

Description

The PDM8PN02R20 uses advanced trench technology to provide excellent $R_{DS(on)}$, low gate charge. This device is suitable for use as a load switch or in PWM applications.

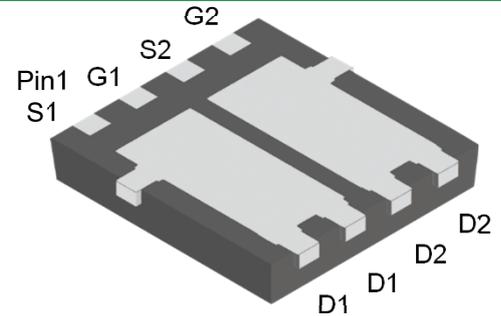
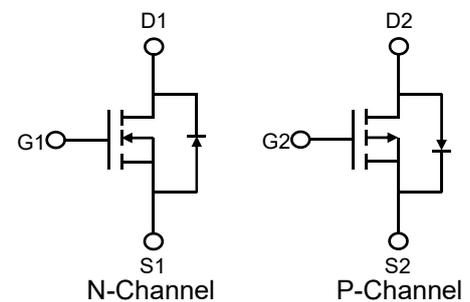
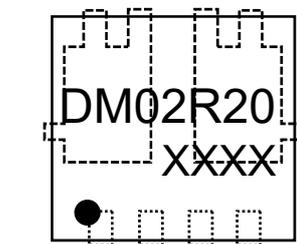
MOSFET Product Summary		
$V_{DS}(V)$	$R_{DS(on)}(m\Omega)$ (Typ)	$I_D(A)$
N-Channel 20	7.6@ $V_{GS} = 4.5V$	50
	9.2@ $V_{GS} = 2.5V$	
P-Channel -20	17@ $V_{GS} = -4.5V$	-35
	22@ $V_{GS} = -2.5V$	

Feature

- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Applications

- PWM applications
- Load switch
- Power management
- DC-DC Converters
- Wireless Chargers


**PDFN3333-8L
(Bottom View)**

Circuit Diagram

Marking (Top View)
Absolute maximum rating@25°C

Rating	Symbol	N-Channel	P-Channel	Units	
Drain-Source Voltage	V_{DS}	20	-20	V	
Gate-Source Voltage	V_{GS}	± 12	± 12	V	
Drain Current-Continuous ¹⁾	I_D	$T_C=25^\circ C$	50	-35	A
		$T_C=100^\circ C$	31	-22	A
Pulsed Drain Current ²⁾	I_{DM}	200	-140	A	
Total Power Dissipation ³⁾	P_D	33.2	33.2	W	
Avalanche Current ⁴⁾	I_{AS}	34	-27	A	
Avalanche Energy ⁴⁾	E_{AS}	57.8	36.5	mJ	
Thermal Resistance , Junction-case ⁵⁾	$R_{\theta JC}$	3.76	3.76	$^\circ C/W$	
Thermal Resistance Junction-to-Ambient ⁵⁾	$R_{\theta JA}$	49.1	49.1	$^\circ C/W$	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	-55 to 150	$^\circ C$	

Electrical characteristics per line@25°C (unless otherwise specified)(N-Channel)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 20V, V_{GS} = 0V$	-	-	1.0	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 12V, V_{DS} = 0V$	-	-	± 100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.5	0.7	1.1	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 15A$	-	7.6	10	m Ω
		$V_{GS} = 2.5V, I_D = 10A$	-	9.2	13	
Dynamic Characteristics⁶⁾						
Input Capacitance	C_{iss}	$V_{DS} = 10V, V_{GS} = 0V$ $f = 1MHz$	-	1120	-	pF
Output Capacitance	C_{oss}		-	214	-	
Reverse Transfer Capacitance	C_{rss}		-	198	-	
Switching Characteristics⁶⁾						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS} = 10V, V_{GS} = 4.5V,$ $R_G = 3\Omega, I_D = 10A$	-	6	-	ns
Turn-on Rise Time	t_r		-	14	-	
Turn-Off Delay Time	$t_{d(off)}$		-	35	-	
Turn-Off Fall Time	t_f		-	20	-	
Total Gate Charge	Q_g	$V_{DS} = 10V, V_{GS} = 4.5V,$ $I_D = 25A$	-	15.4	-	nC
Gate-Source Charge	Q_{gs}		-	1.3	-	
Gate-Drain Charge	Q_{gd}		-	6.2	-	
Gate Resistance	R_g	$f = 1MHz, \text{Open Drain}$	-	1.8	-	Ω
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_S = 15A$	-	0.8	1.2	V
Reverse Recovery Time	t_{rr}	$I_F = 20A, d_i/d_t = 100A/\mu s$	-	19.7	-	ns
Reverse Recovery Charge	Q_{rr}		-	5.7	-	nC

