ON Semiconductor®

FQA10N80C-F109

N-Channel QFET® MOSFET

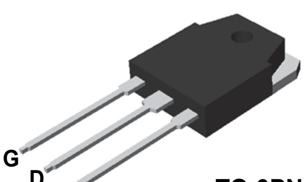
800 V, 10 A, 1.1 Ω

Features

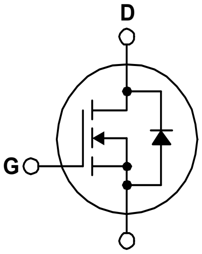
- 10 A, 800 V, $R_{DS(on)}$ = 1.1 Ω (Max.) @ V_{GS} = 10 V, I_D = 5 A
- Low Gate Charge (Typ. 44 nC)
- Low Crss (Typ. 15 pF)
- 100% Avalanche Tested
- RoHS compliant

Description

This N-Channel enhancement mode power MOSFET is produced using ON Semiconductor's proprietary planar stripe and DMOS technology. This advanced MOSFET technology has been especially tailored to reduce on-state resistance, and to provide superior switching performance and high avalanche energy strength. These devices are suitable for switched mode power supplies, active power factor correction (PFC), and electronic lamp ballasts.



G D S TO-3PN



MOSFET Maximum Ratings T_C = 25°C unless otherwise noted.

Symbol	Parameter			FQA10N80C-F109	Unit
V_{DSS}	Drain to Source Voltage			800	V
I_D	Drain Current	-Continuous (T_C = 25°C)		10	A
		-Continuous (T_C = 100°C)		6.32	A
I_{DM}	Drain Current	- Pulsed	(Note 1)	40	A
V_{GSS}	Gate to Source Voltage			± 30	V
E_{AS}	Single Pulsed Avalanche Energy		(Note 2)	920	mJ
I_{AR}	Avalanche Current		(Note 1)	10	A
E_{AR}	Repetitive Avalanche Energy		(Note 1)	24	mJ
dv/dt	Peak Diode Recovery dv/dt		(Note 3)	4.0	V/ns
P_D	Power Dissipation	(T_C = 25°C)		240	W
		- Derate above 25°C		1.92	W/°C
T_J, T_{STG}	Operating and Storage Temperature Range			-55 to +150	°C
T_L	Maximum Lead Temperature for Soldering Purpose, 1/8” from Case for 5 Seconds			300	°C

Thermal Characteristics

Symbol	Parameter	FQA10N80C-F109	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max	0.52	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max	40	°C/W

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FQA10N80C-F109	FQA10N80C	TO-3PN	Tube	N/A	N/A	30 units

Electrical Characteristics T_C = 25°C unless otherwise noted.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 µA	800	--	--	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	I_D = 250 µA, Referenced to 25°C	--	0.98	--	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 800 V, V_{GS} = 0 V	--	--	10	µA
		V_{DS} = 640 V, T_C = 125°C	--	--	100	µA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30 V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -30 V, V_{DS} = 0 V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 µA	3.0	--	5.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 5.0 A	--	0.93	1.1	Ω
g_{FS}	Forward Transconductance	V_{DS} = 50 V, I_D = 5.0 A	--	5.8	--	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	2150	2800	pF
C_{oss}	Output Capacitance		--	180	230	pF
C_{rss}	Reverse Transfer Capacitance		--	15	20	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 400 V, I_D = 10.0 A, R_G = 25 Ω (Note4)	--	50	110	ns
t_r	Turn-On Rise Time		--	130	270	ns
$t_{d(off)}$	Turn-Off Delay Time		--	90	190	ns
t_f	Turn-Off Fall Time		--	80	170	ns
Q_g	Total Gate Charge	V_{DS} = 640 V, I_D = 10.0 A, V_{GS} = 10 V (Note 4)	--	45	58	nC
Q_{gs}	Gate-Source Charge		--	13.5	--	nC
Q_{gd}	Gate-Drain Charge		--	17	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	10.0	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	40.0	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 10.0 A	--	--	1.4	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_S = 10.0 A, dI_F / dt = 100 A/µs	--	730	--	ns
Q_{rr}	Reverse Recovery Charge		--	10.9	--	µC

Notes :

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. L = 17.3 mH, I_{AS} = 10 A, V_{DD} = 50 V, R_G = 25 Ω, starting T_J = 25°C.
3. $I_{SD} \leq$ 8.4 A, di/dt $\leq$ 200 A/µs, $V_{DD} \leq BV_{DSS}$, starting T_J = 25°C.
4. Essentially independent of operating temperature.

