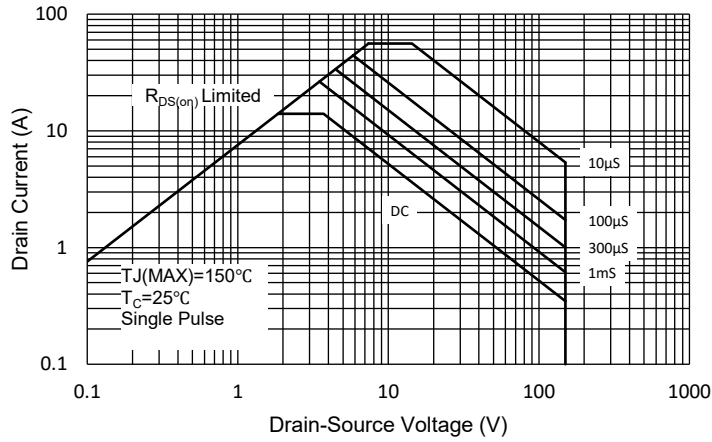


**Fig.11 - PD Dissipation**

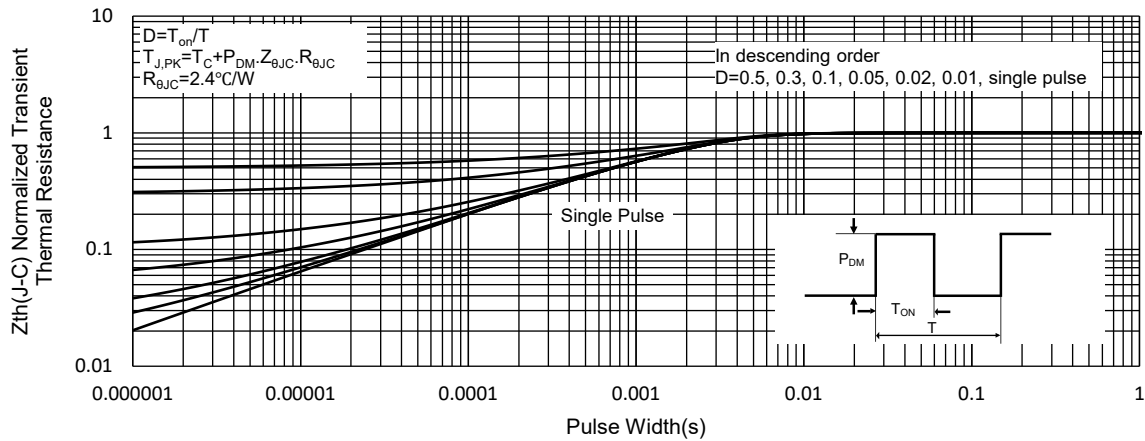


**Curve Characteristics**

**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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