Electrical characteristics per line@25°C (unless otherwise specified)(P-Channel)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = -250\mu A$	-20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -20V, V_{GS} = 0V$	-	-	-1.0	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 12V, V_{DS} = 0V$	-	-	± 100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.5	-0.7	-1.1	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS} = -4.5V, I_D = -10A$	-	17	20	m Ω
		$V_{GS} = -2.5V, I_D = -5A$	-	22	25	
Dynamic Characteristics⁶⁾						
Input Capacitance	C_{ISS}	$V_{DS} = -10V, V_{GS} = 0V$ $f = 1MHz$	-	1340	-	pF
Output Capacitance	C_{OSS}		-	213	-	
Reverse Transfer Capacitance	C_{RSS}		-	183	-	
Switching Characteristics⁶⁾						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS} = -10V, V_{GS} = -4.5V,$ $R_G = 2.5\Omega, I_D = -10A$	-	4.3	-	ns
Turn-on Rise Time	t_r		-	3.8	-	
Turn-Off Delay Time	$t_{d(off)}$		-	63	-	
Turn-Off Fall Time	t_f		-	30	-	
Total Gate Charge	Q_g	$V_{DS} = -10V, V_{GS} = -4.5V,$ $I_D = -6A$	-	15.4	-	nC
Gate-Source Charge	Q_{gs}		-	3.3	-	
Gate-Drain Charge	Q_{gd}		-	2.2	-	
Gate Resistance	R_g	$f = 1MHz, \text{Open Drain}$	-	9.3	-	Ω
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	$V_{GS} = 0V, I_S = -10A$	-	-0.86	-1.2	V
Reverse Recovery Time	t_{rr}	$I_F = -10A, di/dt = 100A/\mu s$	-	11.1	-	ns
Reverse Recovery Charge	Q_{rr}		-	2.3	-	nC

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. Repetitive Rating: Pulse width limited by maximum junction temperature ($T_{J_Max} = 150^\circ C$).
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. This single-pulse measurement was taken under the following condition (NMOS: $L = 0.1mH, V_{GS} = 10V, V_{DS} = 16V$; PMOS: $L = 0.1mH, V_{GS} = -10V, V_{DS} = -16V$) while it's value is limited by $T_{J_Max} = 150^\circ C$.
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
6. Guaranteed by design, not subject to production.

Typical Characteristics(N-Channel)