Typical Characteristics

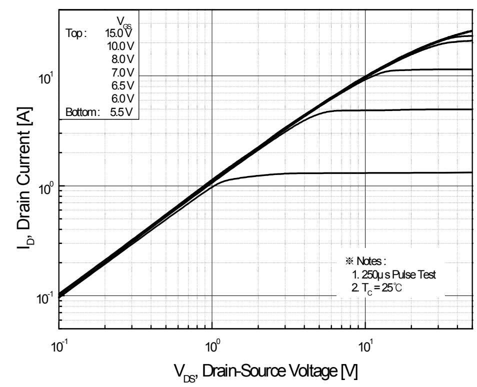


Figure 1. On-Region Characteristics

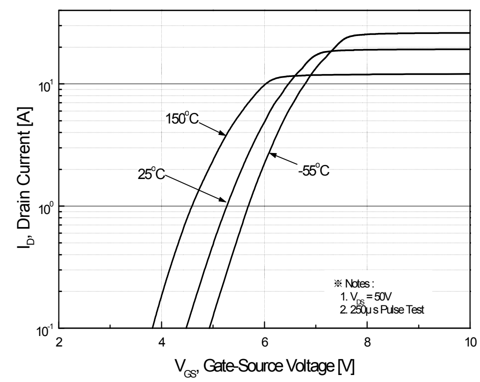


Figure 2. Transfer Characteristics

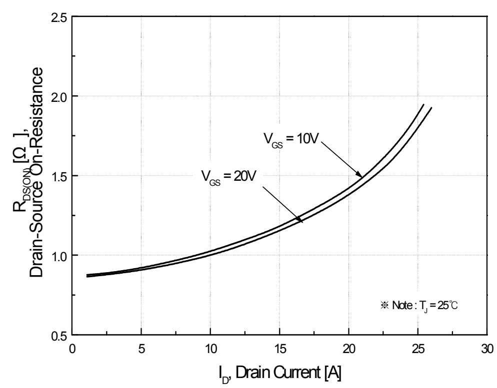


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

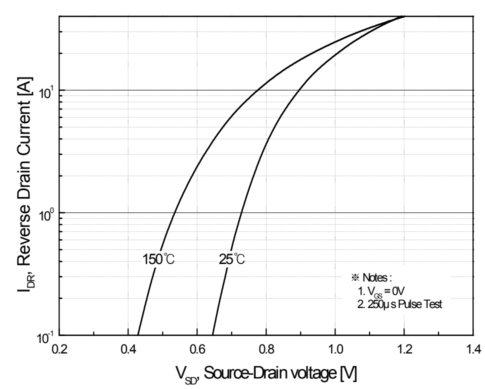


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

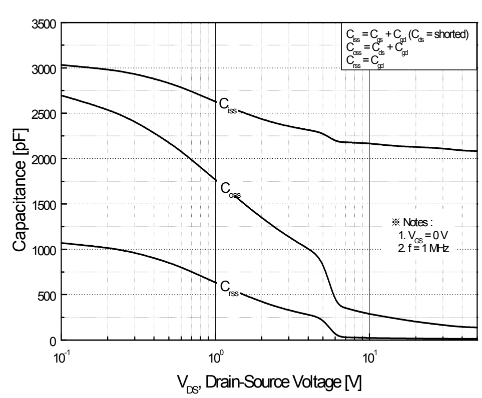


Figure 5. Capacitance Characteristics

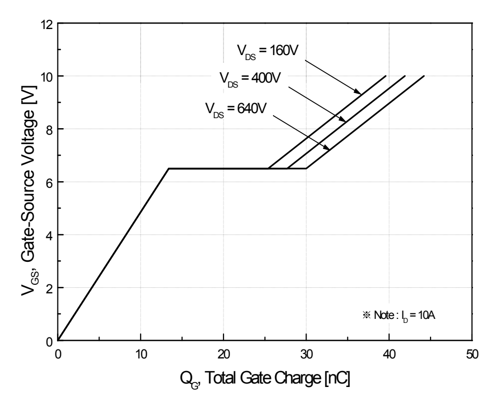


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

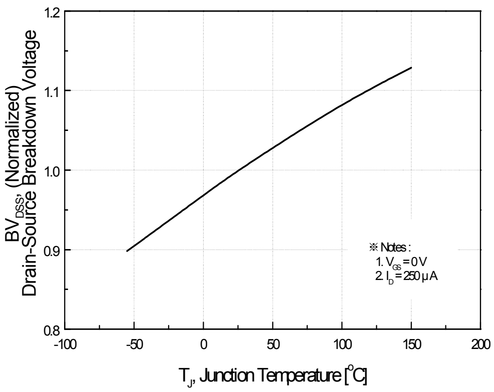


Figure 7. Breakdown Voltage Variation vs Temperature

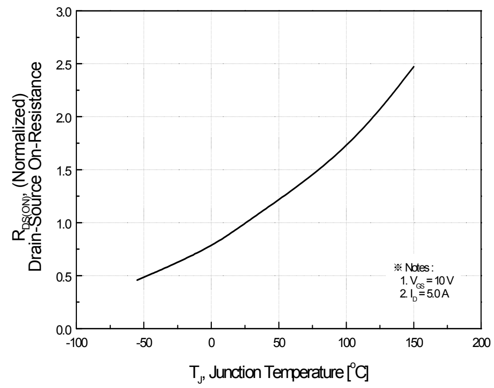


