

DATASHEET

N-Channel Enhancement Mode Power MOSFET

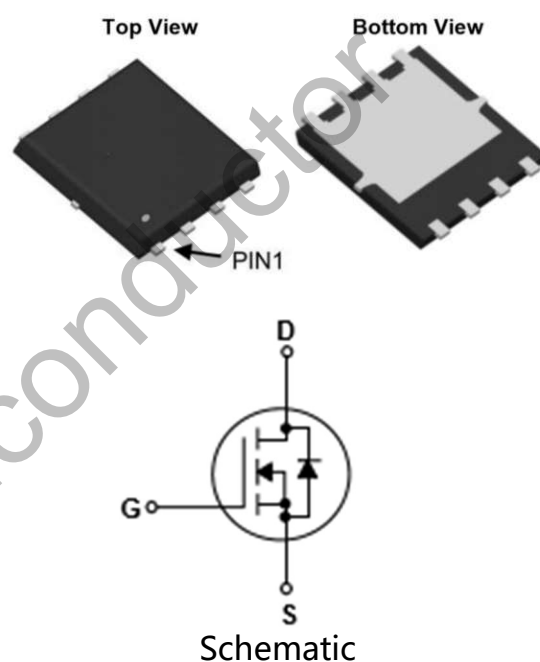
Description

This Power MOSFET is produced using advanced SGT technology. This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

Features

- $V_{DS}=30V$, $I_D=178A$
- $R_{DS(ON) TYP} = 1.1m\Omega @V_{GS}=10V$
- $R_{DS(ON) TYP} = 2.1m\Omega @V_{GS}=4.5V$
- Very Low On-resistance $R_{DS(ON)}$
- Low C_{rss}
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

PDFN5*6-8L



Applications

- Current Switch for DC/DC, AC/DC
- Power Management
- Motor Driving, Quick/Wireless Charging

100% UIS TESTED!

100% ΔV_{ds} TESTED!



Package Marking and Ordering Information

Device	Marking	Package	Packing	Reel size	Reel (pcs)	Per Carton (pcs)
180N03		PDFN5*6	Reel	13inch	5000	60000

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Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-source Voltage		V_{DS}	30	V
Gate-source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C=25^{\circ}\text{C}$	I_D	178	A
	$T_C=100^{\circ}\text{C}$		110	
Pulsed Drain Current($T_C=25^{\circ}\text{C}$, T_p Limited By T_{jmax}) ^(note1)		I_{DM}	485	A
Maximum Power Dissipation($T_C=25^{\circ}\text{C}$)		P_D	78	W
Avalanche energy , single Pulse($L=0.5\text{mH}$) ^(note2)		E_{AS}	101	mJ
Thermal Resistance Junction to Case		$R_{\theta JC}$	1.2	$^{\circ}\text{C/W}$
Thermal Resistance, Junction to Ambient		$R_{\theta JA}$	50	$^{\circ}\text{C/W}$
Operating Junction And Storage Temperature		T_j, T_{stg}	-55 To 150	$^{\circ}\text{C}$

* Drain current limited by maximum junction temperature.

Notes:

1. This single-pulse measurement was taken under $T_{j_Max}=150^{\circ}\text{C}$
2. This Single-pulse measurement was taken under the following condition [$L=100\mu\text{H}$, $V_{GS}=10\text{V}$, $V_{DS}=30\text{V}$] while its value is limited by $T_{j_Max}=150^{\circ}\text{C}$.

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Electrical Characteristic (TC=25°C unless otherwise noted)