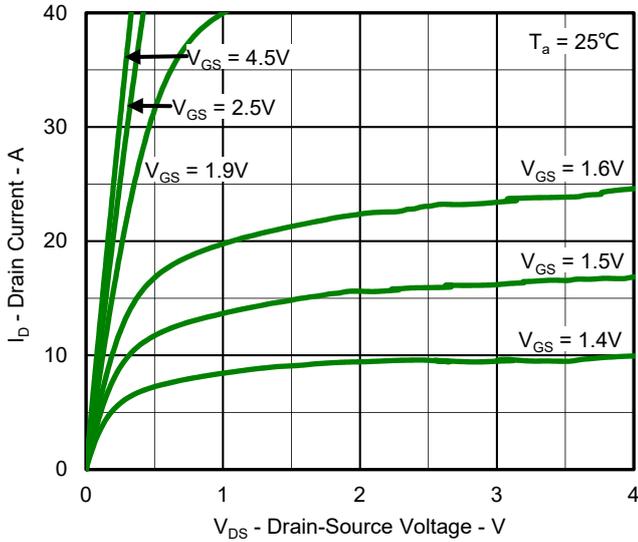


Fig.1 Output Characteristics

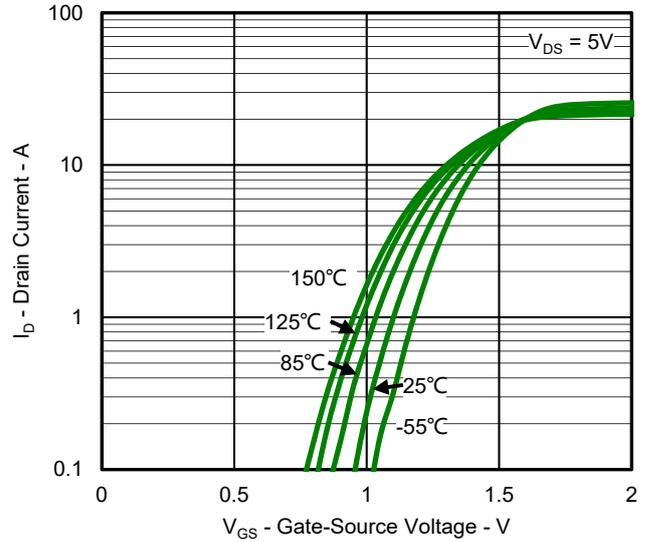


Fig.2 Typical Transfer Characteristic

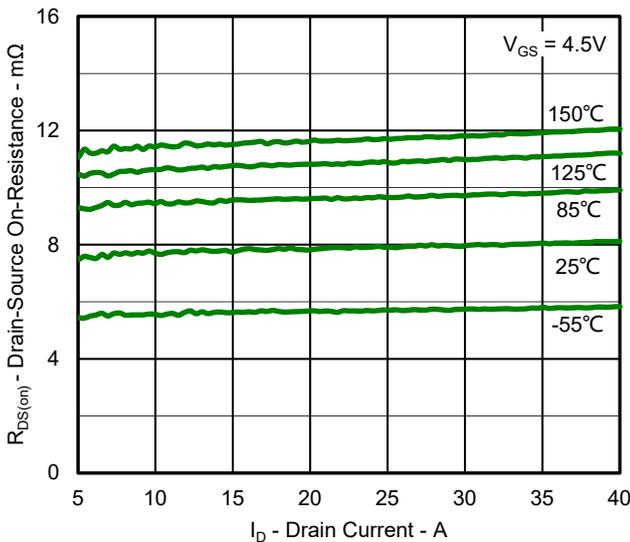


Fig.3 Typical On-Resistance vs Drain Current and Temperature

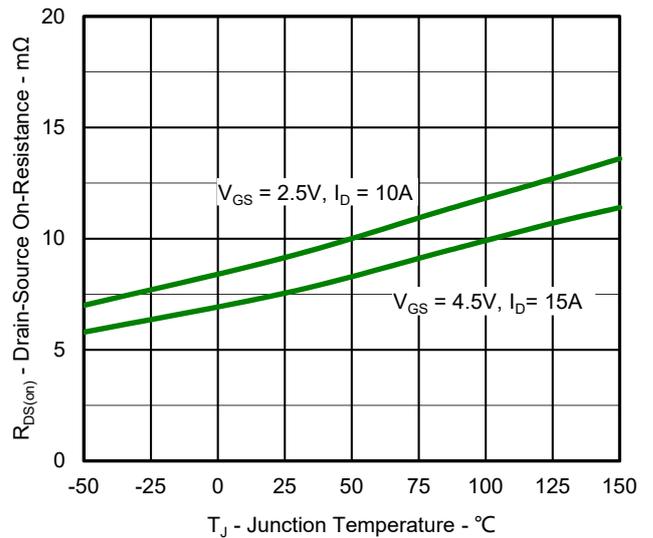


Fig.4 On-Resistance Variation with Temperature

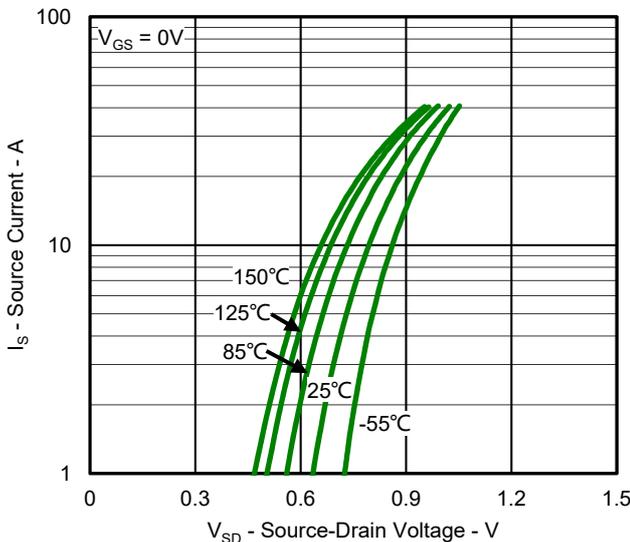


Fig.5 Diode Forward Voltage vs. Current

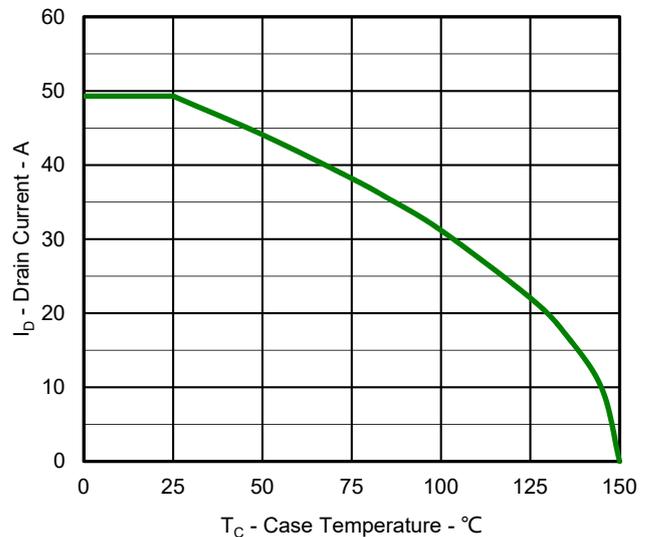


Fig.6 Maximum Drain Current vs. Case Temperature

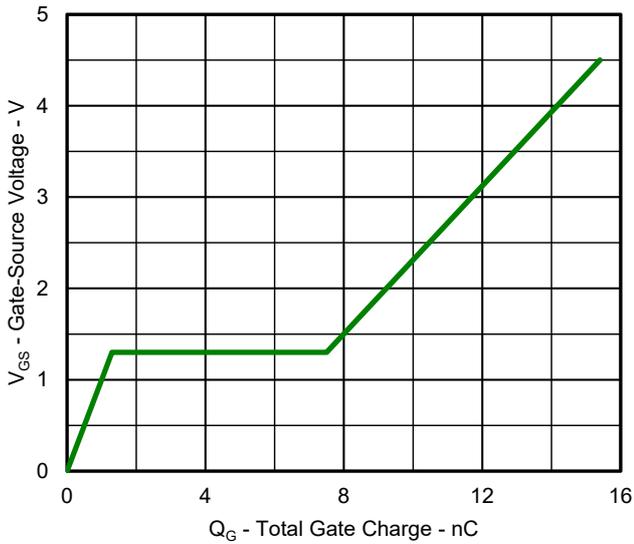


Fig.7 Gate Charge Characteristics

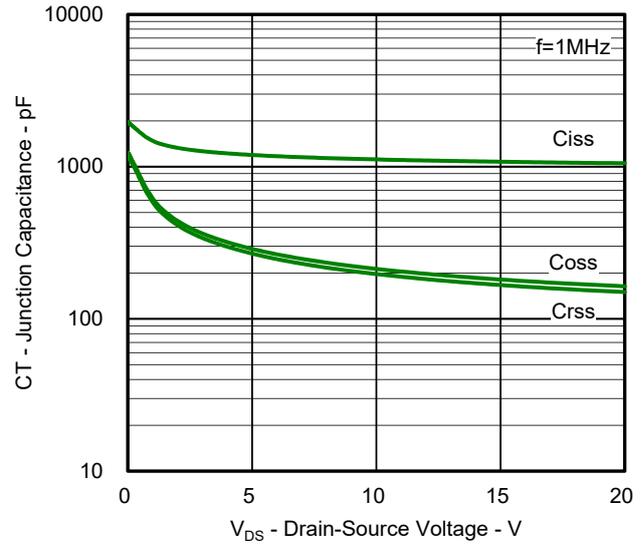


Fig.8 Typical Junction Capacitance

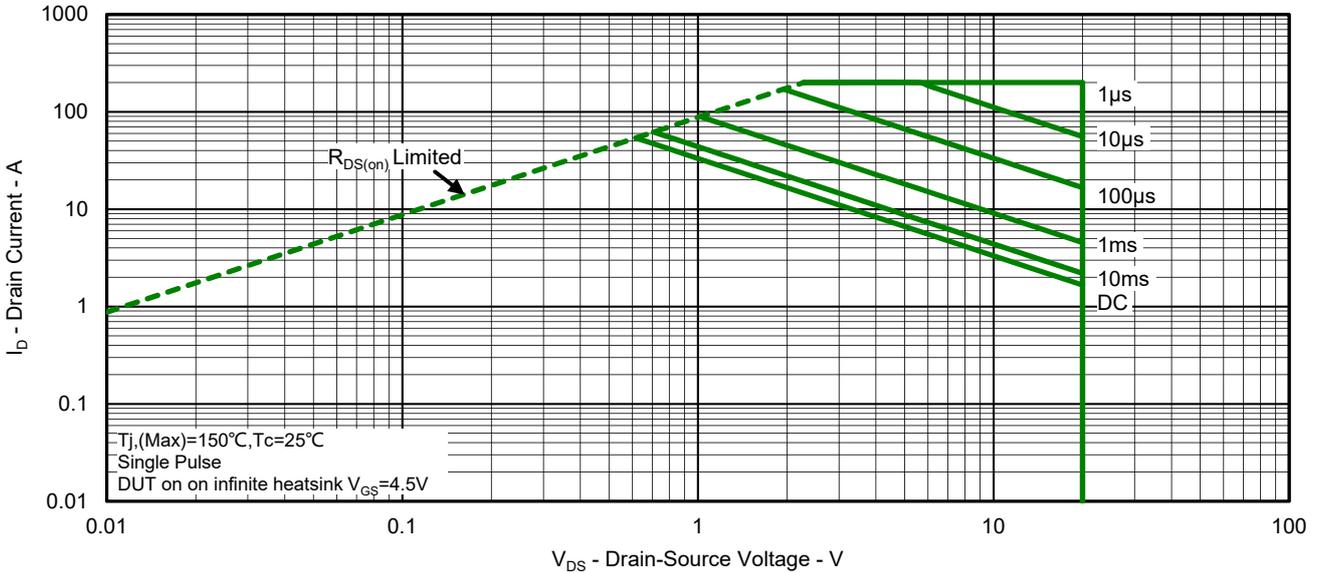


Fig.9 Safe Operation Area

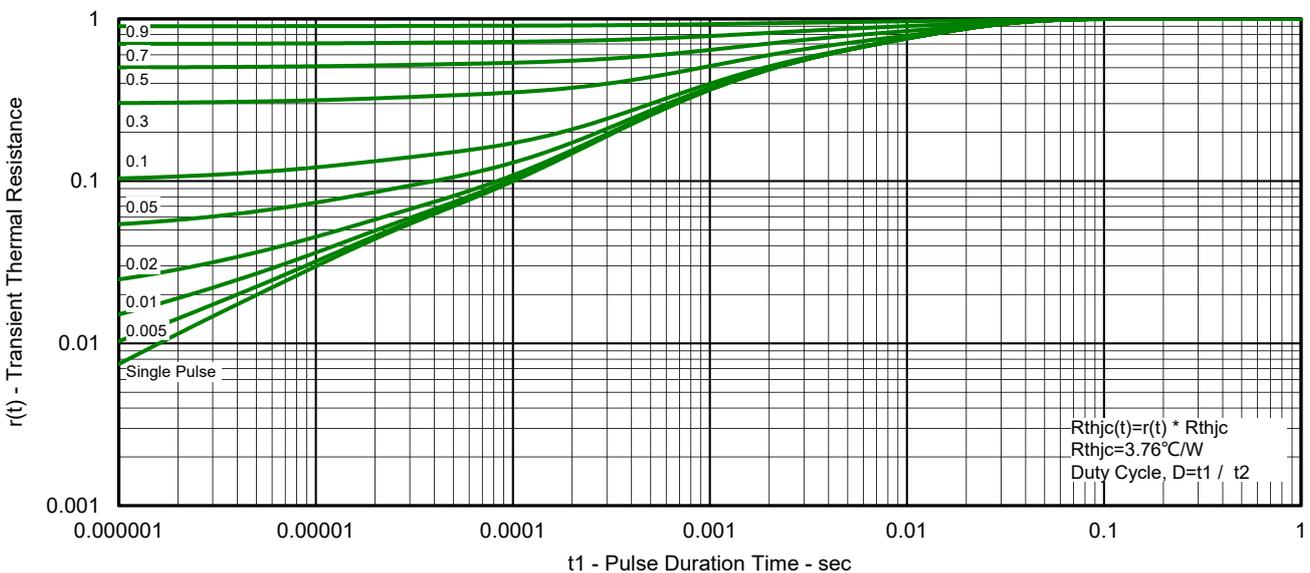


Fig.10 Transient Thermal Resistance

Typical Characteristics(P-Channel)

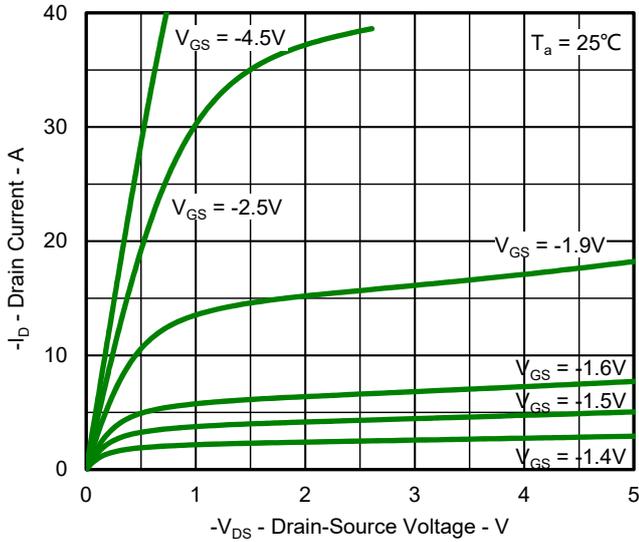


Fig.1 Output Characteristics

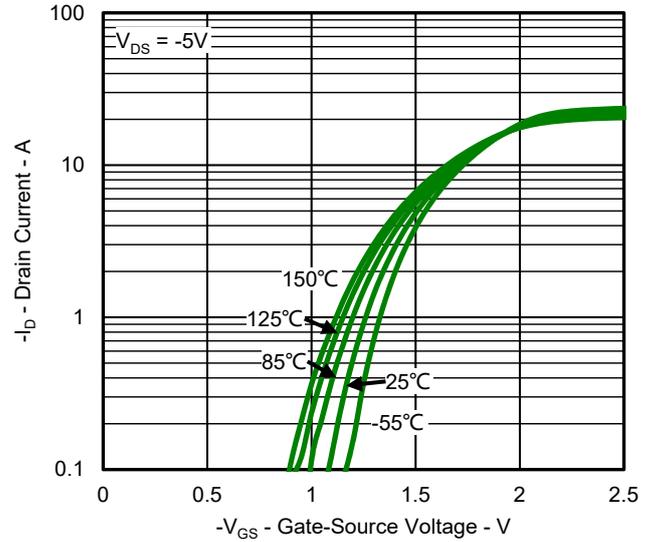


Fig.2 Typical Transfer Characteristic

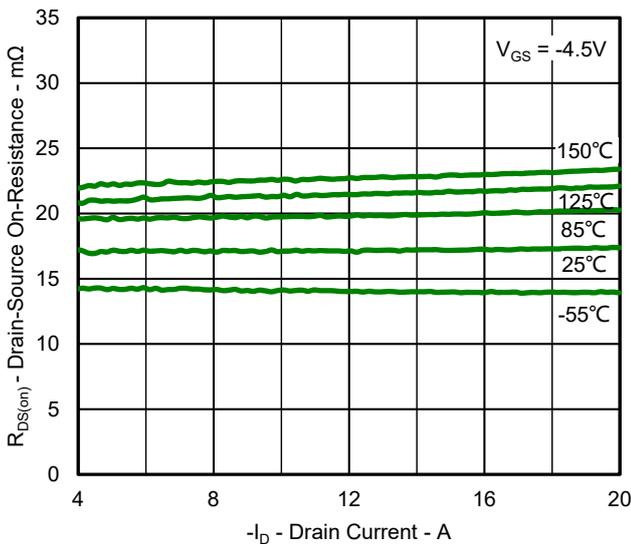


Fig.3 Typical On-Resistance vs Drain Current and Temperature

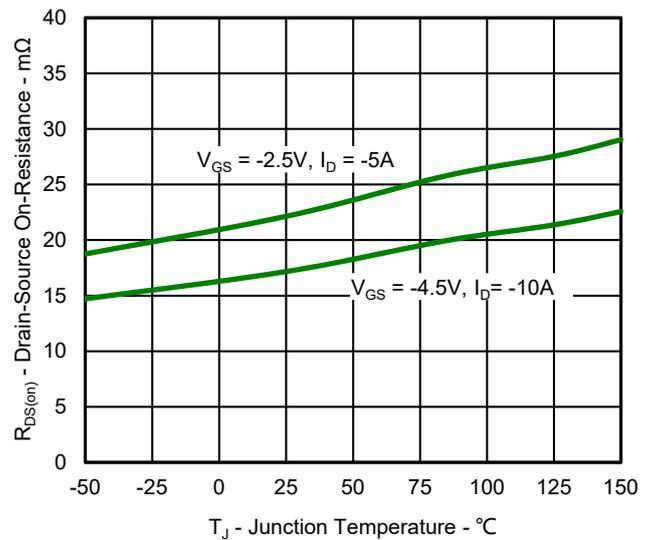


Fig.4 On-Resistance Variation with Temperature

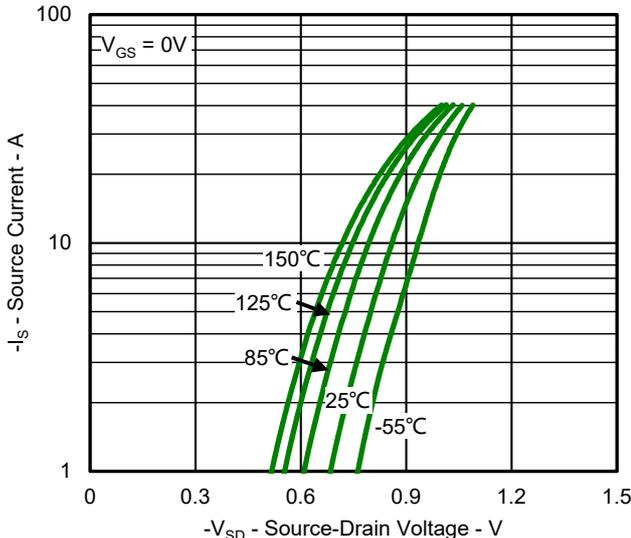


Fig.5 Diode Forward Voltage vs. Current

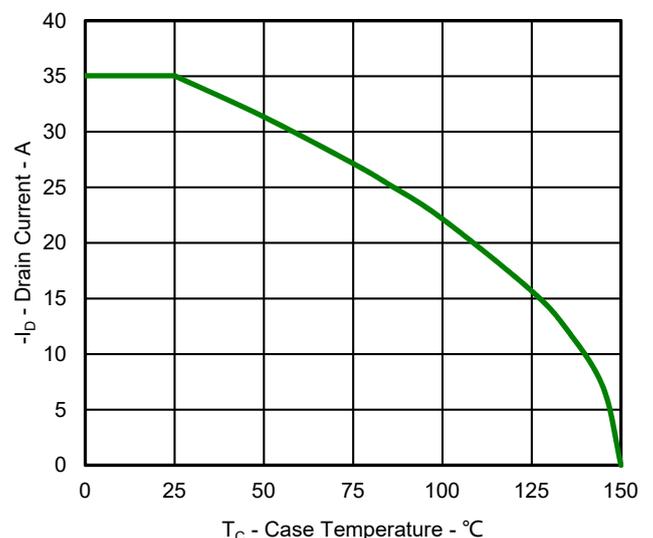


Fig.6 Maximum Drain Current vs. Case Temperature

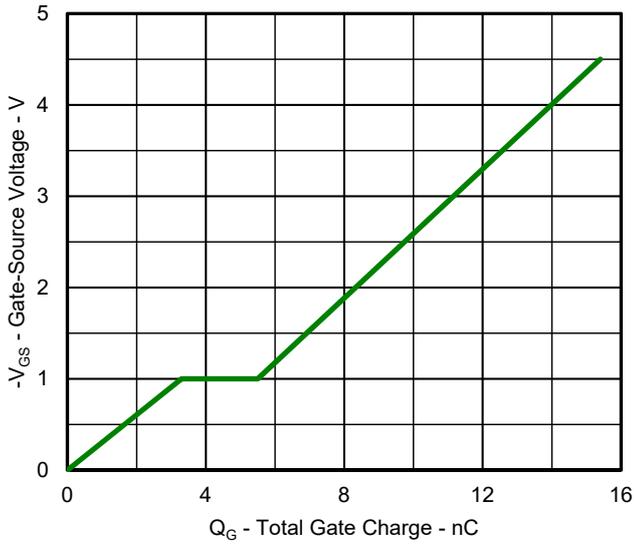


Fig.7 Gate Charge Characteristics

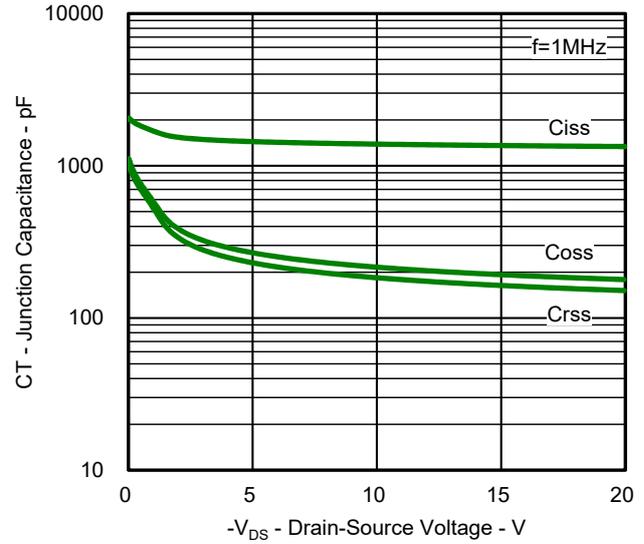


Fig.8 Typical Junction Capacitance

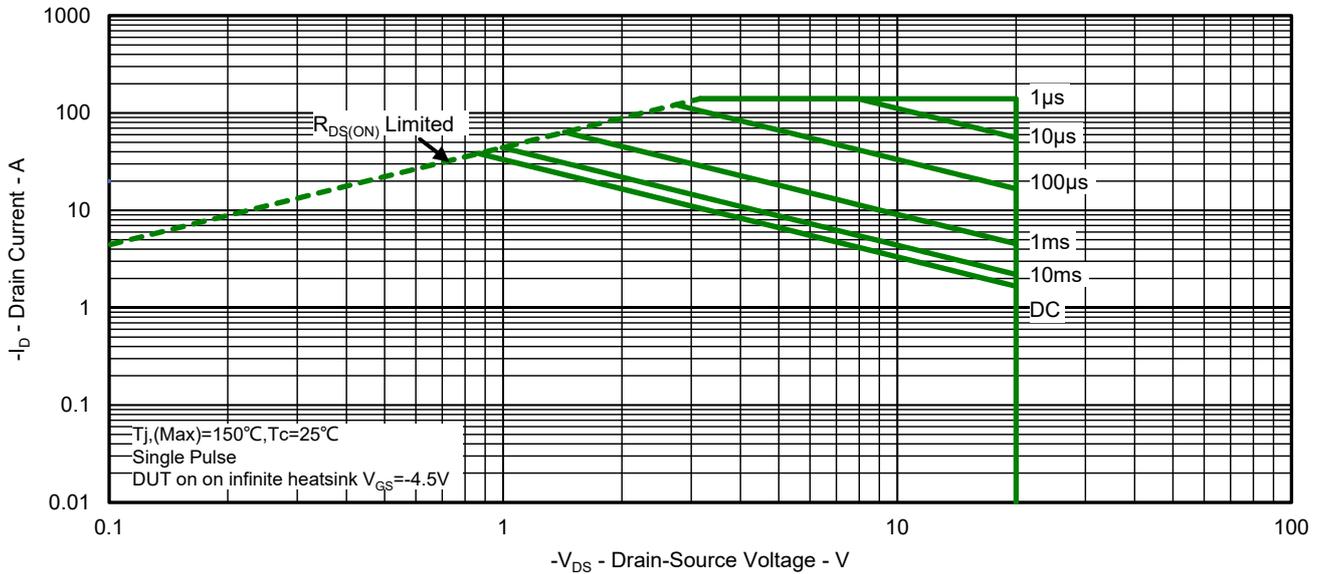


Fig.9 Safe Operation Area

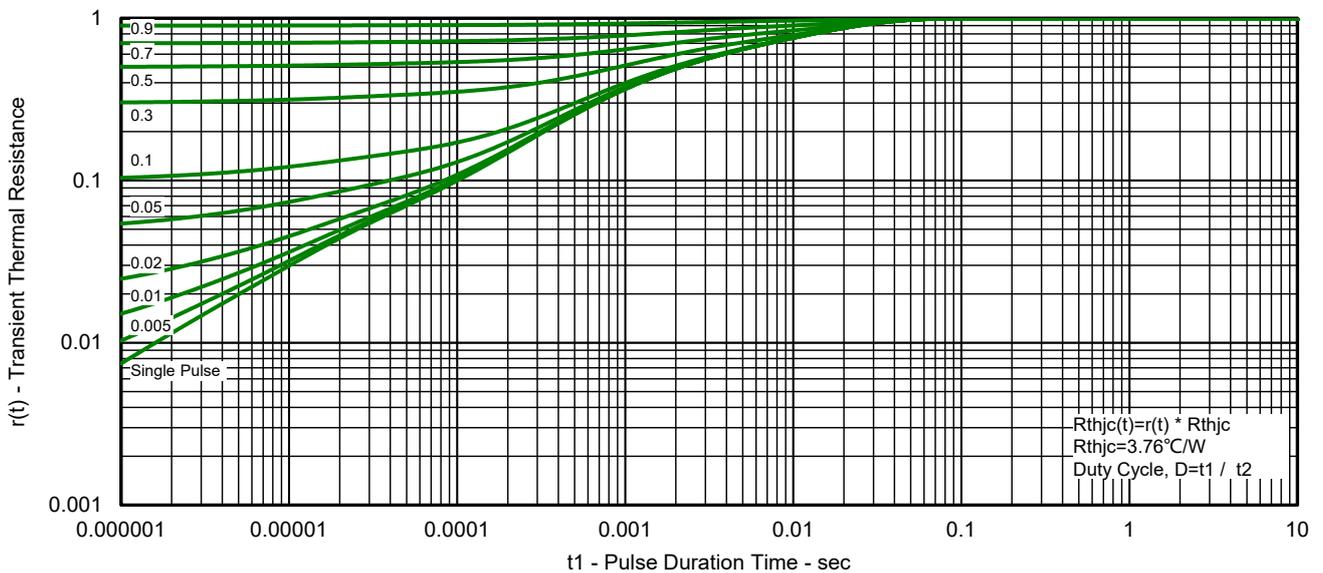
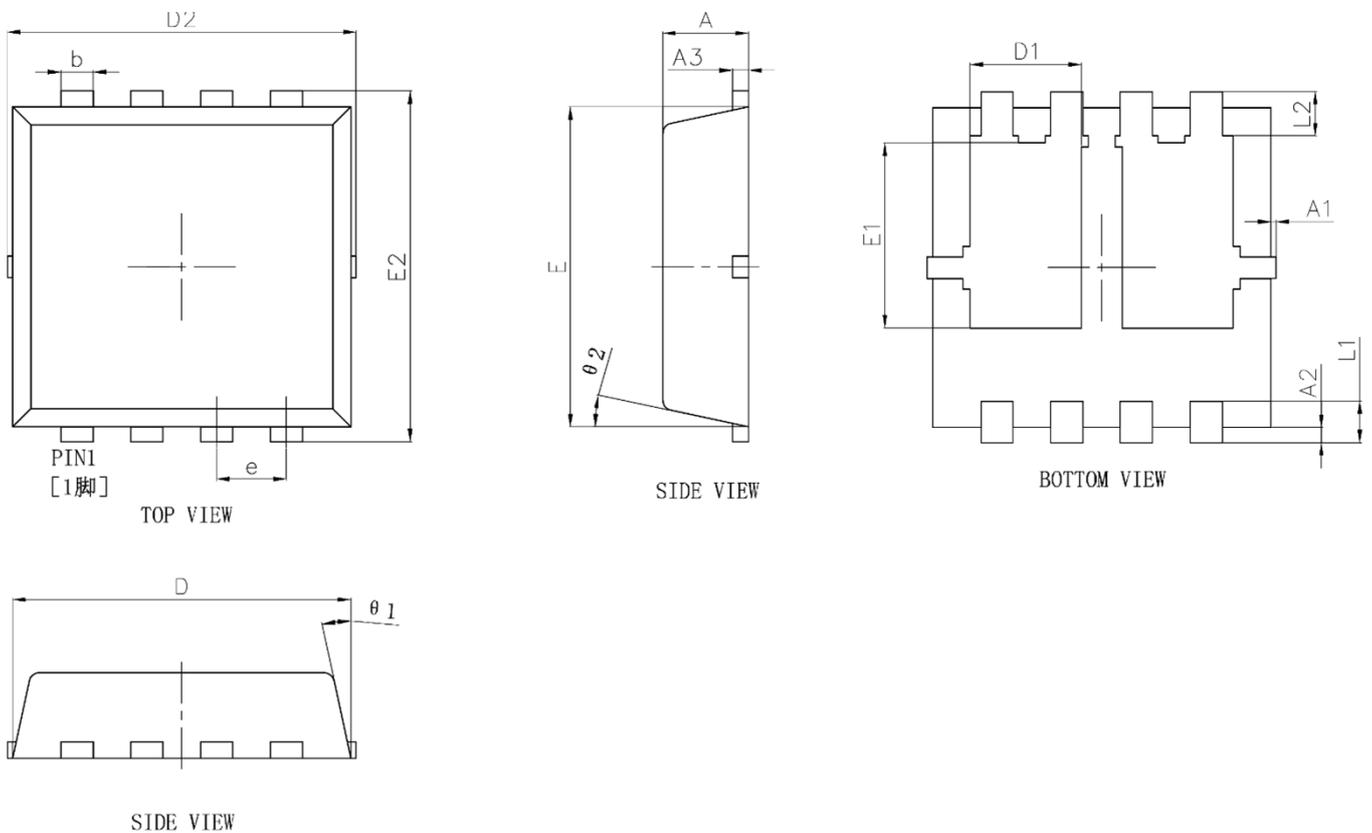


