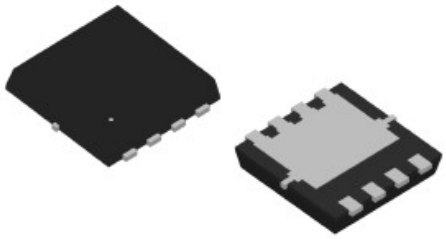
WPM3033

Single P-Channel, -30V,-38A, Power MOSFET

https://www.omnivision-group.com

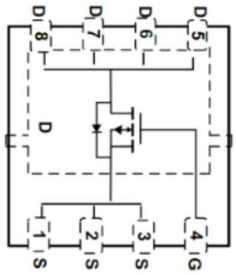
V_{DS} (V)	Typical $R_{DS(on)}$ (mΩ)
-30	5.5 @ V_{GS}=-10V
	8.5 @ V_{GS}=-4.5V



PDFN3X3-8L

Description

The WPM3033 is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product WPM3033 is Pb-free.



Pin configuration (Top view)

Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Extremely Low Threshold Voltage
- Small package PDFN3X3-8L

3033 = Device Code
PS = Special Code
Y = Year
W = Week(A~z)

Marking

Applications

- DC/DC converters
- Power supply converters circuit
- Load/Power Switching for portable device

Order information

Device	Package	Shipping
WPM3033-8/TR	PDFN3X3-8L	3000/Tape&Reel

Absolute Maximum ratings

Parameter		Symbol	Maximum	Unit
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	±25	
Continuous Drain Current [d]	T_C=25°C	I_D	-38	A
	T_C=100°C		-38	A
Pulsed Drain Current [c]		I_{DM}	-110	A
Continuous Drain Current	T_A=25°C	I_{DSM}	-21	A
	T_A=70°C		-17	
Avalanche Current		I_{AS}	-40	A
Avalanche Energy	L=0.1mH,I_D=-40A,R_G=25Ω	E_{AS}	80	mJ
Power Dissipation [b]	T_C=25°C	P_D	43.1	W
	T_C=100°C		17.2	
Power Dissipation [a]	T_A=25°C	P_{DSM}	4.6	W
	T_A=70°C		3.0	
Operating Junction Temperature		T_J	-55 to 150	°C
Storage Temperature Range		T_{STG}	-55 to 150	°C

100% UIS tested in condition of V_D=-20V, L=0.1mH, V_G=-10V, I_D=-40A, Rated V_{DS}=-30V P-CH.

Thermal resistance ratings

Single Operation					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance [a]	t ≤ 10 s	$R_{\theta JA}$	21	27	°C/W
	Steady State		48	60	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	2.3	2.9	

Note:

a The value of $R_{\theta JA}$ is measured with the device mounted on 1-inch^2 (6.45cm^2) with 2oz.(0.071mm thick) Copper pad on a 1.5*1.5 inch^2, 0.06-inch thick FR4 PCB, in a still air environment with T_A =25°C. The power dissipation P_{DSM} is based on $R_{\theta JA}$ t≤10s value and the $T_{J(MAX)}$=150°C. The value in any given application is determined by the user's specific board design.

b The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heat sinking is used.

c Repetitive rating, ~10us pulse width, duty cycle ~1%, keep initial T_J =25°C, the maximum allowed junction temperature of 150°C.

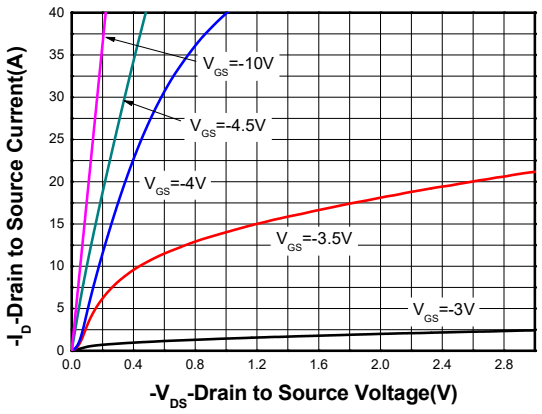
d The maximum current rating by source bonding technology.

e The static characteristics are obtained using ~380us pulses, duty cycle ~1%.

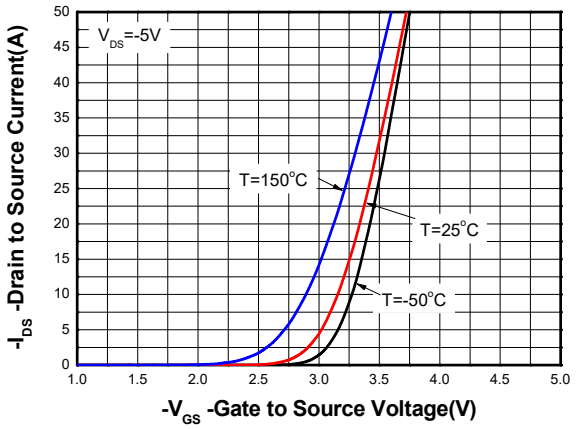
Electronics Characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS}= 0 V, I_D = -250uA	-30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -24V, V_{GS} = 0V			-1	uA
Gate-to-source Leakage Current	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±25V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS}=V_{DS}, I_D = -250uA	-1.0	-1.7	-2.2	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS} = -10V, I_D = -20A		5.7	7.5	mΩ
		V_{GS} = -4.5V, I_D = -16A		8.6	12.5	
Forward Transconductance	g_{FS}	V_{DS} = -5V, I_D = -10A		23		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1.0MHz, V_{DS} = -15 V		2686		pF
Output Capacitance	C_{OSS}			476		
Reverse Transfer Capacitance	C_{RSS}			417		
Gate resistance	R_g	F=1MHz		12.5		Ω
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = -10V, V_{DS} = -15V, I_D = -20 A		58.2		nC
Threshold Gate Charge	$Q_{G(TH)}$			4.8		
Gate-to-Source Charge	Q_{GS}			11.1		
Gate-to-Drain Charge	Q_{GD}			11.5		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$td_{(ON)}$	V_{GS} = -10V, V_{DS} = -15 V, I_D= -20A , R_G= 3Ω		22.5		ns
Rise Time	tr			20.5		
Turn-Off Delay Time	$td_{(OFF)}$			126.5		
Fall Time	tf			67.5		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = -1A		-0.7	-1.2	V
Reverse Recovery Time	t_{rr}	I_F= -16A, di/dt = 100A/us		48		ns
Reverse Recovery Charge	Q_{rr}			28		nC

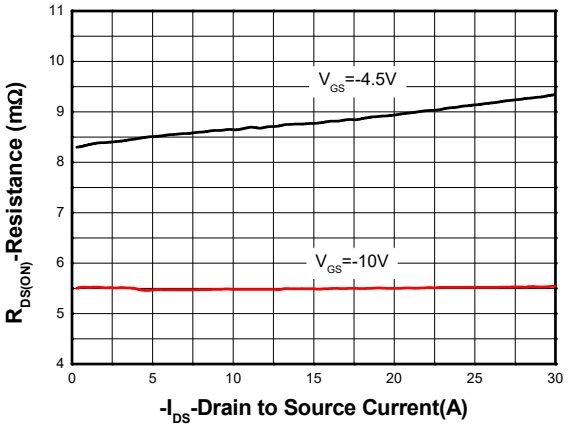
Typical Characteristics (Ta=25°C, unless otherwise noted)



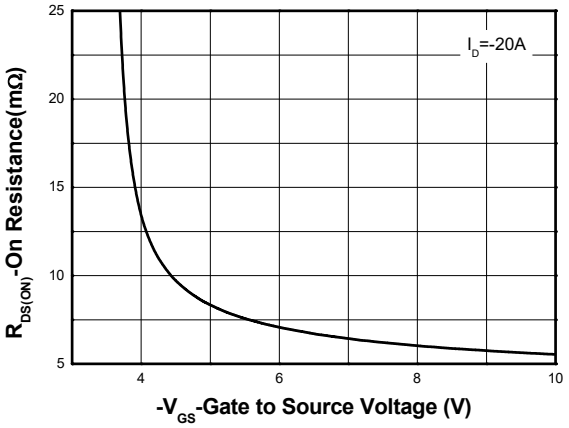
Output Characteristics [e]



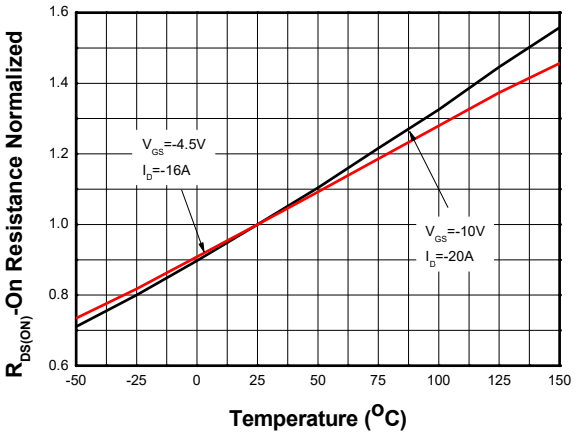
Transfer Characteristics [e]



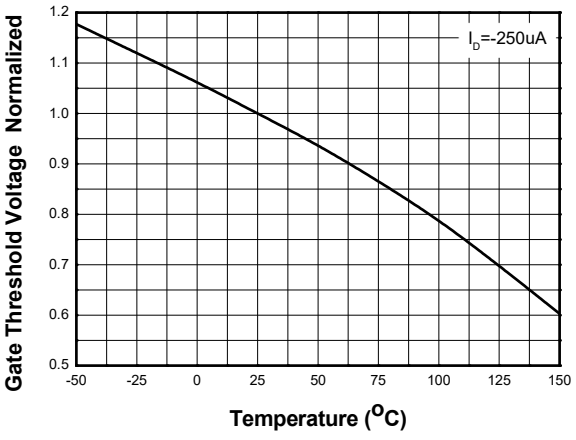
On-Resistance vs. Drain Current [e]



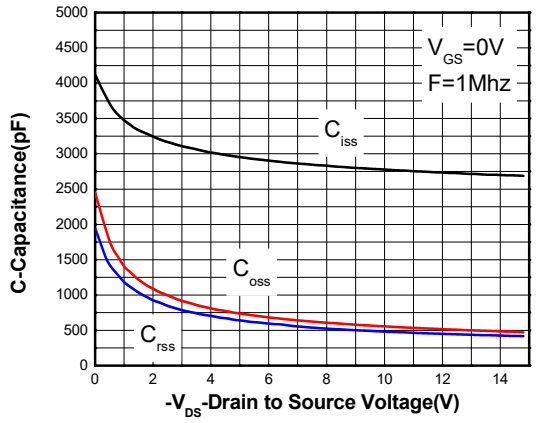
On-Resistance vs. Gate-to-Source Voltage [e]



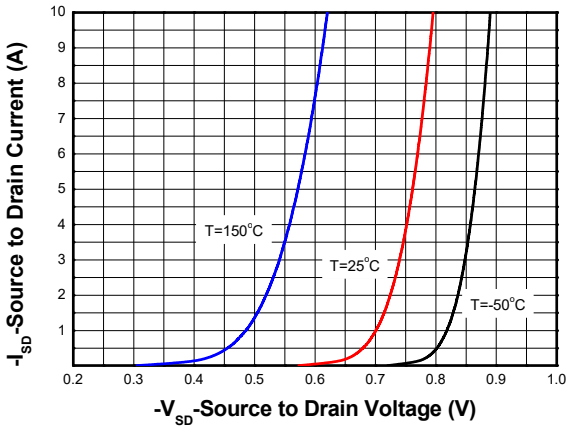
On-Resistance vs. Junction Temperature [e]