Parameter	Symbol	Value			Unit	Test Condition
		Min.	Typ.	Max.		
Off Characteristic						
Drain-source breakdown voltage	BV _{DSS}	30	-	-	V	V _{GS} =0V, I _D =1mA
Zero gate voltage drain current	I _{DSS}	-	-	1	μA	V _{DS} =30V, V _{GS} =0V
		-	-	5	μA	V _{DS} =30V, TC =55℃
Gate-source leakage current	I _{GSS}	-	-	± 100	nA	V _{GS} =± 20V, V _{DS} =0V
On Characteristics						
Gate threshold voltage	V _{GS(th)}	1.2	1.7	2.5	V	V _{DS} =V _{GS} , I _D =250μA
Drain-source on-state resistance	R _{DS(on)}	-	1.1	1.4	mΩ	V _{GS} =10V, I _D =20A
Drain-source on-state resistance	R _{DS(on)}	-	2.1	2.8	mΩ	V _{GS} =4.5V, I _D =15A
Dynamic Characteristic						
Input Capacitance	C _{iss}	-	2975	-	PF	V _{GS} =0V, V _{DS} =15V, f=1.0MHz
Output Capacitance	C _{oss}	-	2650	-		
Reverse Transfer Capacitance	C _{rss}	-	117	-		
Gate Resistance	R _G		1.4		Ω	V _{GS} =0V, V _{DS} =0V, f=1MHz
Switching Characteristics						
Turn-on delay time	t _{d(on)}	-	6	-	nS	V _{GS} =10V , V _{DS} =15V, RL=0.75Ω, R _G =3Ω
Turn-on Rise time	t _r	-	9	-		
Turn-off delay time	t _{d(off)}	-	26			
Turn-off Fall time	t _f	-	10	-		
Gate Total Charge	Q _G	-	39	-	nC	V _{GS} =10V, V _{DS} =15V, I _D =20A
Gate-Source Charge	Q _{gS}	-	8.6	-		
Gate-Drain Charge	Q _{gd}	-	5.0	-		
Drain-Source Diode Characteristics						
Body Diode Forward Voltage	V _{SD}	-	0.68	1.0	V	V _{GS} =0V, I _{SD} =1A, T _J = 25℃
Body Diode Forward Current	I _S	-	-	78	A	-
Body Diode Reverse Recovery Time	T _{rr}	-	51	-	ns	T _J =25℃ , I _F =20A, D _{IF} /d _t =100A/μs
Body Diode Reverse Recovery Charge	Q _{rr}	-	57	-	nC	

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Typical Electrical & Thermal Characteristics

