

<p><b>Features</b></p> <ul style="list-style-type: none"> <li>• 30V, 90A</li> <li>• <math>R_{DS(ON)} = 3m\Omega</math> (Max.) @ <math>V_{GS} = 10V, I_D = 30A</math></li> <li>• Advanced Trench Technology</li> <li>• Provide Excellent <math>R_{DS(ON)}</math> and Low Gate Charge</li> </ul>	<p><b>Application</b></p> <ul style="list-style-type: none"> <li>• PWM Application</li> <li>• Load Switch</li> </ul>
<p><b>Package</b></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>PDFN5060-8L</p> </div> <div style="text-align: center;"> </div> </div> <p style="text-align: center;"><b>SFG90N03AT</b></p>	

**Absolute Maximum Ratings**  $T_C=25^\circ C$  unless otherwise specified

Symbol	Parameter	Max.	Units
$V_{DSS}$	Drain-Source Voltage	30	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_C = 25^\circ C$	90
		$T_C = 100^\circ C$	60
$I_{DM}$	Pulsed Drain Current <sup>note1</sup>	360	A
$E_{AS}$	Single Pulsed Avalanche Energy <sup>note2</sup>	400	mJ
$P_D$	Power Dissipation	$T_C = 25^\circ C$	45
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.8	$^\circ C/W$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +175	$^\circ C$

\*Drain current limited by maximum junction temperature

**Electrical Characteristics**  $T_C=25^{\circ}\text{C}$  unless otherwise specified

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	30	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 30V, V_{GS} = 0V$	-	-	1	$\mu A$
$I_{GSS}$	Gate to Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.6	2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance <sup>note2</sup>	$V_{GS} = 10V, I_D = 30A$	-	2.4	3.0	m $\Omega$
		$V_{GS} = 4.5V, I_D = 20A$	-	4.5	6.2	
$g_{FS}$	Forward Transconductance	$V_{DS} = 5V, I_D = 10A$	20.8	-	-	S
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS} = 15V, V_{GS} = 0V,$ $f = 1.0MHz$	-	3500	-	pF
$C_{oss}$	Output Capacitance		-	386	-	pF
$C_{riss}$	Reverse Transfer Capacitance		-	358	-	pF
$Q_g$	Total Gate Charge	$V_{DD} = 15V, I_D = 30A,$ $V_{GS} = 10V$	-	70	-	nC
$Q_{gs}$	Gate-Source Charge		-	12	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	17	-	nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 15V, I_D = 60A$ $R_{GEN} = 1.8\Omega$	-	11	-	ns
$t_r$	Turn-On Rise Time		-	120	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	25	-	ns
$t_f$	Turn-Off Fall Time		-	60	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	-	90	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		-	-	360	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 20A$	-	-	1.2	V
$t_{rr}$	Body Diode Reverse Recovery Time	$V_{GS} = 0V, I_F = 60A,$ $di/dt = 100A/\mu s$	-	56	-	ns
$Q_{rr}$	Body Diode Reverse Recovery Time Charge		-	110	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $T_C = 25^{\circ}\text{C}$ ,  $L=0.5mH, R_G=25\Omega$
3. Pulse Test: Pulse Width  $\leq 300 \mu s$ , Duty Cycle  $\leq 1\%$

## Typical Performance Characteristics

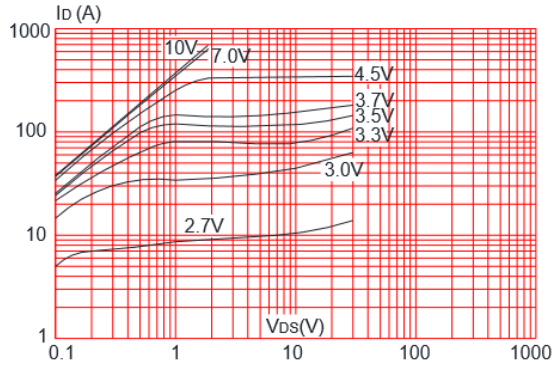


Figure 1. Output Characteristics

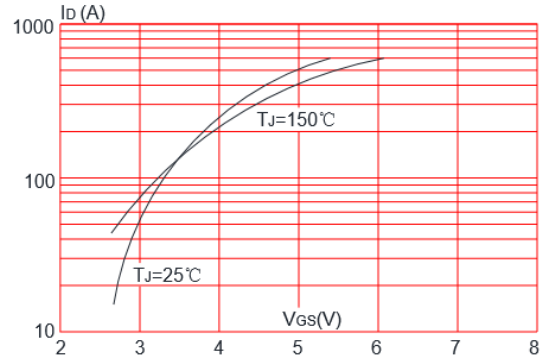


Figure 2. Transfer Characteristics

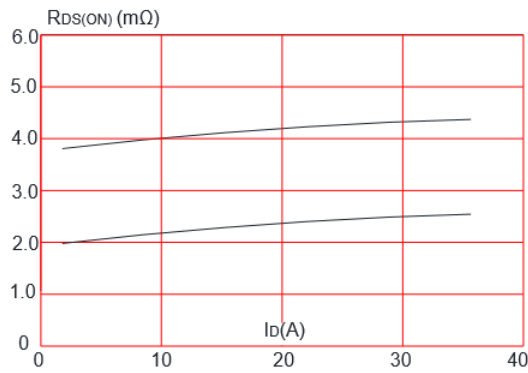


Figure 3. Drain-to-Source On Resistance

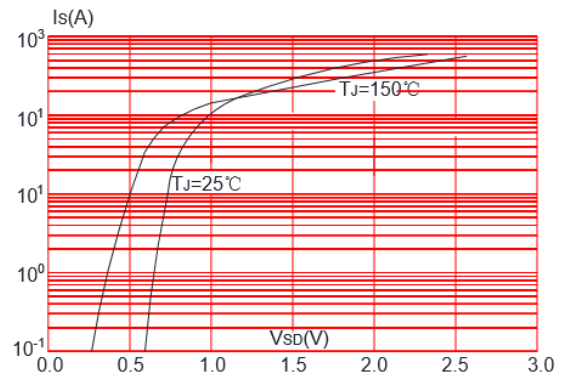


Figure 4. Body Diode Characteristics

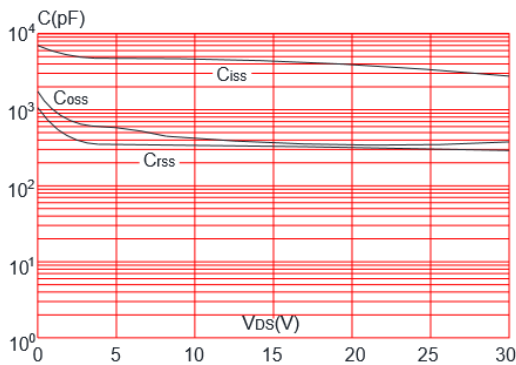


Figure 5. Capacitance Characteristics

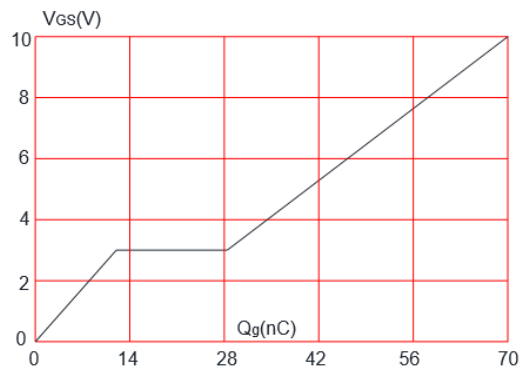


Figure 6. Gate Charge Characteristics

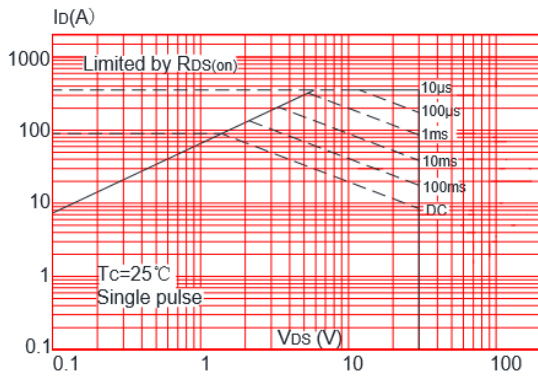


Figure 7. Maximum Safe Operating Area

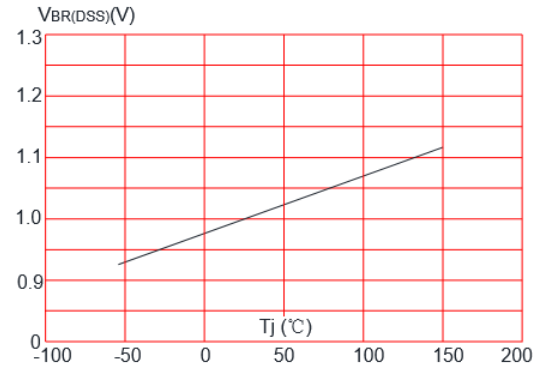


Figure 8. Normalized Breakdown Voltage VS. Junction Temperature

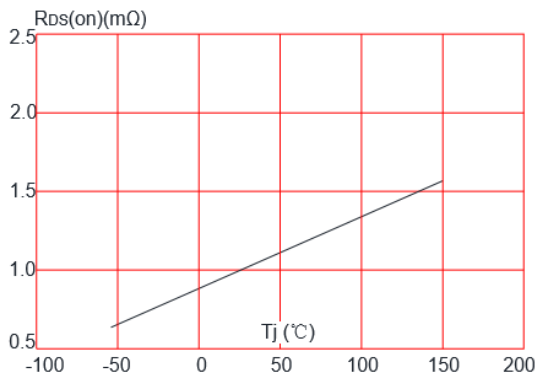


Figure 9. Normalized on Resistance VS. Junction Temperature

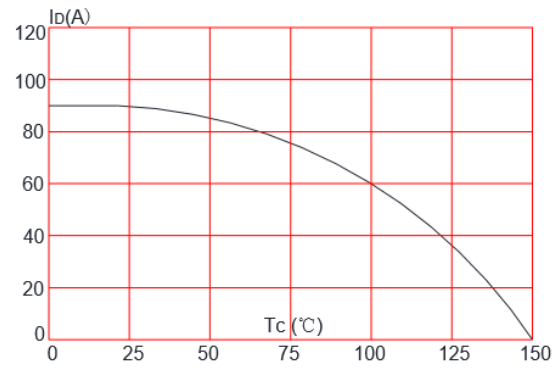


Figure 10. Maximum Continuous Drain Current VS. Case Temperature

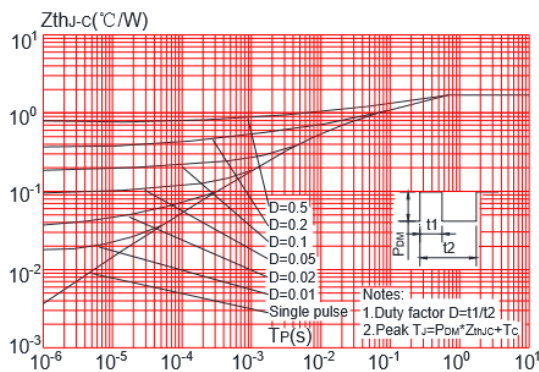