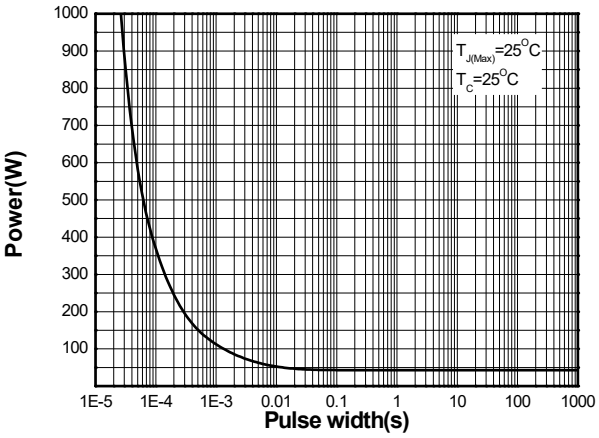
Threshold Voltage vs. Temperature



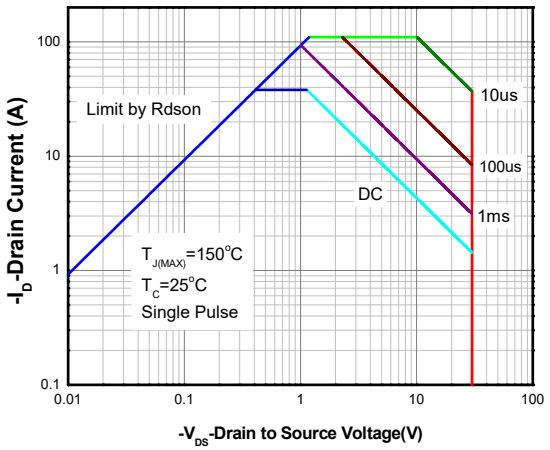
Capacitance



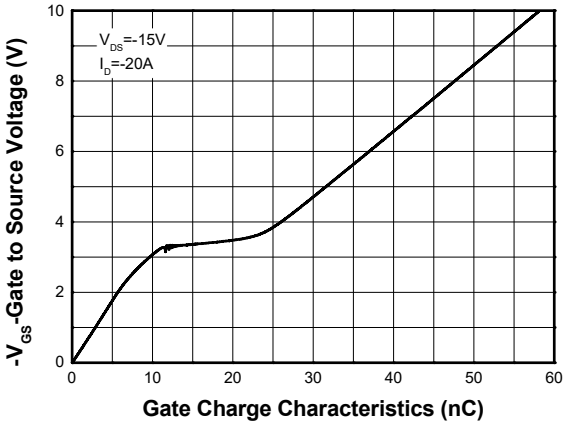
Body Diode Forward Voltage [e]



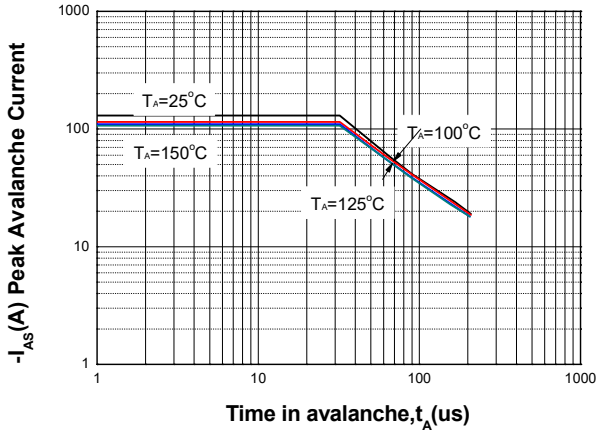
Single Pulse power



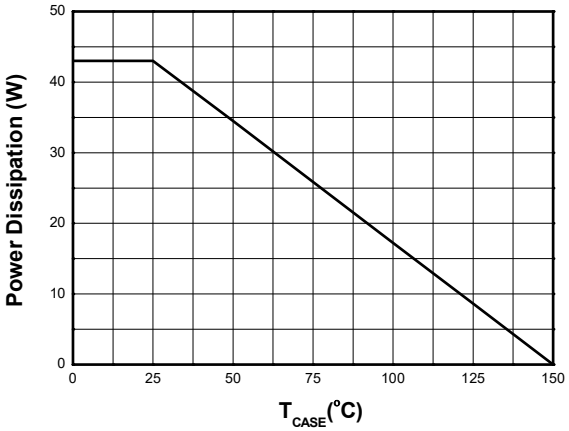
Safe Operating Power



Gate Charge Characteristics

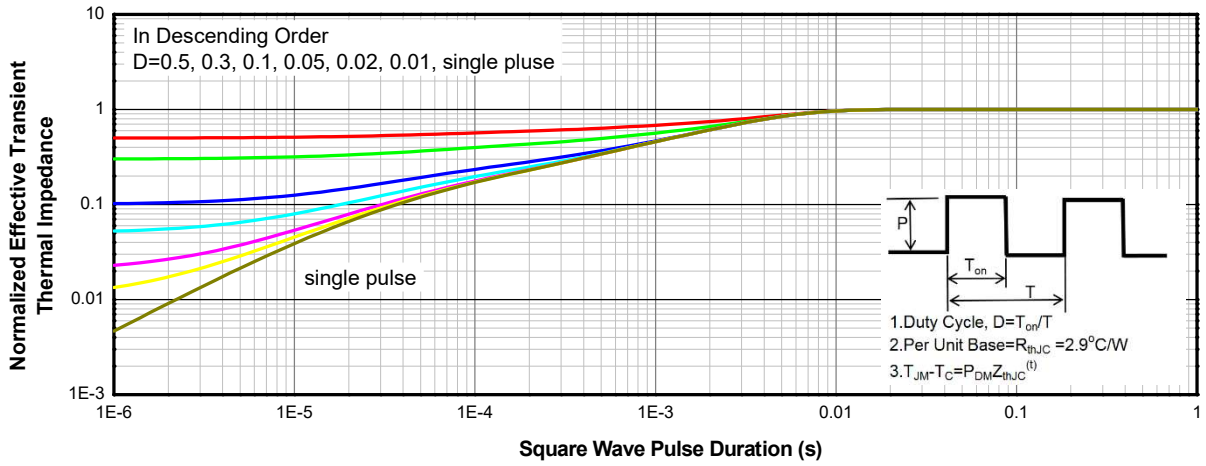


Single Pulse Avalanche capability

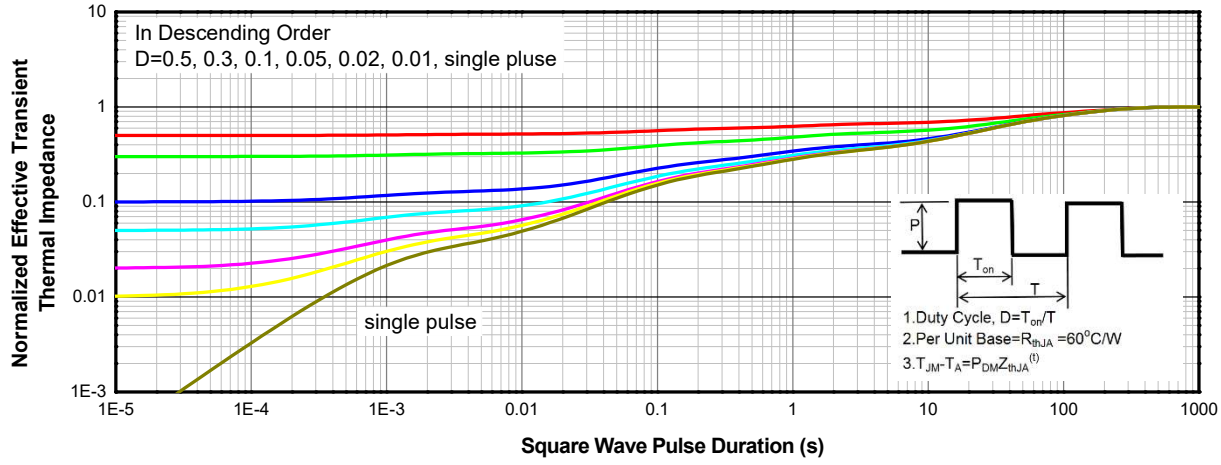


Power De-rating

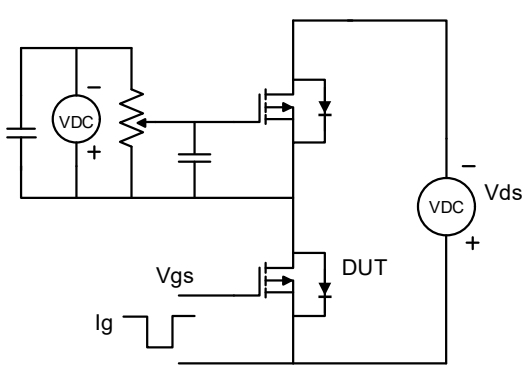
Transient Thermal Response (Junction-to-Case)

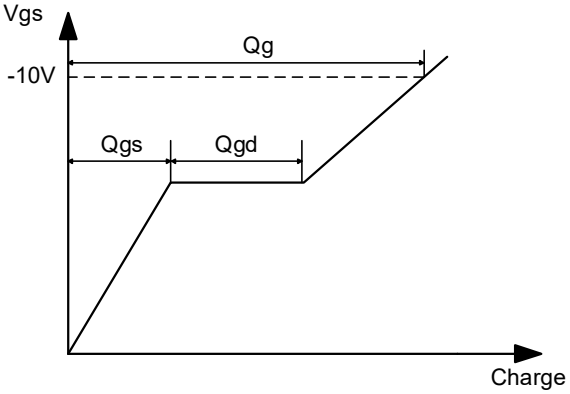


Transient Thermal Response (Junction-to-Ambient)

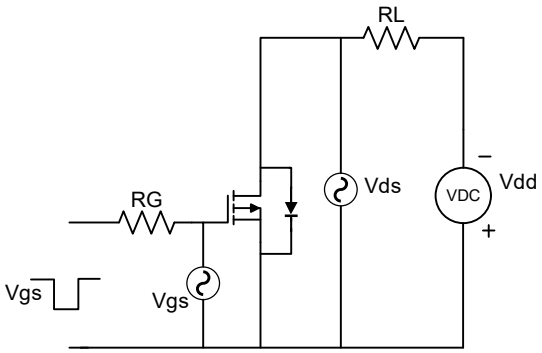


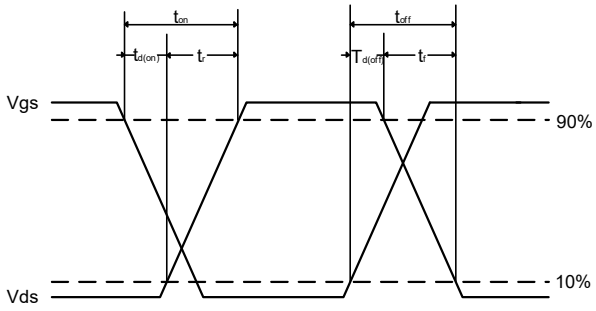
Gate Charge Test Circuit & Waveform



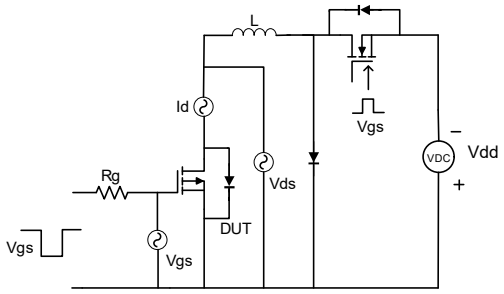


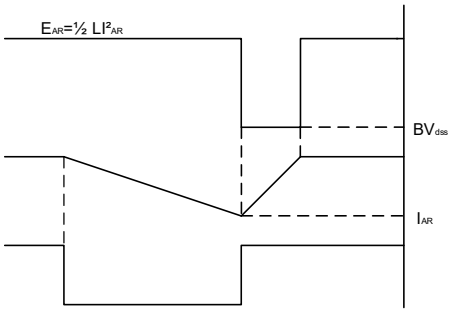
Resistive Switching Test Circuit & Waveform



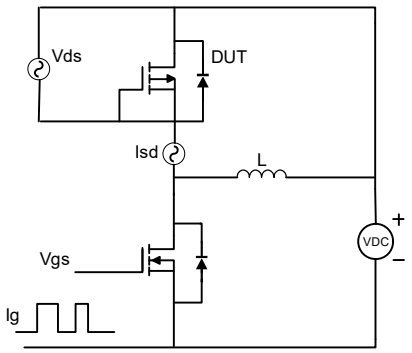


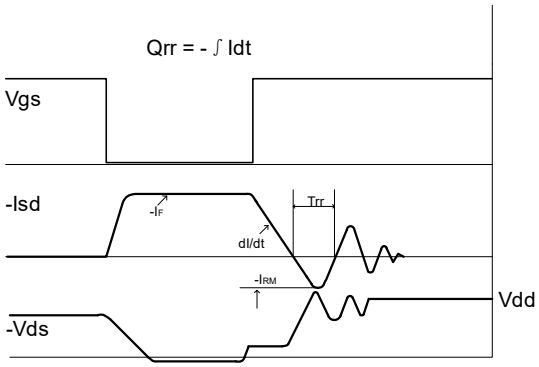
Unclamped Inductive Switching(UIS) Test Circuit & Waveform





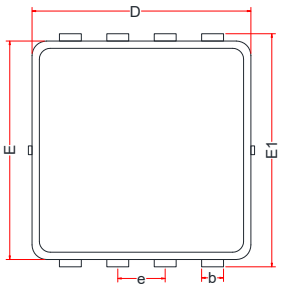
Diode Recovery Test Circuit & Waveform



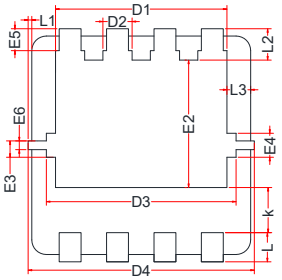


PACKAGE OUTLINE DIMENSIONS

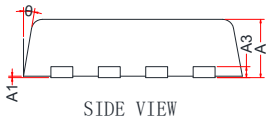
PDFN3x3-8L



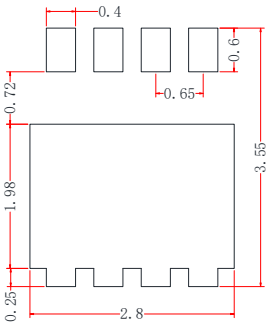
TOP VIEW



BOTTOM VIEW



SIDE VIEW



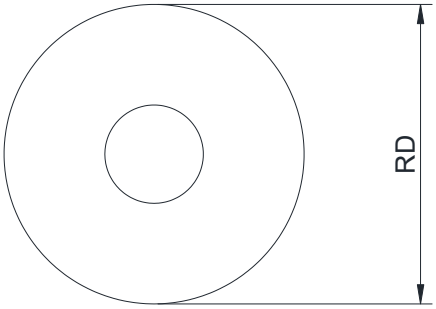
RECOMMENDED LAND PATTERN(Unit:mm)

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.70	0.80	0.90
A1	0.00	0.02	0.05
A3	0.10	0.15	0.25
b	0.24	0.30	0.35
D	2.90	3.00	3.10
D1	2.25	2.35	2.45
D2	0.30	0.40	0.50
D3	2.50	2.60	2.70
D4	3.00	3.10	3.20
E	2.90	3.00	3.10
E1	3.10	3.20	3.30
E2	1.65	1.75	1.85
E3	0.48	0.58	0.68
E4	0.23	0.33	0.43
E5	0.20	0.30	0.40
E6	0.07	0.12	0.18
e	0.60	0.65	0.70
K	0.52	0.62	0.72

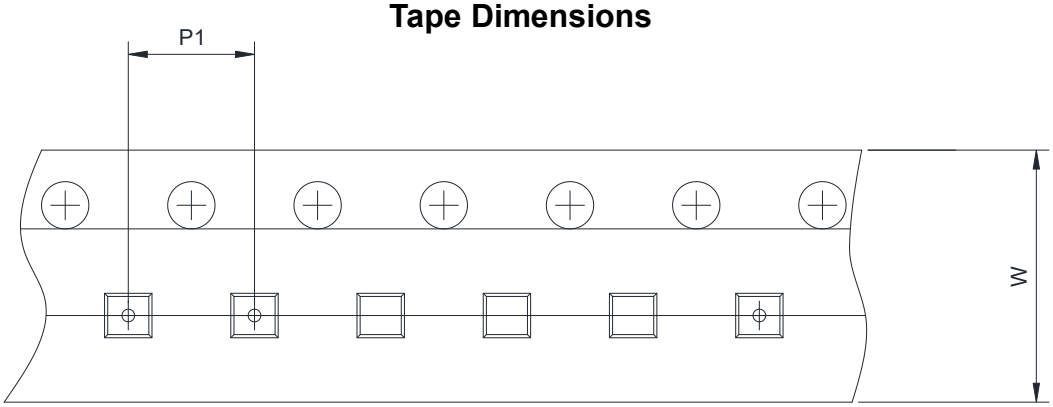
L	0.30	0.40	0.50
L1	0.00	0.05	0.10
L2	0.33	0.43	0.53
L3	0.27	0.37	0.48
θ	0°	10°	12°

TAPE AND REEL INFORMATION

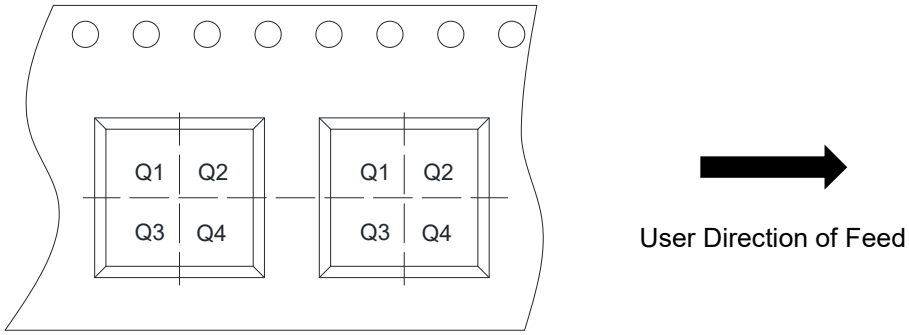
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



RD	Reel Dimension	☐ 7inch ☑ 13inch
W	Overall width of the carrier tape	☐ 8mm ☑ 12mm ☐ 16mm
P1	Pitch between successive cavity centers	☐ 2mm ☐ 4mm ☑ 8mm
Pin1	Pin1 Quadrant	☑ Q1 ☐ Q2 ☐ Q3 ☐ Q4