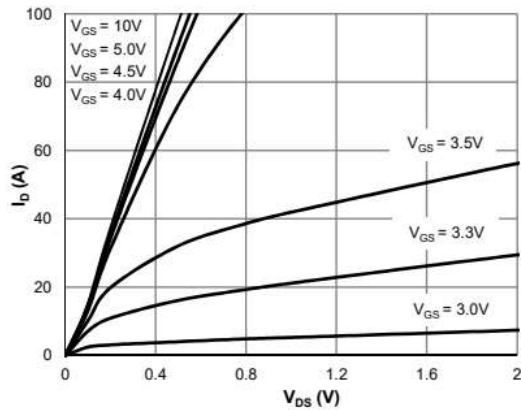


Figure 1: Saturation Characteristics

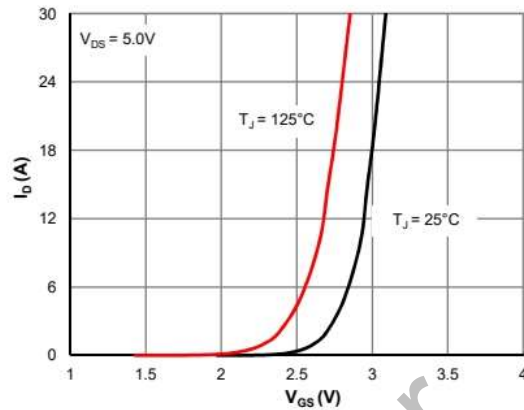


Figure 2: Transfer Characteristics

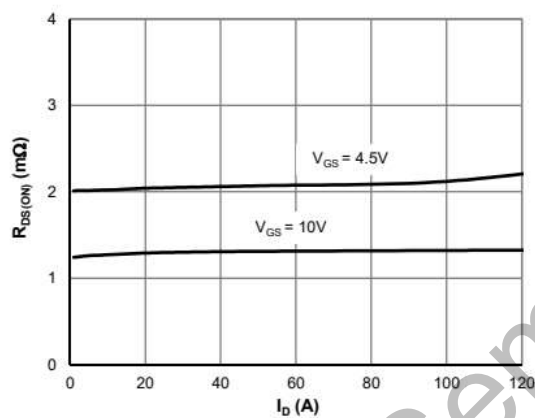


Figure 3: $R_{DS(ON)}$ vs. Drain Current

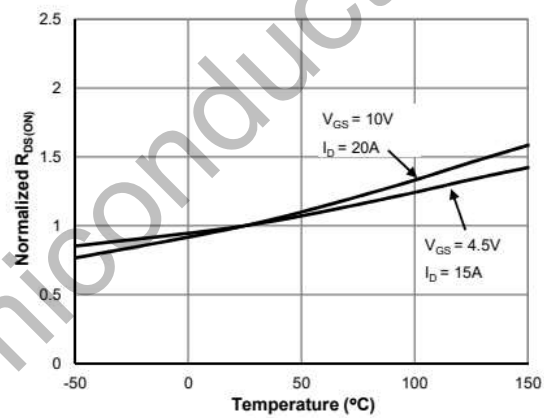


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

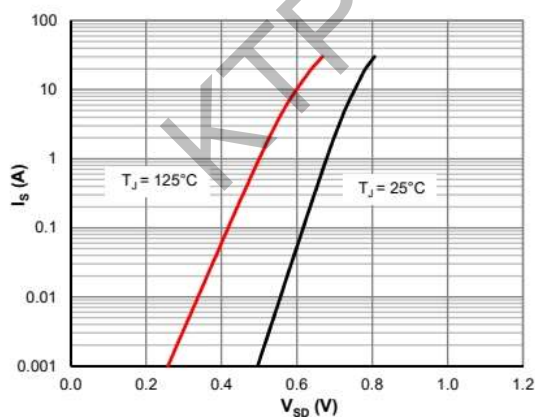


Figure 5: Body-Diode Characteristics

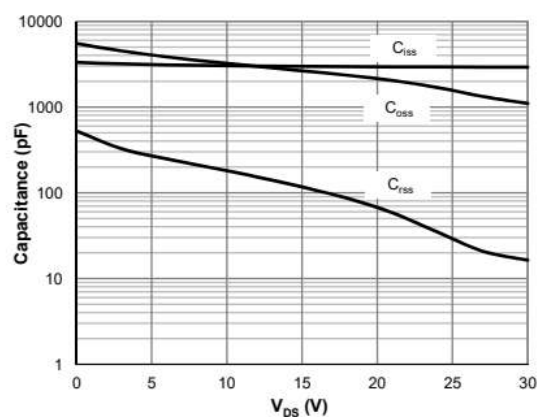


Figure 6: Capacitance Characteristics

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Typical Electrical & Thermal Characteristics