Figure 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

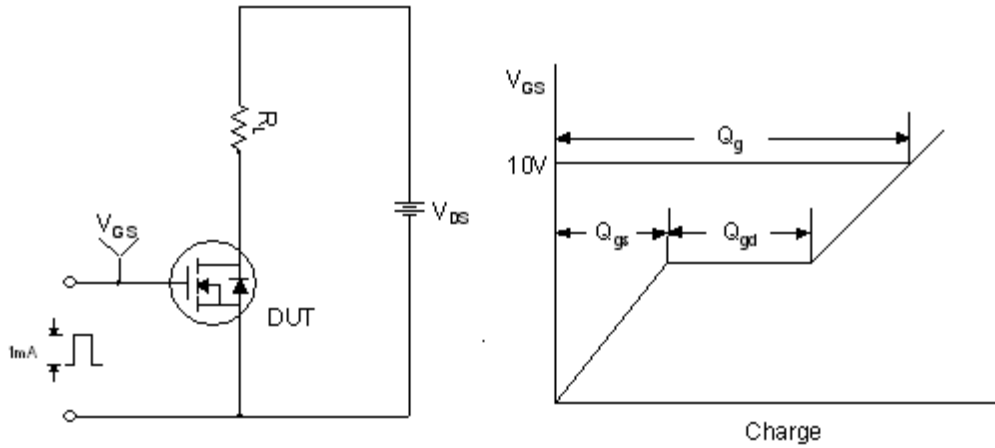


Figure 12. Gate Charge Test Circuit & Waveform

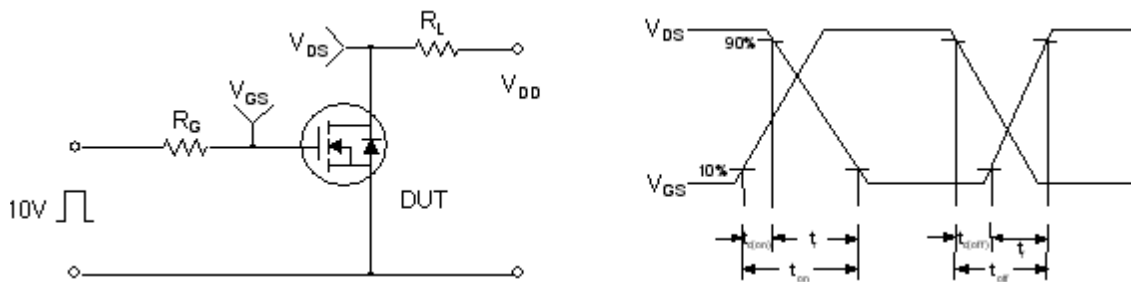


Figure 13. Resistive Switching Test Circuit & Waveforms

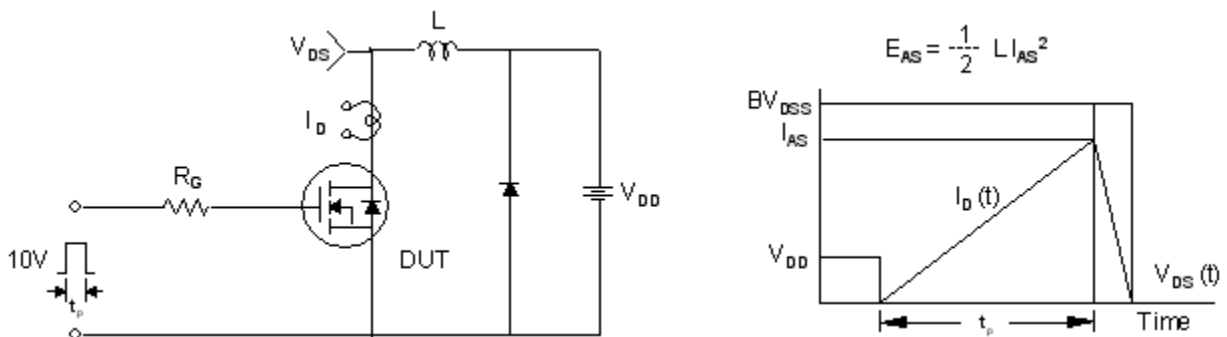


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

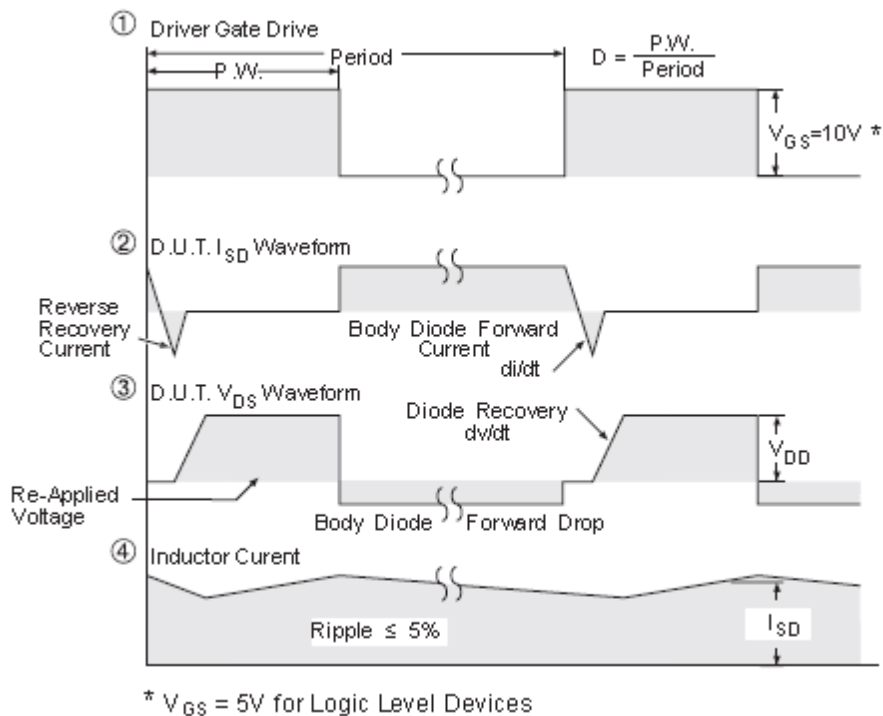
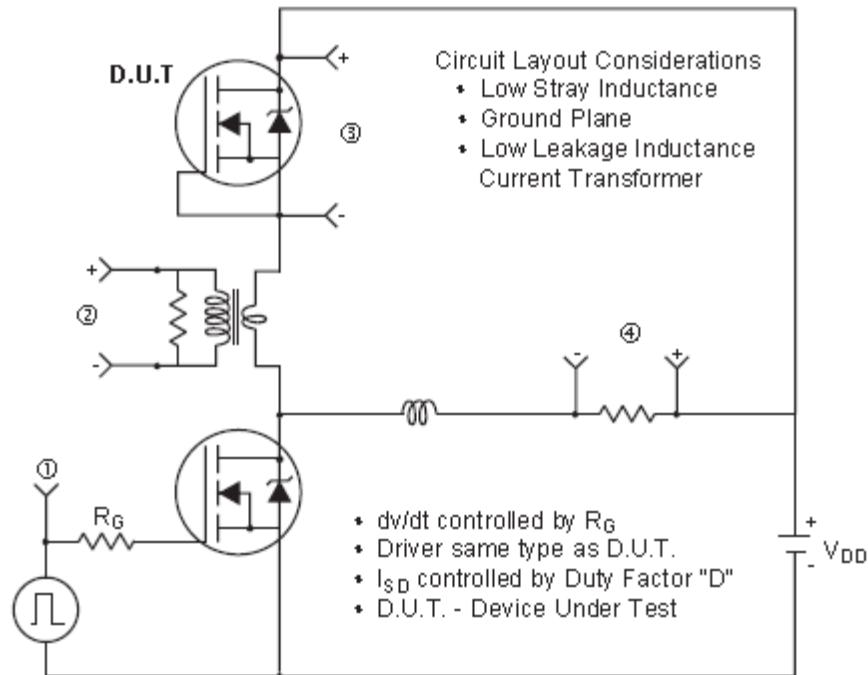
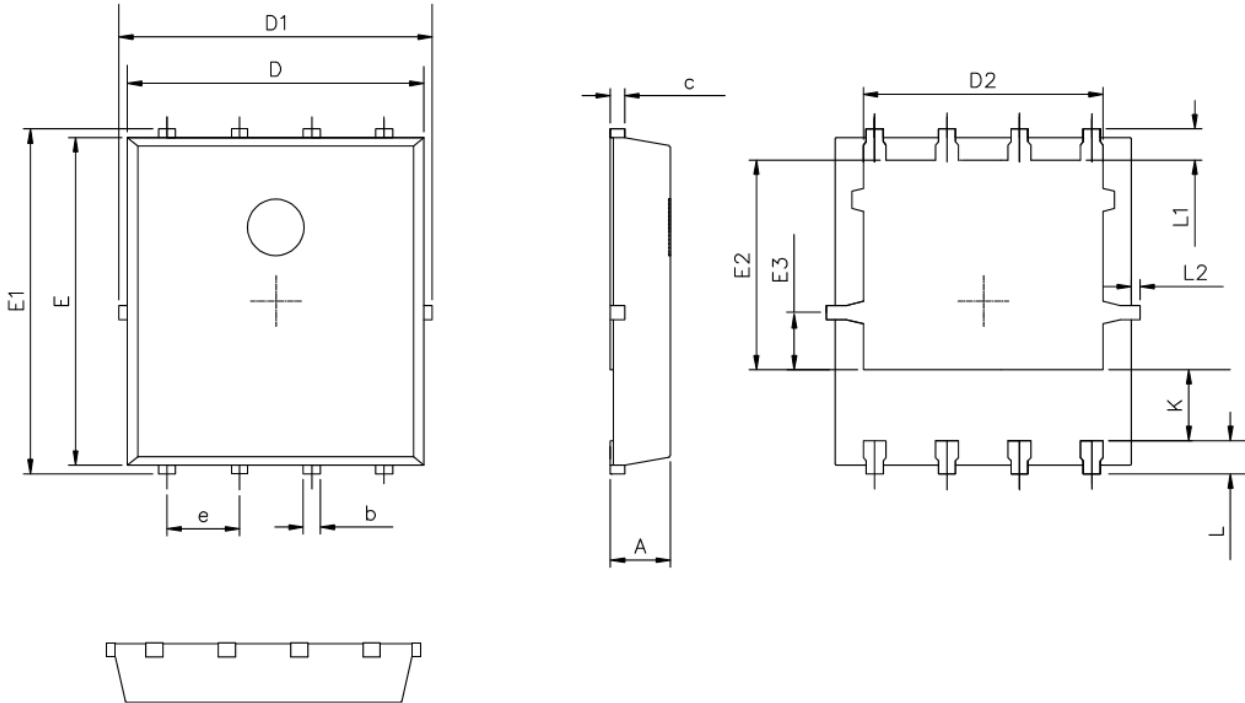
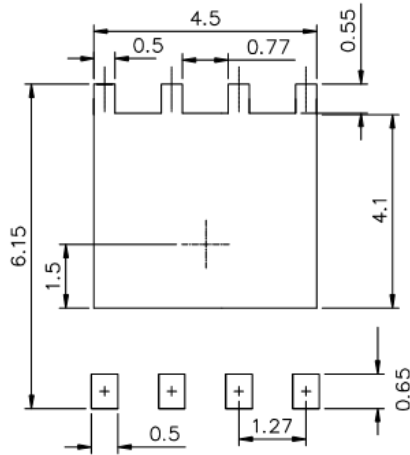


Figure 15. Peak Diode Recovery  $dv/dt$  Test Circuit & Waveforms (For N-channel)

PDFN5060-8L Package Mechanical Data



RECOMMENDED LAND PATTERN



UNIT:mm

	MIN	NOM	MAX
A	0.90	1.00	1.10
b	0.25	0.35	0.50
c	0.10	0.20	0.30
D	4.80	5.00	5.30
D1	4.90	5.10	5.50
D2	3.92	4.02	4.20
E	5.65	5.75	5.85
E1	5.90	6.05	6.20
E2	3.325	3.525	3.775
E3	0.80	0.90	1.00
e		1.27	
L	0.40	0.55	0.70
L1		0.65	
L2	0.00		0.15
K	1.00	1.30	1.50

## SFG90N03AT Product Description

Silicon N-Channel MOSFET



### NOTE:

1. We strongly recommend customers check carefully on the trademark when buying our product, if there is any question, please don't be hesitate to contact us.
2. Please do not exceed the absolute maximum ratings of the device when circuit designing.
3. Winsemi Microelectronics Co., Ltd reserved the right to make changes in this specification sheet and is subject to change without prior notice.

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