Fig.10 Transient Thermal Resistance

Product Dimension (PDFN3333-8L)

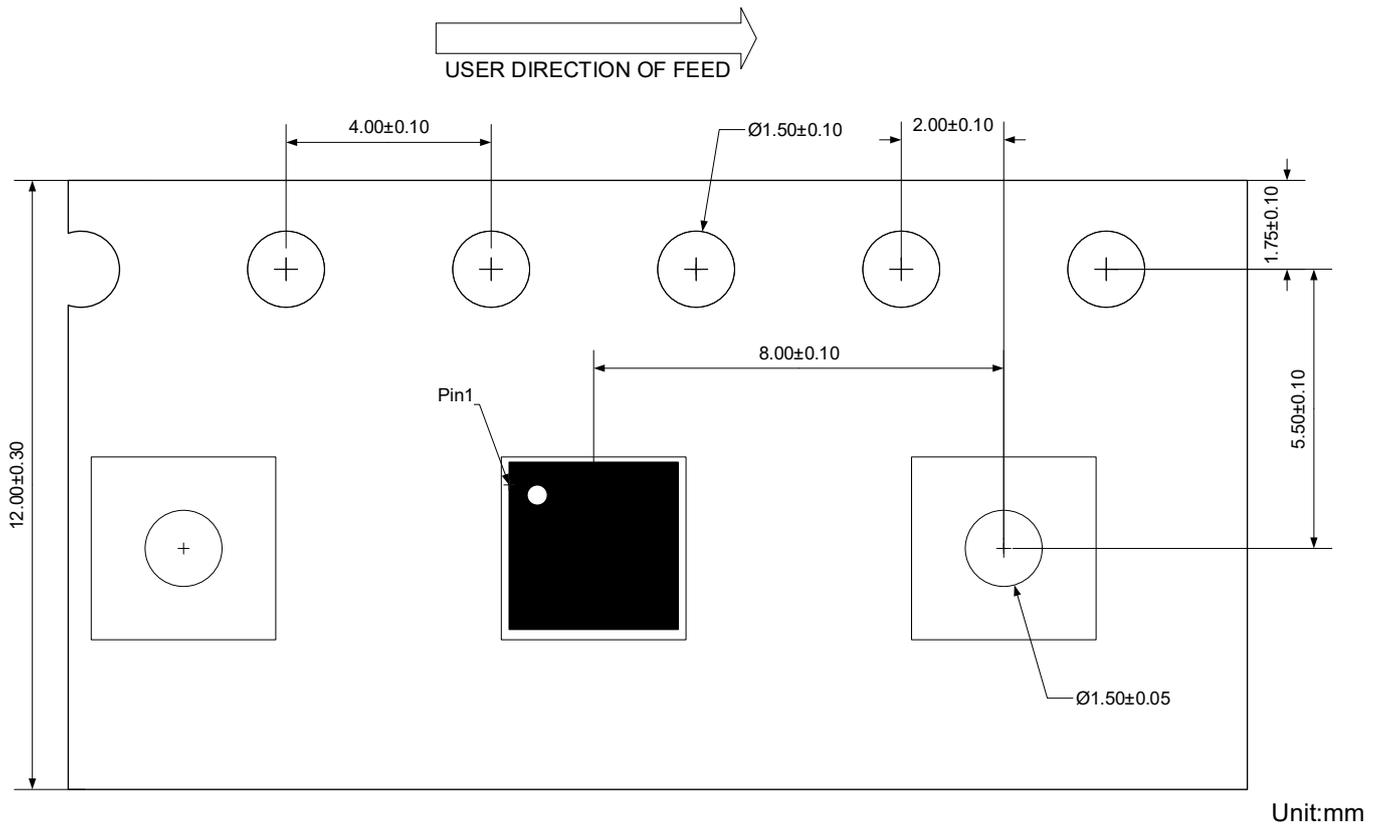


Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	0.60	0.85	0.024	0.033
A1	0.00	0.10	0.000	0.004
A2	0.10	0.20	0.004	0.008
A3	0.152 Ref.		0.006 Ref.	
D	2.95	3.25	0.116	0.128
D1	0.935	1.135	0.037	0.045
D2	2.95	3.40	0.116	0.134
E	2.90	3.10	0.114	0.122
E1	1.635	1.835	0.064	0.072
E2	3.15	3.40	0.124	0.134
b	0.20	0.40	0.008	0.016
e	0.625	0.675	0.025	0.027
L1	0.30	0.45	0.012	0.018
L2	0.365	0.465	0.014	0.018
$\theta 1$	5°	14°	5°	14°
$\theta 2$	5°	14°	5°	14°

Ordering Information

Package	Reel	Shipping
PDFN3333-8L	13"	5000 / Tape & Reel

Load With Information



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