Figure 8. On-Resistance Variation vs Temperature

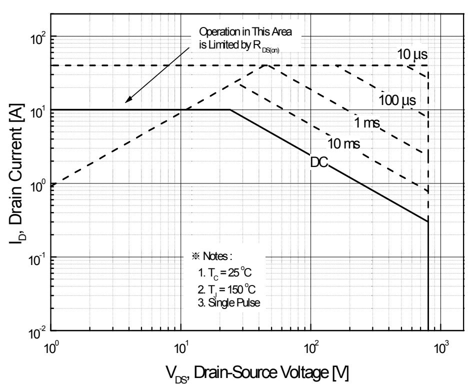


Figure 9. Maximum Safe Operating Area

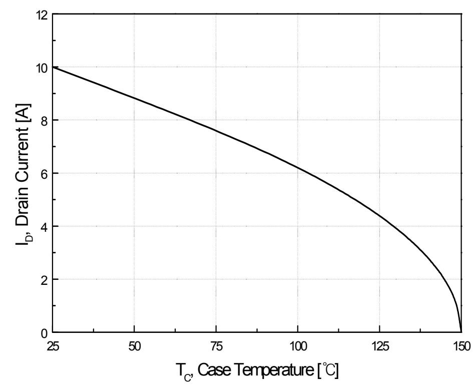


Figure 10. Maximum Drain Current vs Case Temperature

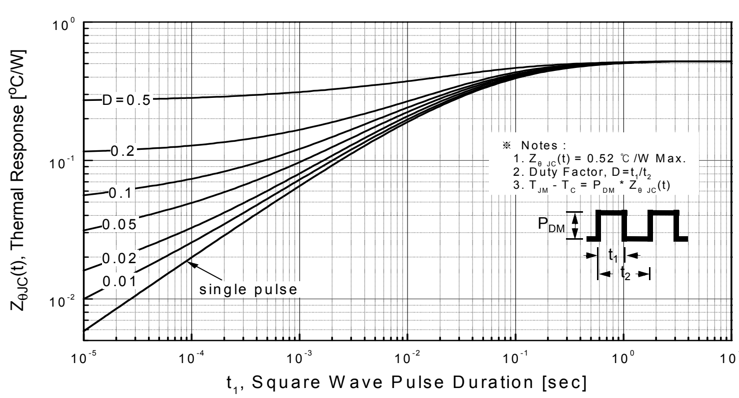


Figure 11. Transient Thermal Response Curve

Figure 12. Gate Charge Test Circuit & Waveform

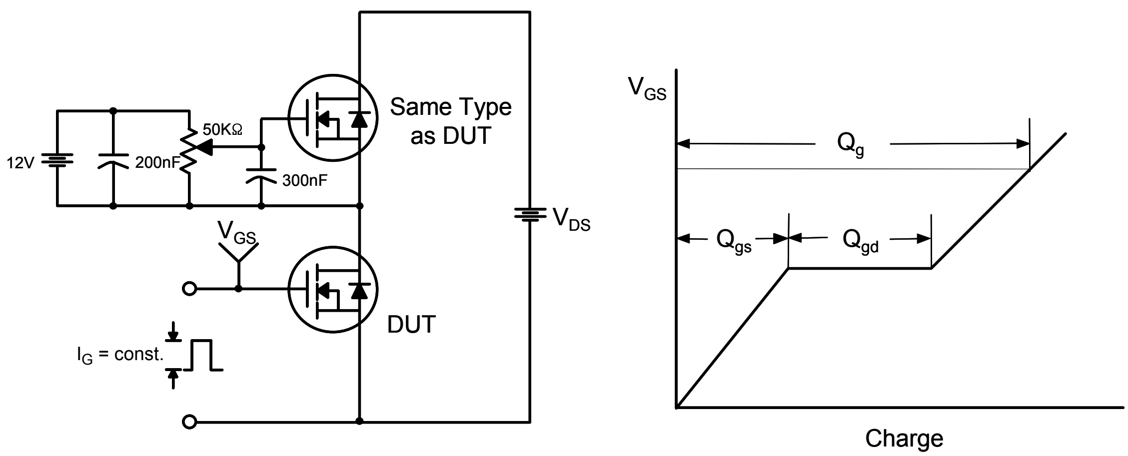


Figure 13. Resistive Switching Test Circuit & Waveforms

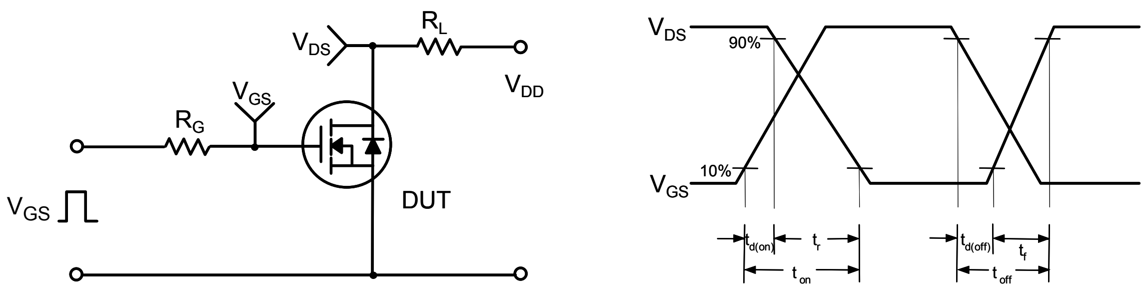


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

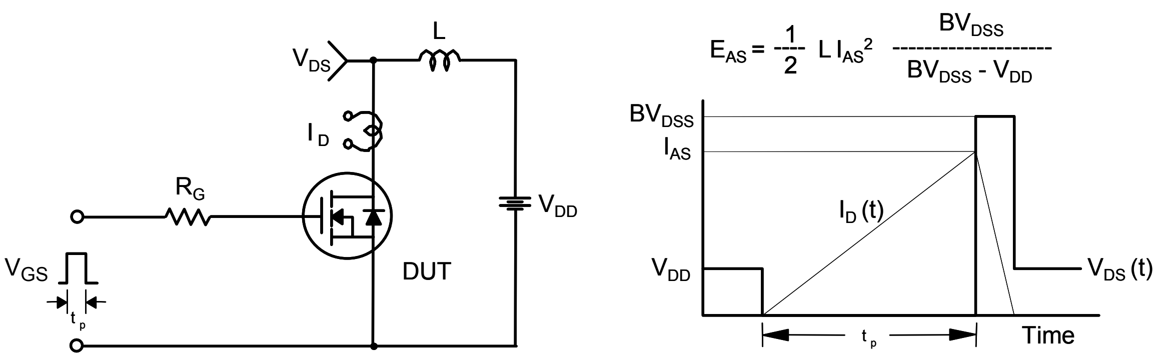
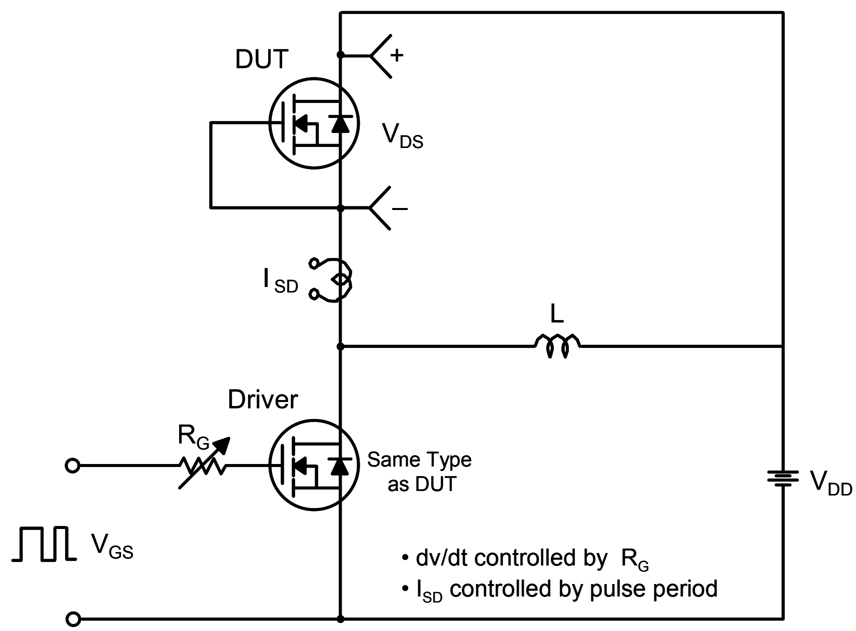
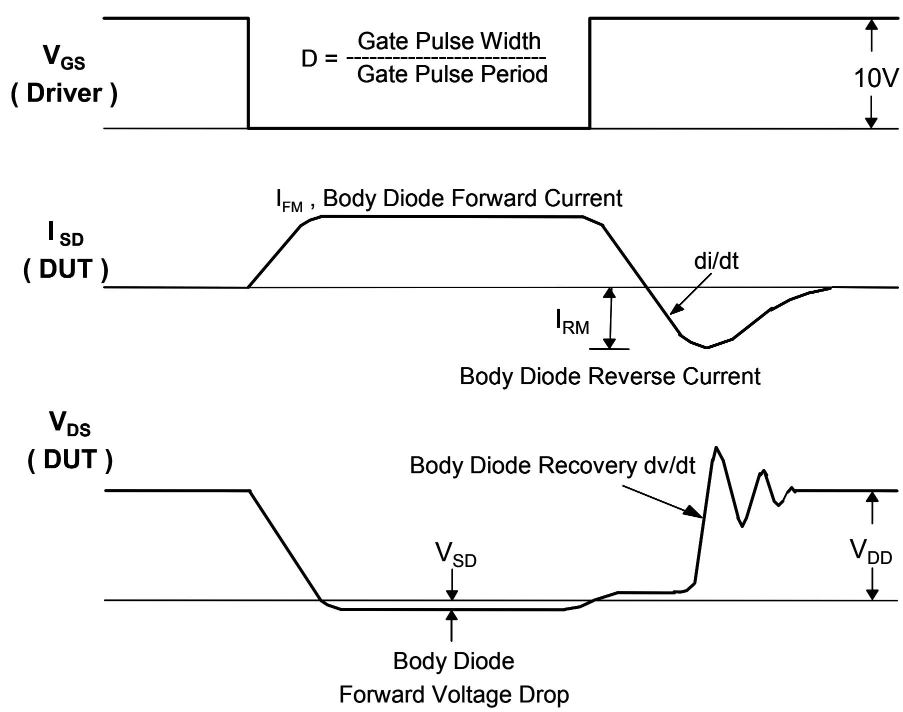


Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms





Mechanical Dimensions

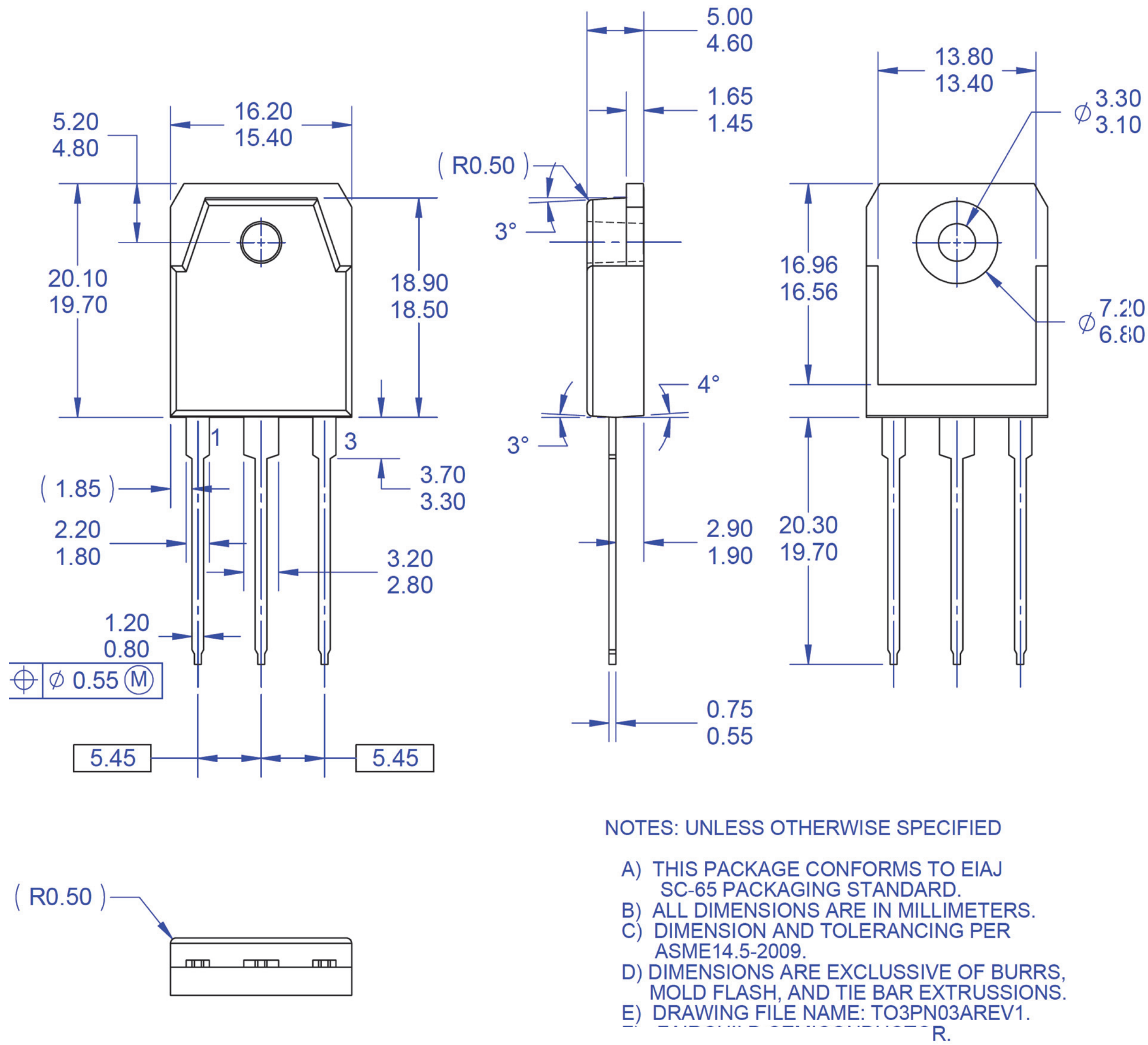


Figure 16. TO3PN, 3-Lead, Plastic, EIAJ SC-65

Package drawings are provided as a service to customers considering ON Semiconductor components. Drawings may change in any manner without notice. Please note the revision and/or date on the drawing and contact a ON Semiconductor representative to verify or obtain the most recent revision. Package specifications do not expand the terms of ON Semiconductor's worldwide terms and conditions, specif-ically the warranty therein, which covers ON Semiconductor products.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5817−1050

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative