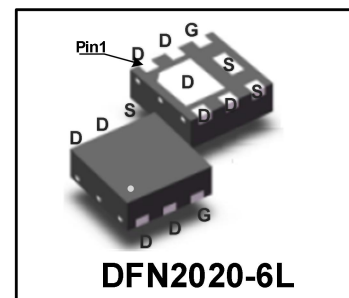


30V N-Channel Enhancement Mode Power MOSFET

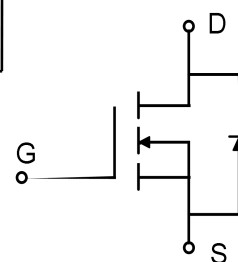
Description

EMR05N03LB uses generation power trench MOSFET technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance. This device is well suited for high efficiency fast switching applications.



Features

- $V_{DS}=30V$, $I_D = 17A$
 $R_{DS(on)} < 4.9m\Omega$ @ $V_{GS} = 10V$
 $R_{DS(on)} < 8m\Omega$ @ $V_{GS} = 4.5V$
- Low $R_{DS(ON)}$
- Low Gate Charge
- 100% EAS Guaranteed



Applications

- Power Management Switches
- DC/DC Converter

Absolute Maximum Ratings($T_A = 25^\circ C$, unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_A=25^\circ C$	I_D	17	A
	$T_A=100^\circ C$		11	
Pulsed Drain Current ¹		I_{DM}	68	A
Single Pulse Avalanche Energy ²		EAS	39.2	mJ
Total Power Dissipation	$T_A=25^\circ C$	P_D	2.4	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient ³	$R_{\theta JA}$	52	$^\circ C/W$

EMR05N03LB

Electrical Characteristics($T_J = 25^{\circ}\text{C}$, unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	30	-	-	V
Gate-body Leakage Current		I _{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T _J =25°C	I _{DSS}	V _{DS} = 30V, V _{GS} = 0V	-	-	1	μA
	T _J =100°C			-	-	100	
Gate-Threshold Voltage		V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.2	1.6	2.4	V
Drain-Source On-Resistance ⁴		R _{DS(on)}	V _{GS} = 10V, I _D = 8A	-	4.2	4.9	mΩ
			V _{GS} = 4.5V, I _D =6A	-	6	8	
Forward Transconductance ⁴		g _{fs}	V _{DS} = 10V, I _D = 8A	-	65	-	S
Dynamic Characteristics ⁵							
Input Capacitance		C _{iss}	V _{DS} = 15V, V _{GS} =0V, f =1MHz	-	905	-	pF
Output Capacitance		C _{oss}		-	475	-	
Reverse Transfer Capacitance		C _{rss}		-	57	-	
Gate Resistance		R _g	f = 1MHz	-	2.5	-	Ω
Switching Characteristics ⁵							
Total Gate Charge		Q _g	V _{GS} = 10V, V _{DS} = 15V, I _D = 8A	-	16	-	nC
Gate-Source Charge		Q _{gs}		-	3	-	
Gate-Drain Charge		Q _{gd}		-	3.3	-	
Turn-On Delay Time		t _{d(on)}	V _{GS} =10V, V _{DD} = 15V, R _G = 3Ω, I _D = 8A	-	6.3	-	ns
Rise Time		t _r		-	3.2	-	
Turn-Off Delay Time		t _{d(off)}		-	18	-	
Fall Time		t _f		-	3.6	-	
Body Diode Reverse Recovery Time		t _{rr}	I _F =8A, dI/dt=100A/μs	-	10	-	ns
Body Diode Reverse Recovery Charge		Q _{rr}		-	13.2	-	nC
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴		V _{SD}	I _S = 1A, V _{GS} = 0V	-	-	1.2	V
Continuous Source Current	T _A =25°C	I _S	-	-	-	17	A

Notes:

- 1.Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^{\circ}\text{C}$.
- 2.The EAS data shows Max. rating . The test condition is $V_{DD} = 25V, V_{GS} = 10V, L = 0.4\text{mH}, I_{AS} = 14A$.
3. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
5. This value is guaranteed by design hence it is not included in the production test.

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Typical Characteristics

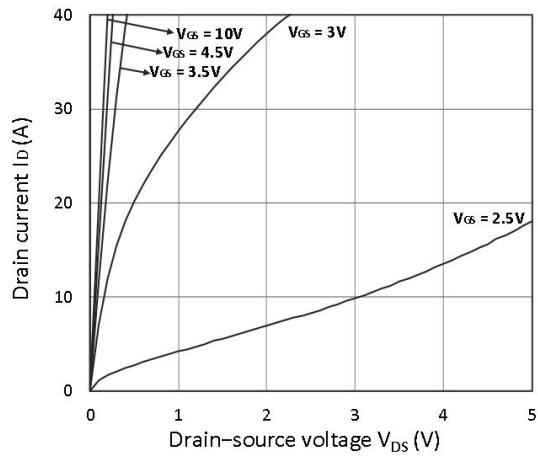


Figure 1. Output Characteristics

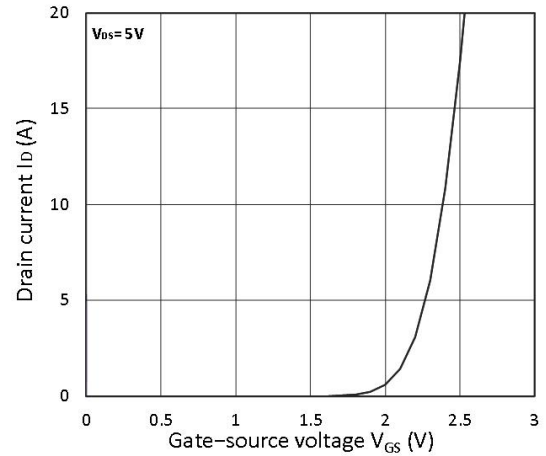


Figure 2. Transfer Characteristics

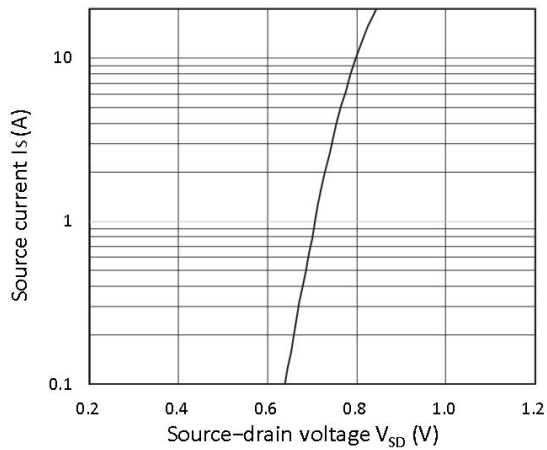


Figure 3. Forward Characteristics of Reverse

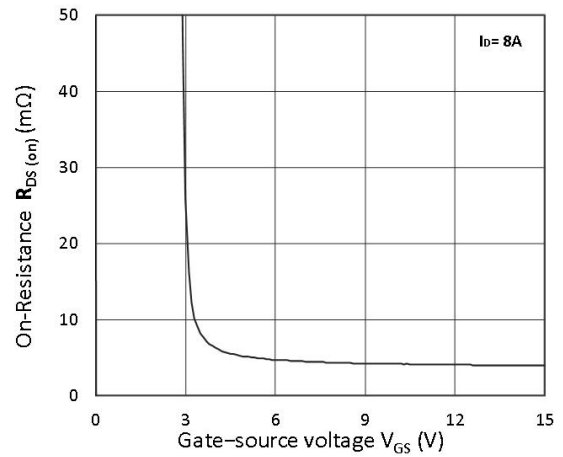


Figure 4. $R_{DS(on)}$ vs. V_{GS}

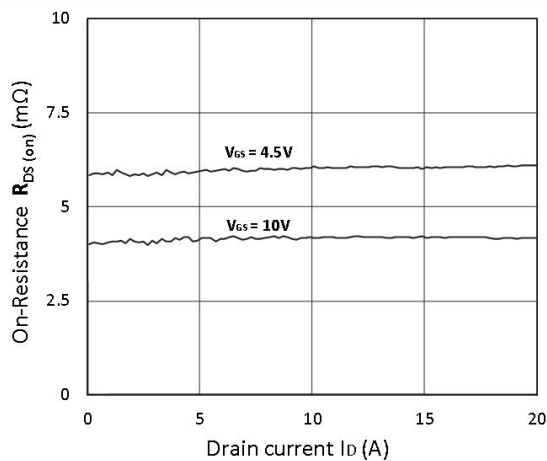


Figure 5. $R_{DS(on)}$ vs. I_D

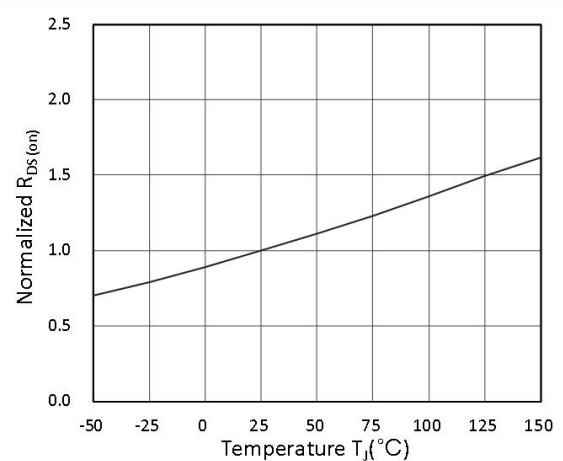


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

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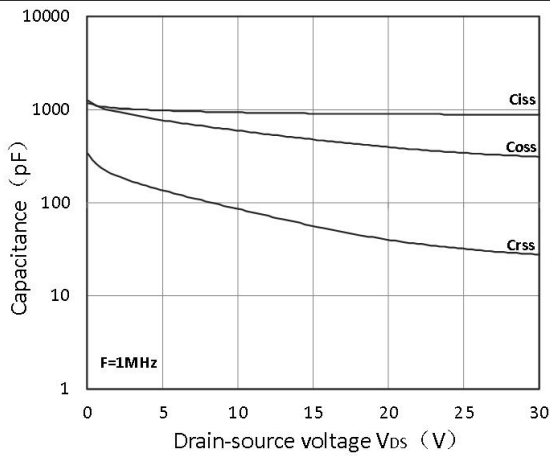


Figure 7. Capacitance Characteristics

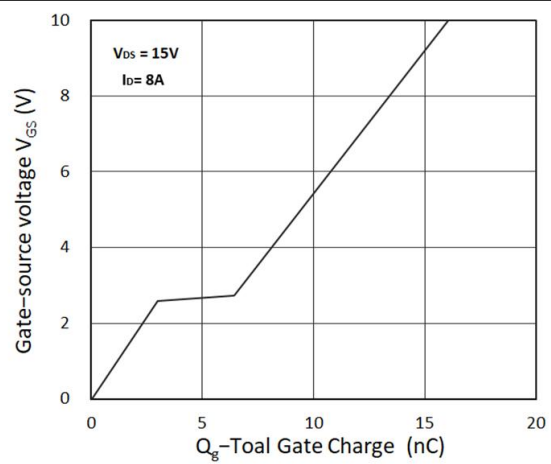


Figure 8. Gate Charge Characteristics

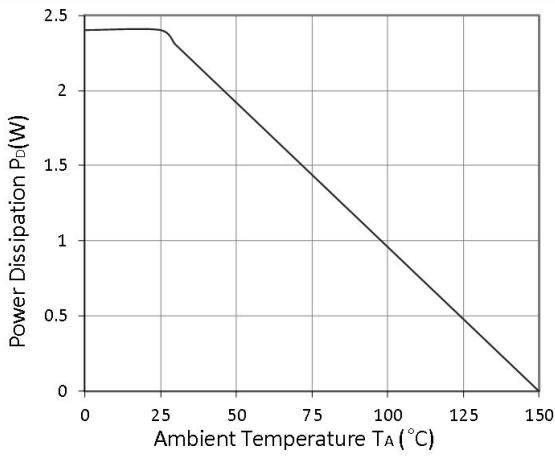


Figure 9. Power Dissipation

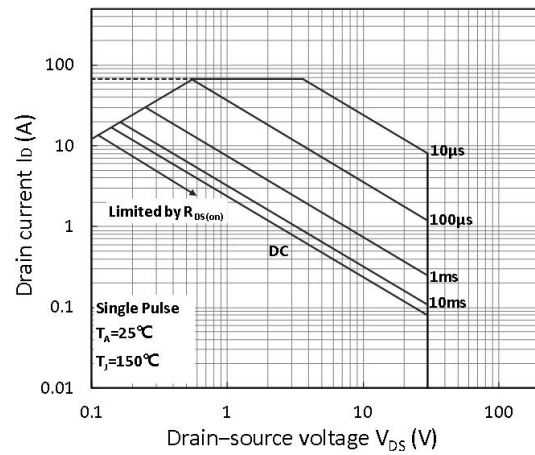


Figure10. Safe Operating Area

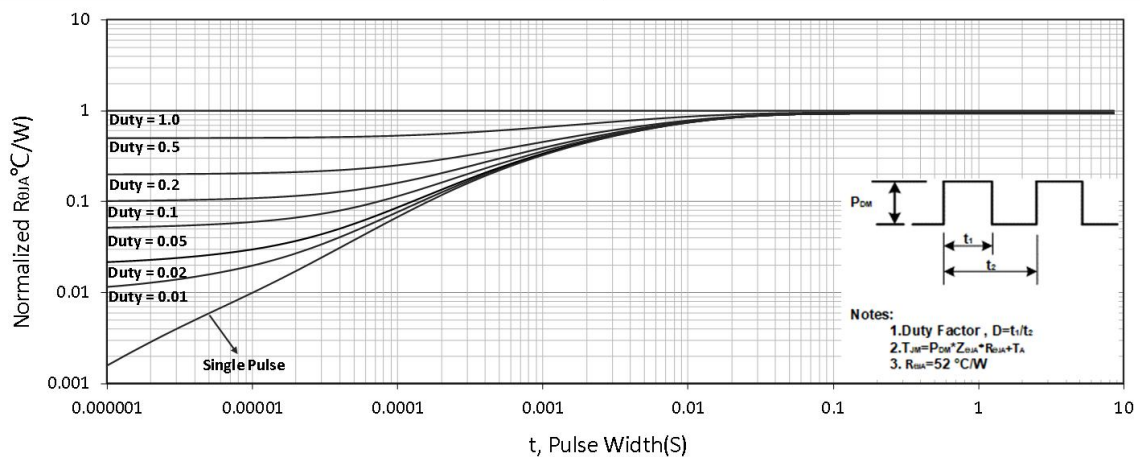


Figure 11. Normalized Maximum Transient Thermal Impedance

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TestCircuit

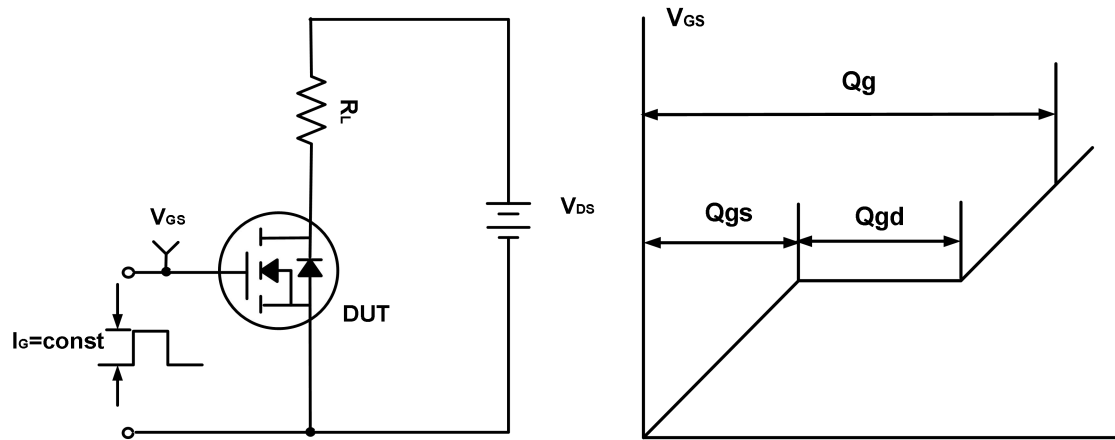


Figure A. GateCharge Test Circuit & Waveforms

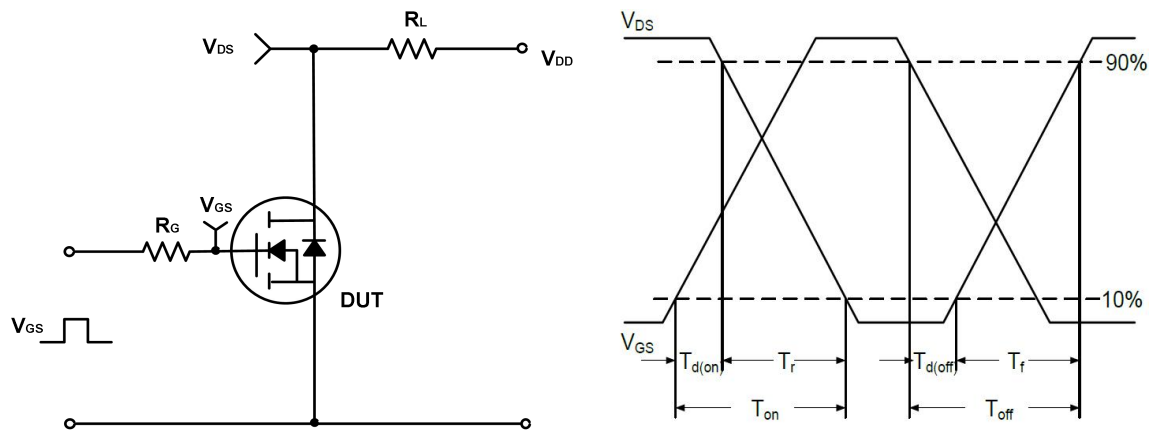


Figure B. Switching Test Circuit & Waveforms

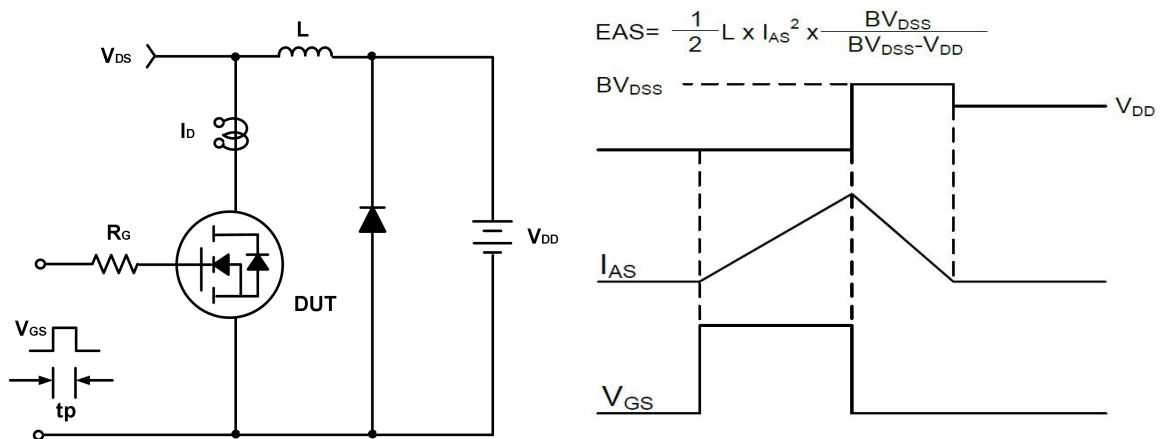
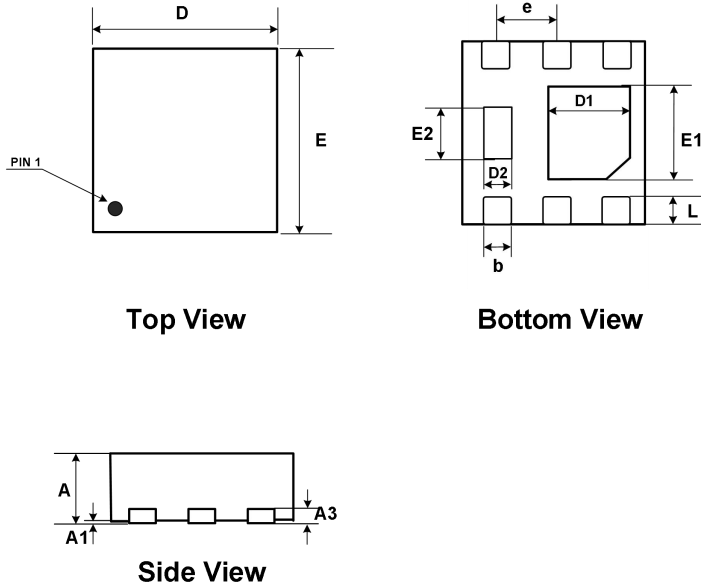


Figure C. Unclamped Inductive Switching Circuit & Waveforms

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Mechanical Dimensions for DFN2020-6L



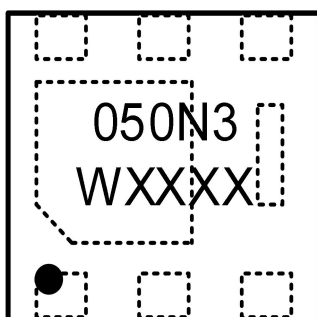
COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	0.500	0.600
A1	0.000	0.050
A3	0.152REF	
D	1.900	2.100
E	1.900	2.100
D1	0.800	1.000
E1	0.850	1.050
E2	0.460	0.660
D2	0.200	0.400
b	0.250	0.350
e	0.650TYP	
L	0.174	0.326

Ordering Information

Part	Package	Marking	Packing method
EMR05N03LB	DFN2020-6L	050N3	Tape and Reel

Marking Information



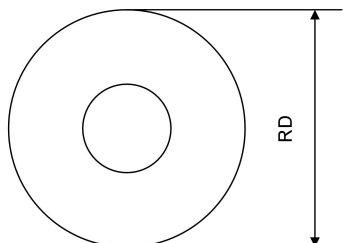
050N3= Device code

WXXXX= Date code

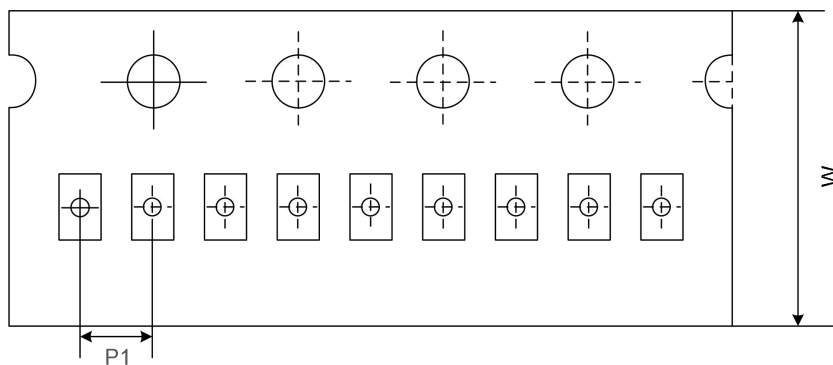
EMR05N03LB

TAPE AND REEL INFORMATION

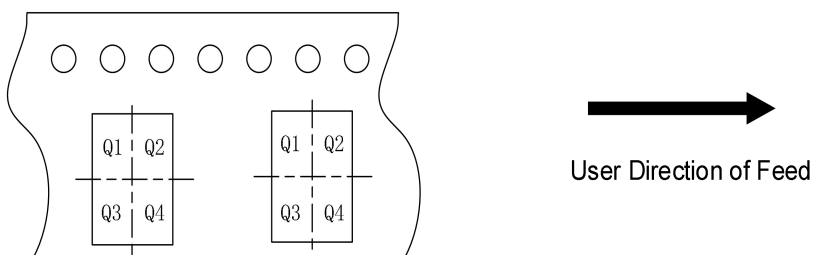
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



RD	Reel Dimensions	7 inch
W	Overall width of the carrier tape	8 mm
P1	Pitch between successive cavity centers	4mm
Pin1	Pin1 Quadrant	Q1

EMR05N03LB

Revision History

No.	Version	Date	Revision Item	Request	Function and characteristic checking	Package dimension checking	Typos checking
1	1.0	2021-09-22	Released Version	QiShuKun	QiShuKun	Liu Jia Ying	Liu Jia Ying
2	1.1	2022-04-15	Verify $R_{DS(on)}$	QiShuKun	QiShuKun	Liu Jia Ying	Liu Jia Ying
3	1.2	2023-12-04	Add tape information	QiShuKun	QiShuKun	Liu Jia Ying	Liu Jia Ying