WANSEMI
万 芯 半 导 体

WP047N09KF

N-channel Enhancement Mode Power MOSFET

TO-263/NMOS/90V/±20V/3V/135A/4mΩ

Rev0.7

90V, 4.0mΩ, 135A, N-channel Enhancement Mode Power MOSFET

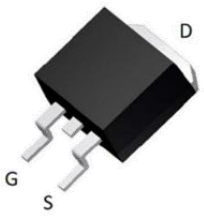
1.Features

- Low Gate Charge
- Ultra-low $R_{DS(on}$
- Halogen-free and RoHS-compliant
- 100% Avalanche&Rg Tested

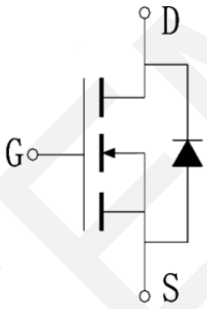
V_{DS}	$R_{DS(on)}$ Typ.	I_D Max.
90V	4.0mΩ @10V	135A

2.Applications

- Current Switching in DC/DC & AC/DC (SR) Sub-syste
- Motor Driving in Power Tool, E-vehicle, Robotics



TO-263
Pin Description



Schematic Diagram

3.Package Marking and Ordering Information

Part no.	Package	Marking	Material Code	$V_{GS(th)}$	PCS/Reel	PCS/CTN.
WP047N09KF	TO-263	WP047N09	1221079000084	2.5V-2.7V	800	4000
			1221079000046	2.7V-2.9V		
			1221079000053	2.9V-3.1V		
			1221079000060	3.1V-3.3V		
			1221079000077	3.3V-3.5V		

4.Absolute Max Ratings at Ta=25℃ (Note1)

Parameter	Symbol	Maximum	Units
Drain to Source Voltage	V_{DSS}	90	V
Gate to Source Voltage	V_{GSS}	±20	V
Drain Current (DC)	I_D	135	A
Drain Current (Pulse), PW≤300μs	I_{DP}	336	A
Total Dissipation	P_D	192	W
Avalanche Energy, Single Pulsed	E_{AS}	552	mJ
Junction Temperature	T_j	150	℃
Storage Temperature	T_{stg}	-55 to +150	℃

Note 1: Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

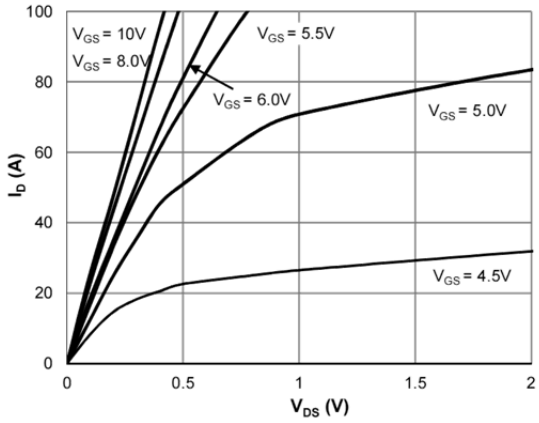
5.Electrical Characteristics at Ta=25℃ (Note 2)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = 250μA, V_{GS} = 0V	90			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS} = 80V, V_{GS} = 0V			1	μA
Gate to Source Leakage Current	I_{GSS1}	V_{GS} = ±20V, V_{SS} = 0V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_{DS}=250μA	2.0	3.0	3.5	V
Static Drain to Source On-State Resistance	$R_{DS(on)}$	I_D =30A, V_{GS} =10V	-	4.0	4.9	mΩ
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=45V, Frequency=1.0MHz		3525		pF
Output Capacitance	C_{oss}			960		pF
Reverse Transfer Capacitance	C_{rss}			22		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = 45V, R_L = 2.3Ω, V_{GS} = 10V, R_{GEN} =3Ω		15.5		ns
Rise Time	t_r			29		ns
Turn-off Delay Time	$t_{d(off)}$			38		ns
Fall Time	t_f			24		ns
Total Gate Charge	Q_g	V_{DS} = 45V, V_{GS} =10V, I_D =20A		56		nC
	Q_{gs}			15.5		nC
	Q_{gd}			16.2		nC
Diode Forward Voltage	V_{FSD}	I_S = 30A, V_{GS} = 0	0.4	0.85	1.2	V