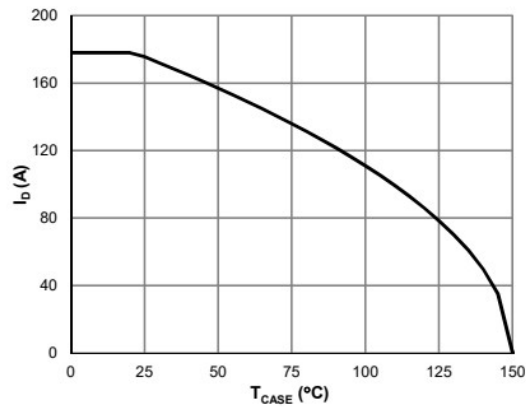


Figure 7: Current De-rating

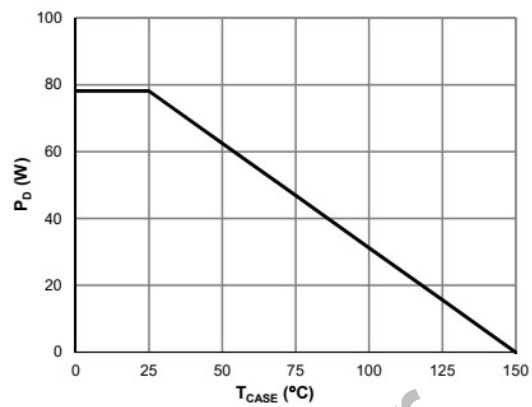


Figure 8: Power De-rating

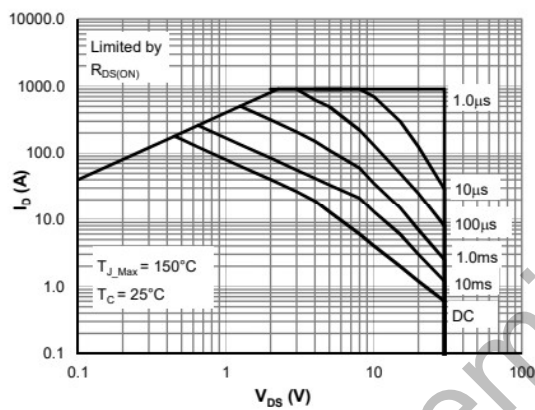


Figure 9: Maximum Safe Operating Area

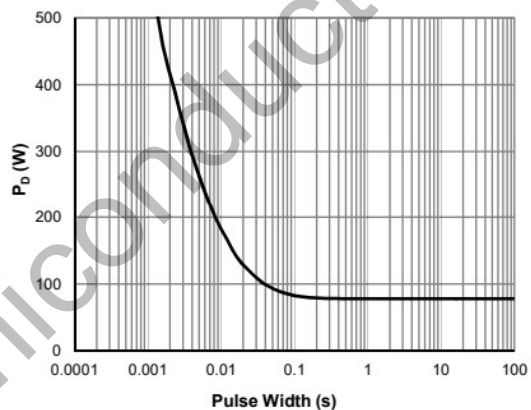


Figure 10: Single Pulse Power Rating, Junction-to-Case

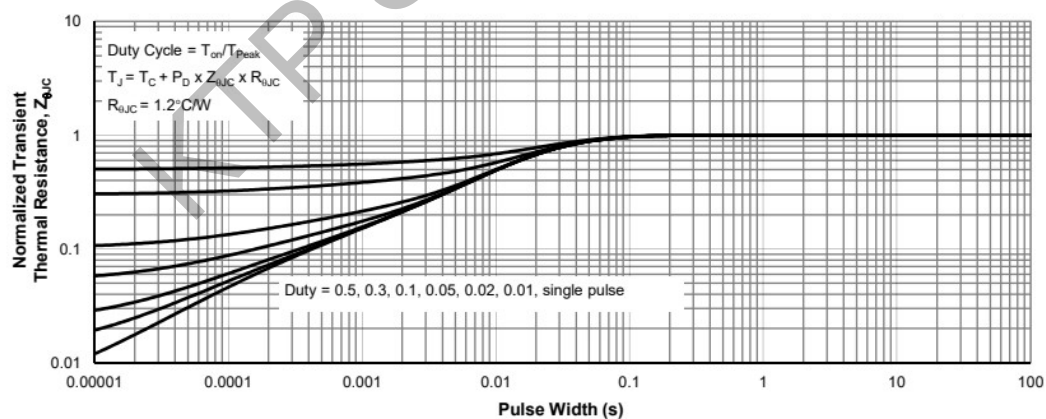


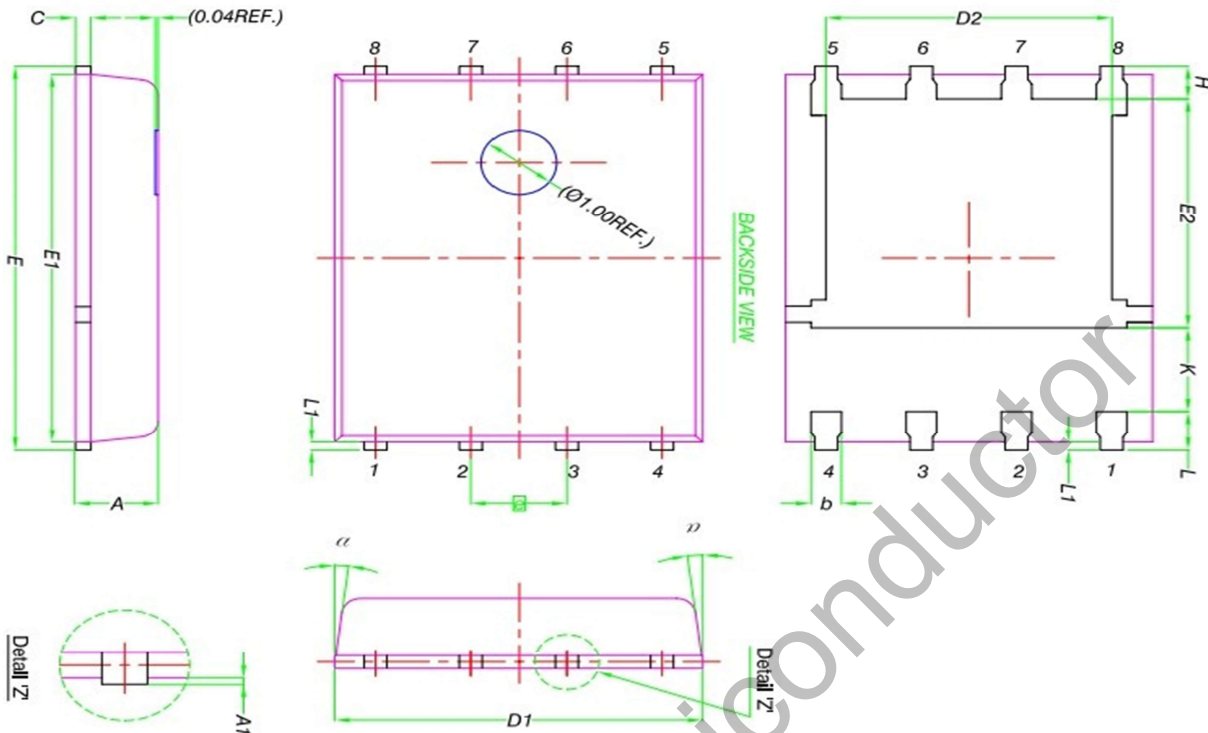
Figure 11: Normalized Maximum Transient Thermal Impedance

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Package Information

PDFN5*6-8L



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°

Note:

