

Features

- Split Gate Trench Power MOSFET Technology
- High Density Cell Design for Low $R_{DS(ON)}$
- 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

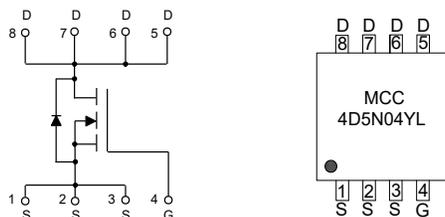
- Operating Junction Temperature Range : -55°C to +175°C
- Storage Temperature Range: -55°C to +175°C
- Thermal Resistance: 60°C/W Junction to Ambient (Note3)
- Thermal Resistance: 2.2°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	$T_C=25^\circ\text{C}$	80
		$T_C=100^\circ\text{C}$	56
Pulsed Drain Current (Note4)	I_{DM}	320	A
Total Power Dissipation (Note5)	P_D	68	W
Single Pulsed Avalanche Energy (Note6)	E_{AS}	54	mJ

Note:

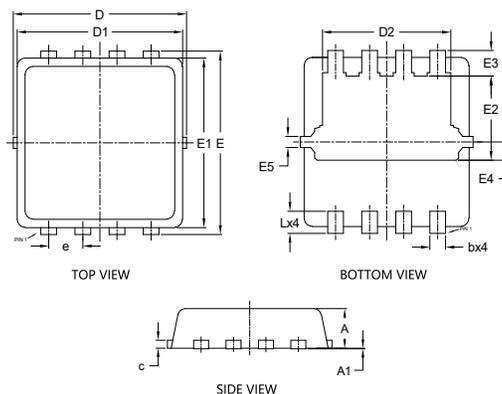
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. High Temperature Solder Exemption Applied, see EU Directive Annex 7(a)-I.
3. The value of $R_{\theta JA}$ is measured with the device mounted 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. $T_J=25^\circ\text{C}, V_{DD}=30\text{V}, V_{GS}=10\text{V}, R_G=25\Omega, L=0.5\text{mH}$.

Internal Structure and Marking Code



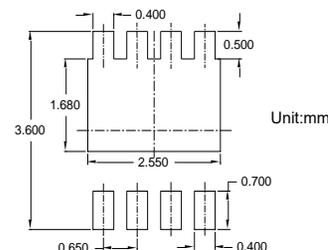
N-CHANNEL MOSFET

PDFN3333



DIM	DIMENSIONS				NOTE
	INCHES		MM		
A	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
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=1mA$	40			V
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=32V, V_{GS}=0V$			1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.7	2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		3.4	4.5	m Ω
		$V_{GS}=4.5V, I_D=20A$		5.8	8	
Gate Resistance	R_g	f=1MHz, Open Drain		1.5		Ω
Diode Characteristics						
Continuous Body Diode Current	I_S				80	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=20A$			1.2	V
Reverse Recovery Time	t_{rr}	$I_F=20A, di_F/dt=100A/\mu s$		21		ns
Reverse Recovery Charge	Q_{rr}			11		nC
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=20V, V_{GS}=0V, f=1MHz$		960		pF
Output Capacitance	C_{oss}			580		
Reverse Transfer Capacitance	C_{rss}			32		
Total Gate Charge	Q_g	$V_{DS}=20V, V_{GS}=10V, I_D=20A$		16.3		nC
Gate-Source Charge	Q_{gs}			3.5		
Gate-Drain Charge	Q_{gd}			3.6		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=20V, V_{GS}=10V, I_{DS}=20A, R_G=3\Omega$		8.5		ns
Turn-On Rise Time	t_r			4.6		
Turn-Off Delay Time	$t_{d(off)}$			19.6		
Turn-Off Fall Time	t_f			5.3		

Curve Characteristics

Fig.1 - Typical Output Characteristics

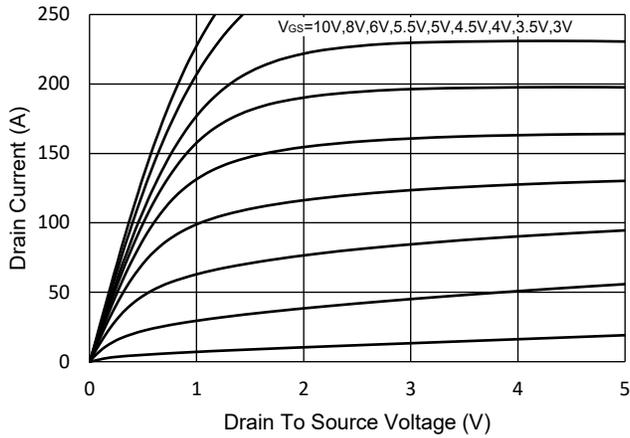


Fig.2 - Transfer Characteristics

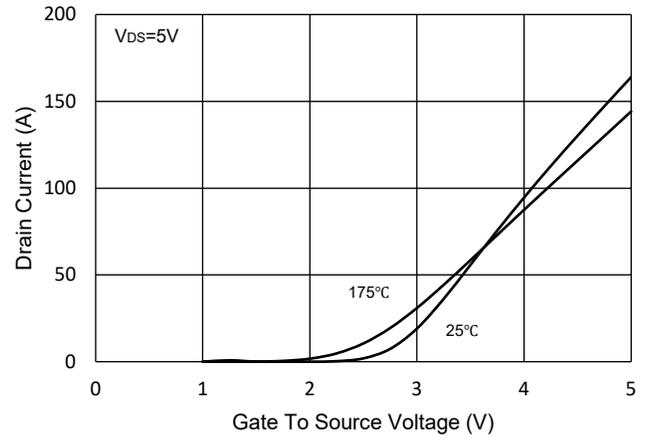


Fig.3 - $R_{DS(ON)}$ - V_{GS}

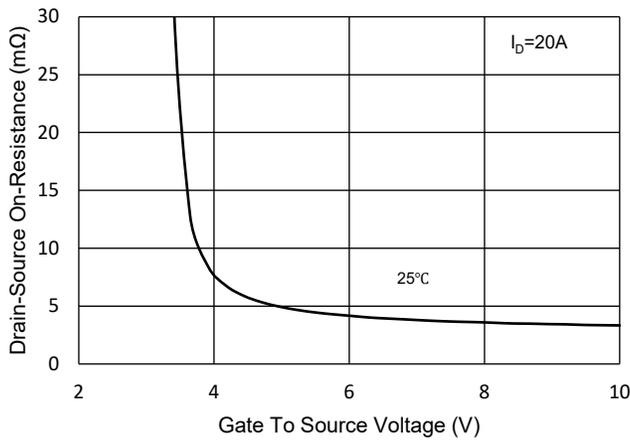


Fig.4 - $R_{DS(ON)}$ - I_D

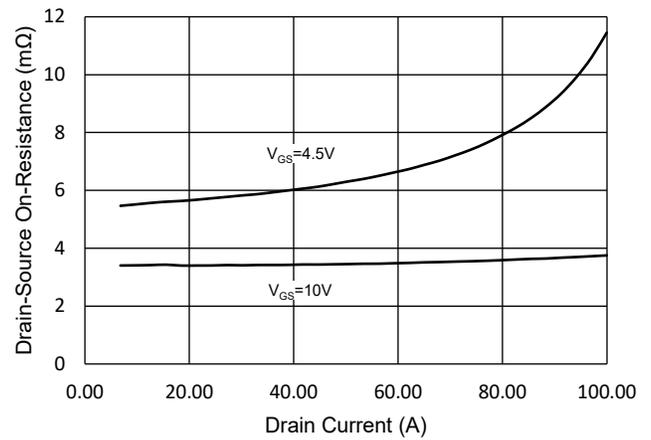


Fig.5 - Capacitance Characteristics

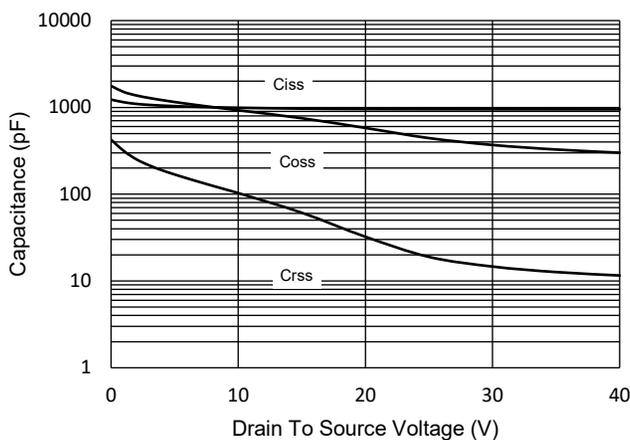
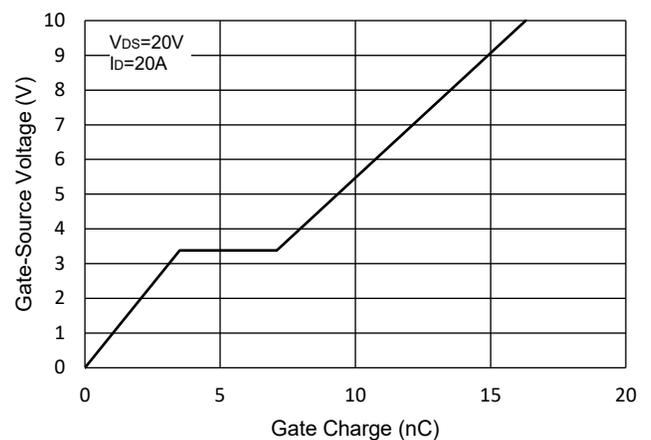


Fig.6 - Gate Charge



Curve Characteristics

Fig.7 - Normalized Threshold Voltage

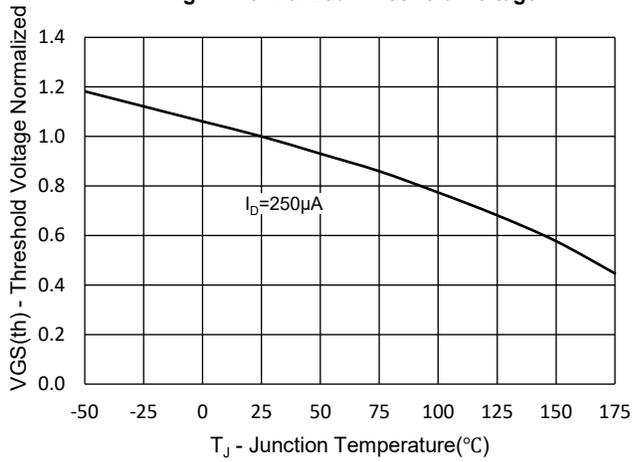


Fig.8 - Normalized On Resistance Characteristics

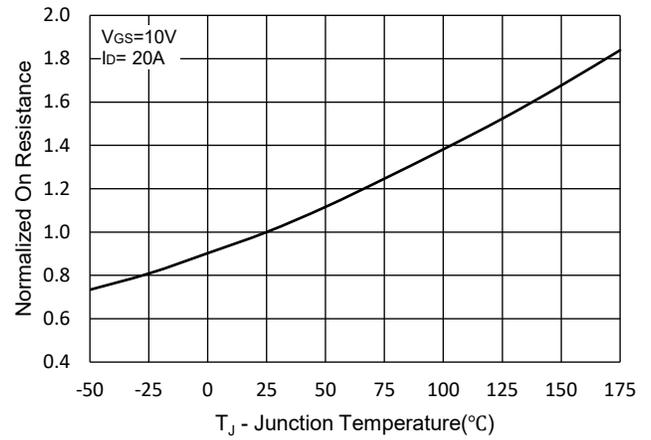


Fig.9 - $I_S - V_{SD}$

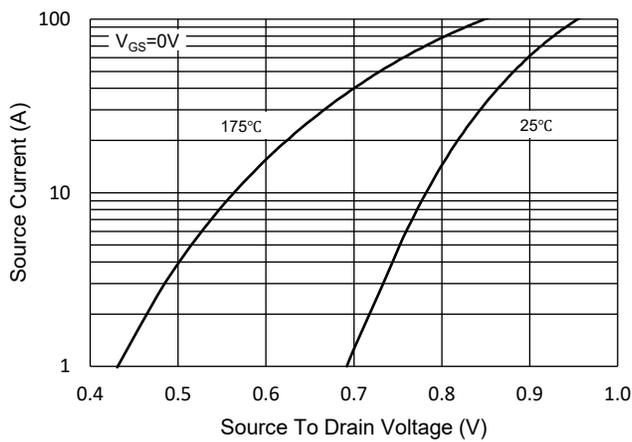


Fig.10 - Drain Current

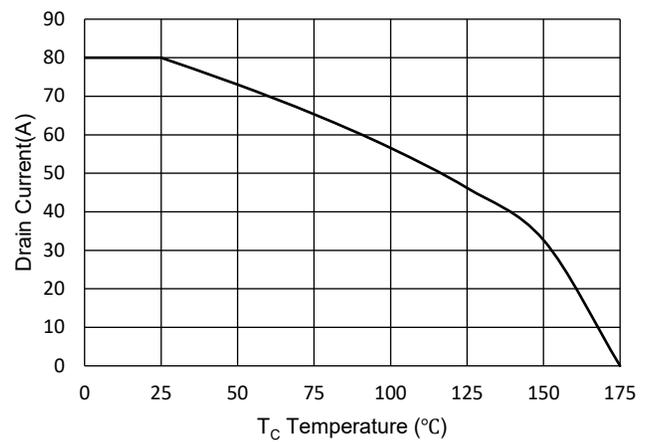
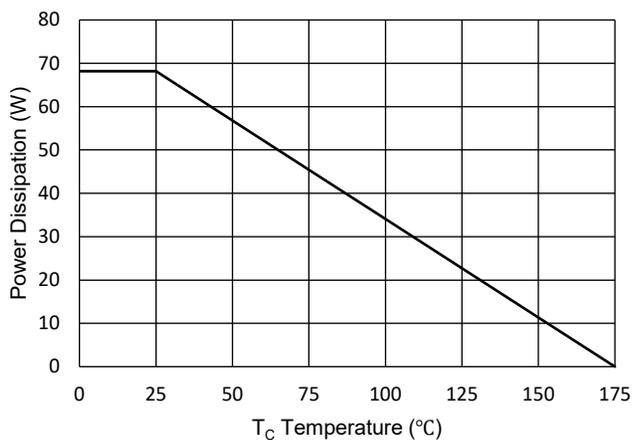


Fig.11 - PD Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

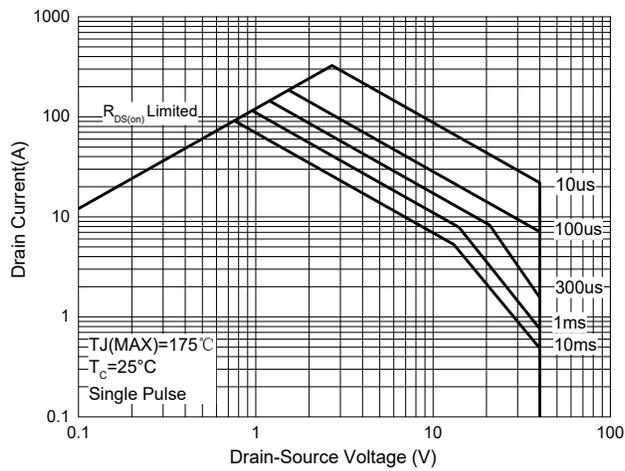
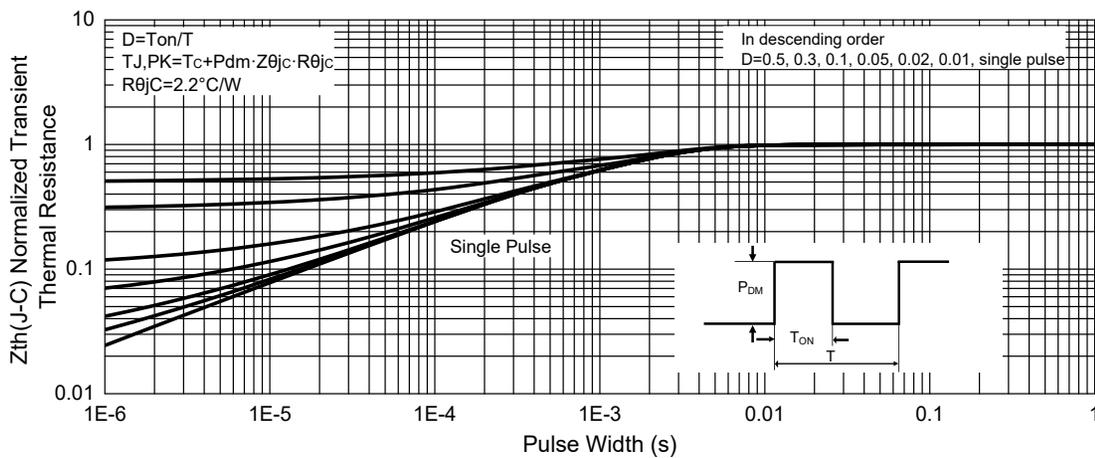


Fig. 13 -Normalized Transient Thermal Impedance



Ordering Information

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

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