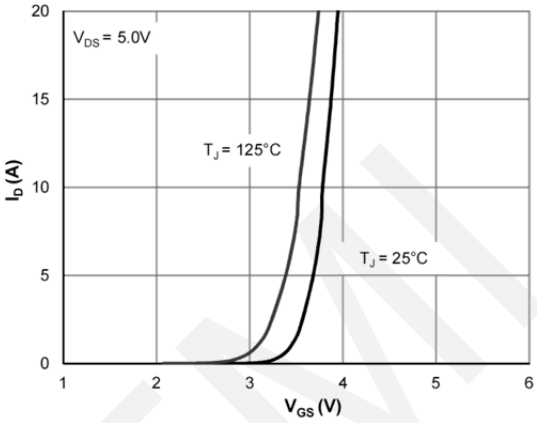
Note 2: Product parametric performance is indicated in the Electrical Characteristics for the listed test

conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

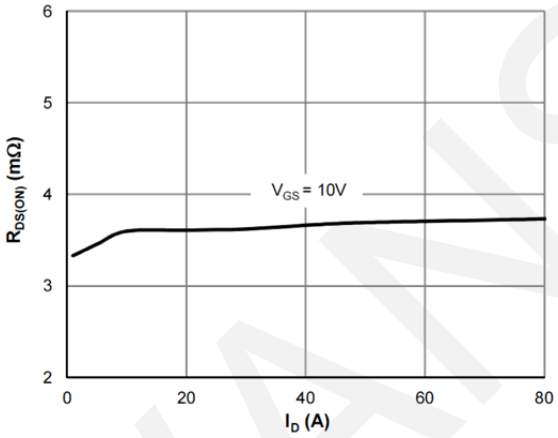
6.Typical electrical and thermal characteristics



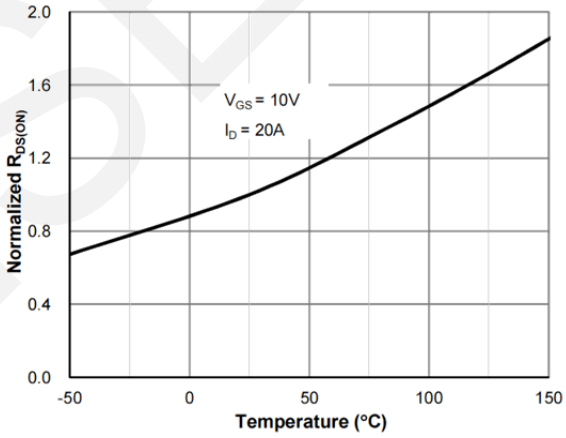
Saturation Characteristics



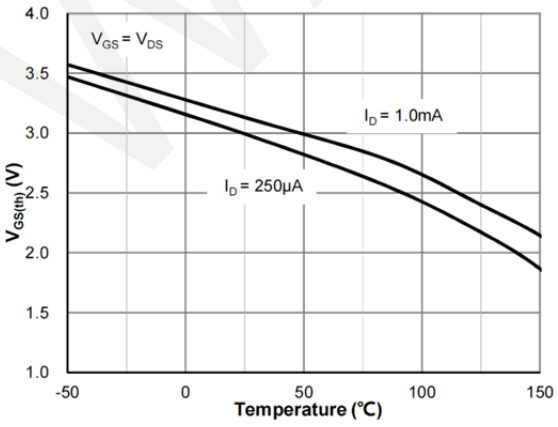
Transfer Characteristics



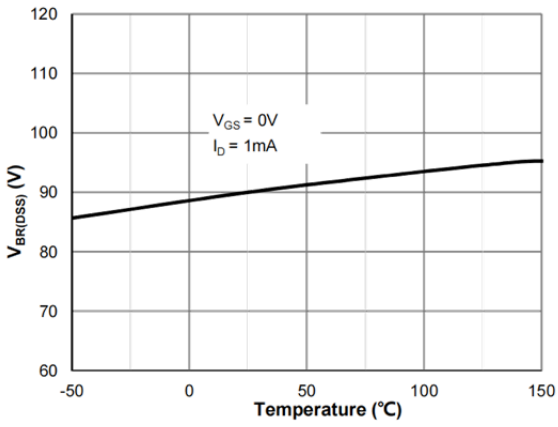
$R_{DS(on)}$vs.Drain Current



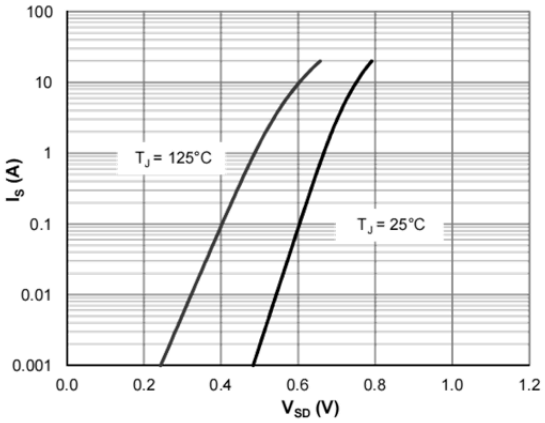
$R_{DS(on)}$vs.Junction Temperature

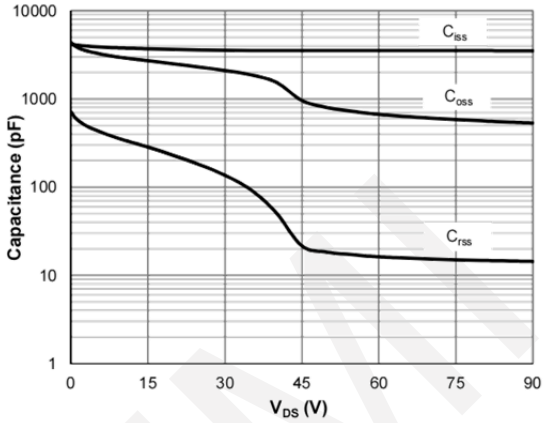


VGS(th) vs. Junction Temperature

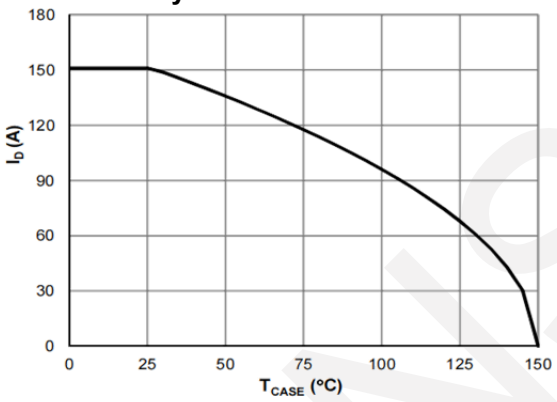


$V_{BR(DSS)}$vs.Junction Temperature

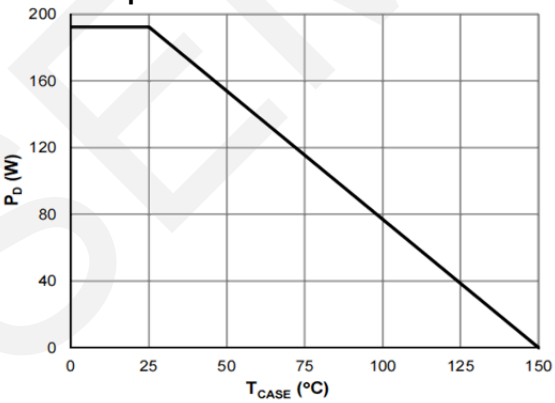




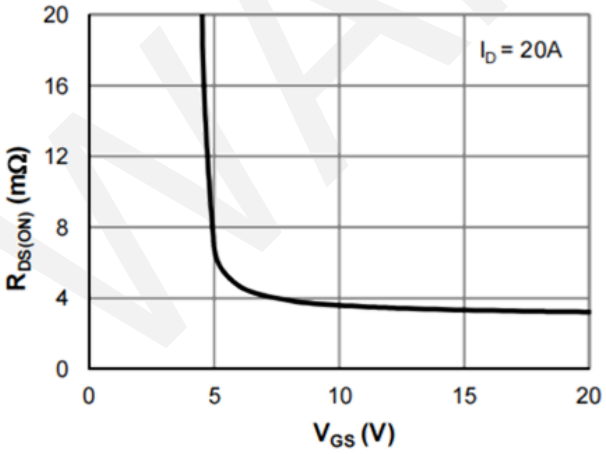
Body-Diode Characteristics



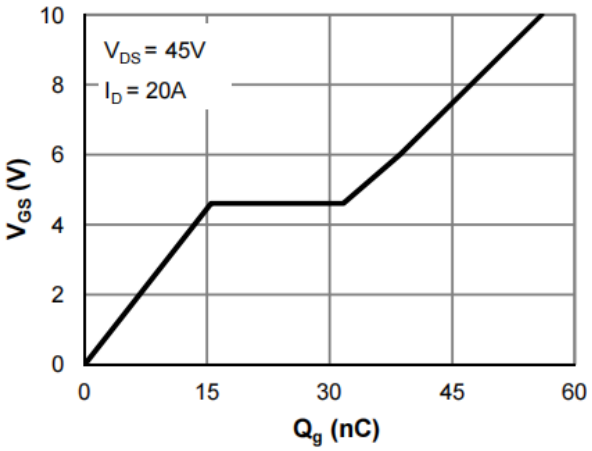
Capacitiance Characteristics



Current De-rating

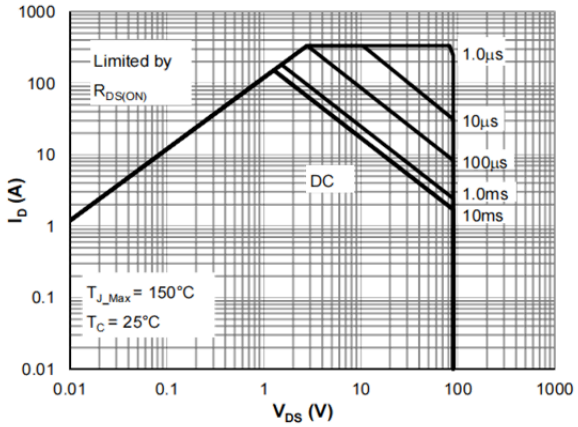


Power De-rating

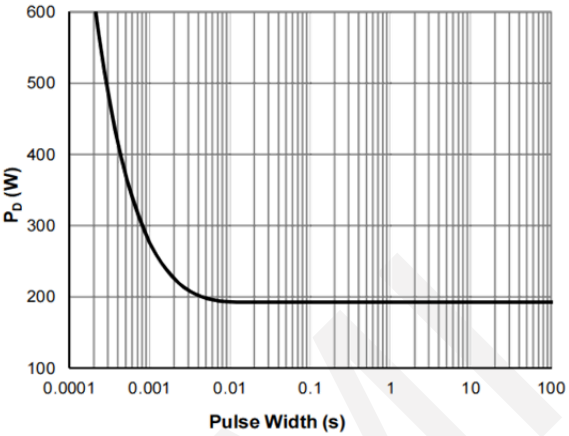


$R_{DS(on)}$ vs. V_{GS}

Gate Charge



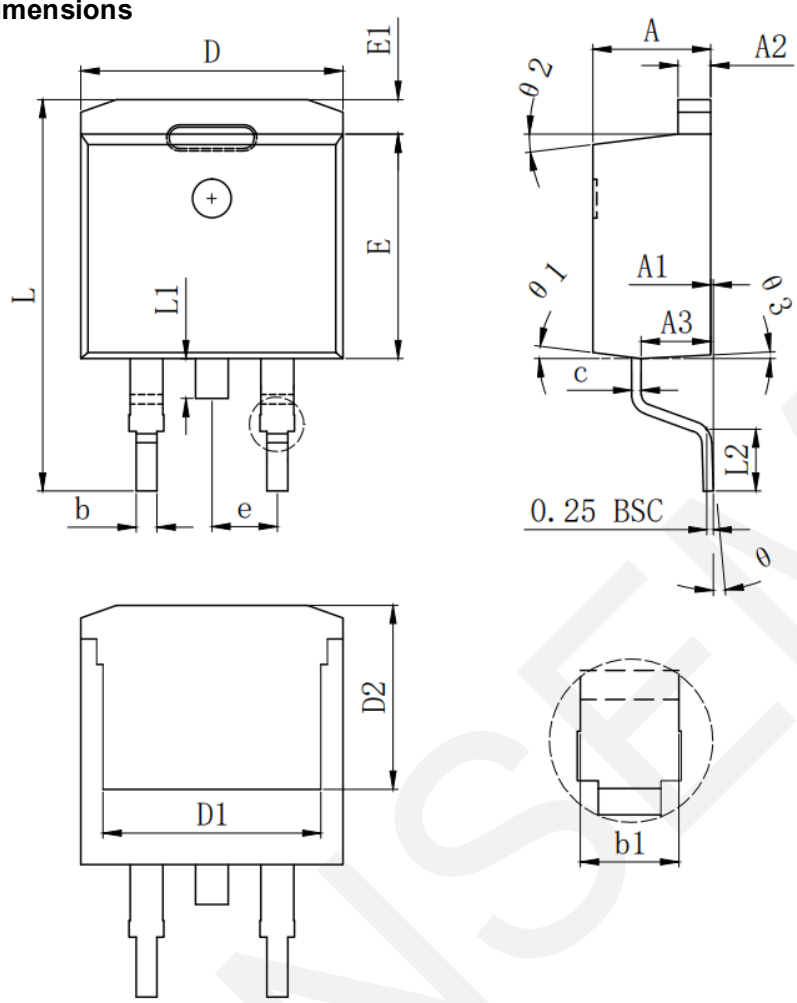
Maximum Safe Operating Area



Single Pulse Power Rating,Junction-to-Case

WANSEMI

7.Package Dimensions



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	4.370	4.570	4.770
A1	0.000		0.250
A2	1.220	1.270	1.420
A3	2.490	2.690	2.890
b	0.700	0.810	0.960
b1	1.170	1.270	1.470
c	0.300	0.380	0.530
D	9.860	10.160	10.360
D1	8.400 REF		
D2	7.073 REF		
E	8.500	8.700	8.900
E1	1.070	1.270	1.470
e	2.540 TYP		
L	14.700	15.100	15.500
L1	1.400	1.550	1.700
L2	2.000	2.300	2.600
θ	0°		9°
θ1	7° TYP		
θ2	7° TYP		
θ3	3° TYP		

8. Important Notice

WAN SEMICONDUCTOR (NINGBO) CO.,LTD reserves the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services and to discontinue any product or service. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as “components”) are sold subject to WANSEMI’s terms and conditions of sale supplied at the time of order acknowledgment.

WANSEMI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in WANSEMI’s terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent WANSEMI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

WANSEMI assumes no liability for applications assistance or the design of Buyers’ products. Buyers are responsible for their products and applications using WANSEMI components. To minimize the risks associated with Buyers’ products and applications, Buyers should provide adequate design and operating safeguards.

No WANSEMI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Unless WANSEMI has specifically designated certain components which meet ISO/TS16949 requirements, mainly for automotive use, WANSEMI will not be responsible for any failure of such components to meet such requirements.