Is Now Part of

ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at
www.onsemi.com

Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

March 2015

FQT13N06L

N-Channel QFET® MOSFET

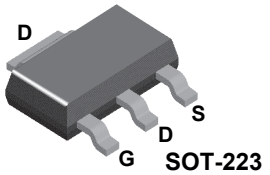
60 V, 2.8 A, 110 mΩ

General Description

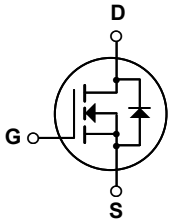
This N-Channel enhancement mode power MOSFET is produced using Fairchild Semiconductor®'s proprietary planar stripe and DMOS technology. This advanced MOSFET technology has been especially tailored to reduce on-state resistance, and to provide superior switching performance and high avalanche energy strength. These devices are suitable for switched mode power supplies, audio amplifier, DC motor control, and variable switching power applications.

Features

- 2.8 A, 60 V, $R_{DS(on)}$ = 110 mΩ (Max.) @V_{GS} = 10 V, I_D = 1.4 A
- Low Gate Charge (Typ. 4.8 nC)
- Low Crss (Typ. 17 pF)
- 100% Avalanche Tested



SOT-223
FQT Series



Absolute Maximum Ratings

T_C = 25°C unless otherwise noted

Symbol	Parameter		FQT13N06L	Unit
V_{DSS}	Drain-Source Voltage		60	V
I_D	Drain Current - Continuous (T_C = 25°C)		2.8	A
	- Continuous (T_C = 70°C)		2.24	A
I_{DM}	Drain Current - Pulsed	(Note 1)	11.2	A
V_{GSS}	Gate-Source Voltage		± 20	V
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	85	mJ
I_{AR}	Avalanche Current	(Note 1)	2.8	A
E_{AR}	Repetitive Avalanche Energy	(Note 1)	0.21	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	7.0	V/ns
P_D	Power Dissipation (T_C = 25°C)		2.1	W
	- Derate above 25°C		0.017	W/°C
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	°C
T_L	Maximum Lead Temperature for Soldering, 1/8" from Case for 5 Seconds		300	°C

Thermal Characteristics

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient *	--	60	°C/W

* When mounted on the minimum pad size recommended(PCB mount).

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	60	--	--	V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C	--	0.05	--	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 60 V, V_{GS} = 0 V	--	--	1	μA
		V_{DS} = 48 V, T_C = 125°C	--	--	10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 20 V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -20 V, V_{DS} = 0 V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 μA	1.0	--	2.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 1.4 A	--	0.088	0.11	Ω
		V_{GS} = 5 V, I_D = 1.4 A	--	0.110	0.14	
g_{FS}	Forward Transconductance	V_{DS} = 25 V, I_D = 1.4 A (Note 4)	--	4.1	--	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	270	350	pF
C_{oss}	Output Capacitance		--	95	125	pF
C_{rss}	Reverse Transfer Capacitance		--	17	23	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 30 V, I_D = 6.8 A, R_G = 25 Ω (Note 4, 5)	--	8	25	ns
t_r	Turn-On Rise Time		--	90	190	ns
$t_{d(off)}$	Turn-Off Delay Time		--	20	50	ns
t_f	Turn-Off Fall Time		--	40	90	ns
Q_g	Total Gate Charge	V_{DS} = 48 V, I_D = 13.6 A, V_{GS} = 5 V (Note 4, 5)	--	4.8	6.4	nC
Q_{gs}	Gate-Source Charge		--	1.6	--	nC
Q_{gd}	Gate-Drain Charge		--	2.7	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	2.8	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	11.2	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 2.8 A	--	--	1.5	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_S = 13.6 A, dI_F / dt = 100 A/μs (Note 4)	--	45	--	ns
Q_{rr}	Reverse Recovery Charge		--	45	--	nC

Notes:
1. Repetitive rating : pulse-width limited by maximum junction temperature.
2. L = 12.6 mH, I_{AS} = 2.8 A, V_{DD} = 25 V, R_G = 25 Ω, starting T_J = 25°C.
3. I_{SD} ≤ 13.6 A, di/dt ≤ 300 A/μs, V_{DD} ≤ BV_{DSS}, starting T_J = 25°C.
4. Pulse test : pulse width ≤ 300 μs, Duty cycle ≤ 2%.
5. Essentially independent of operating temperature.

Typical Characteristics

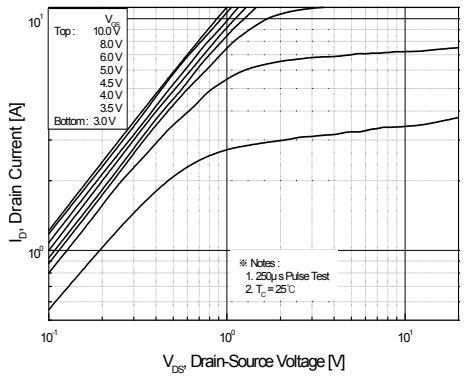


Figure 1. On-Region Characteristics

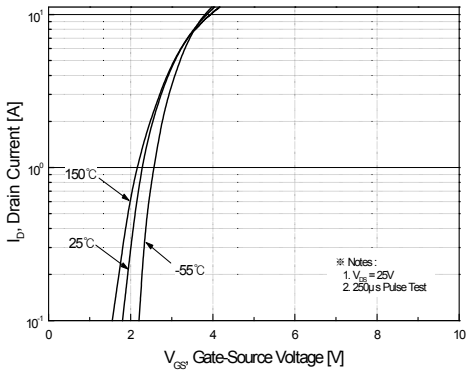


Figure 2. Transfer Characteristics

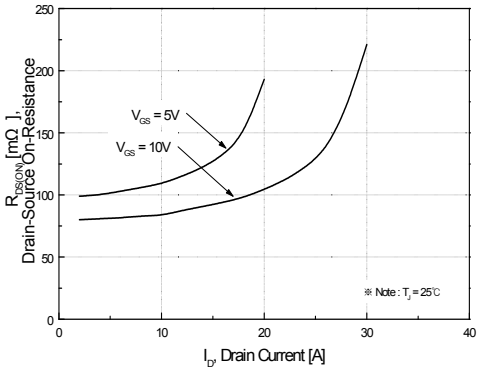


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

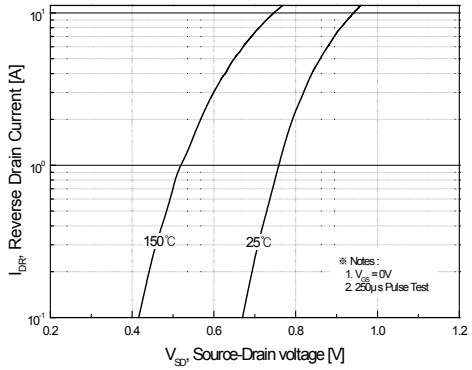


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

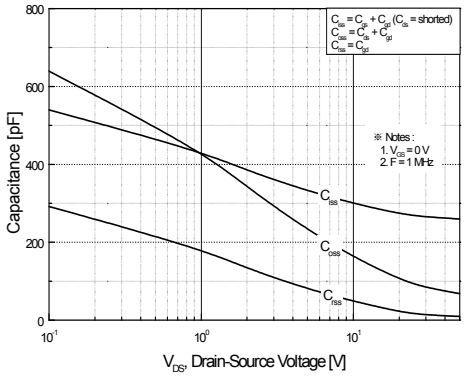


Figure 5. Capacitance Characteristics

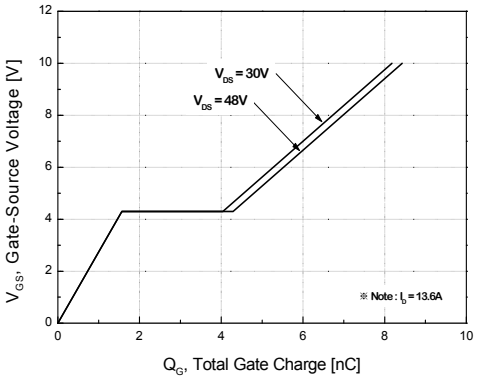


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

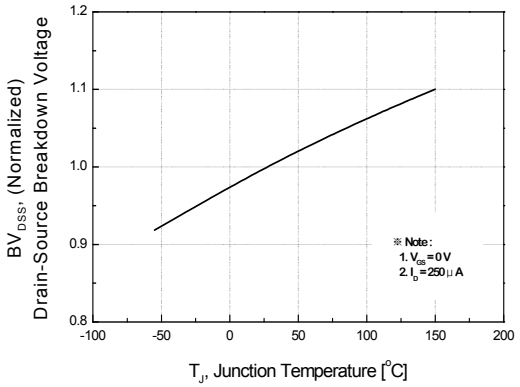


Figure 7. Breakdown Voltage Variation vs Temperature

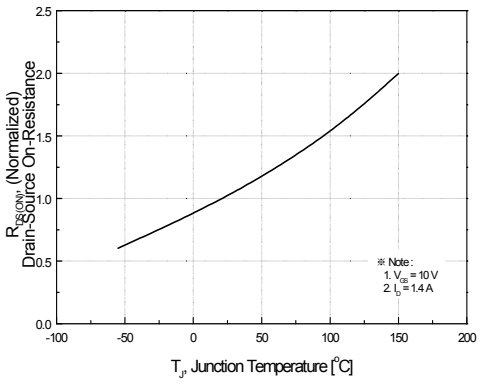


Figure 8. On-Resistance Variation vs Temperature

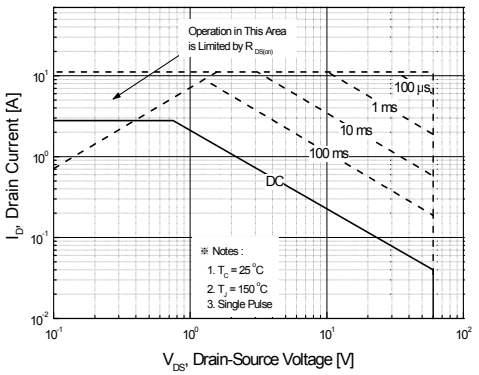


Figure 9. Maximum Safe Operating Area

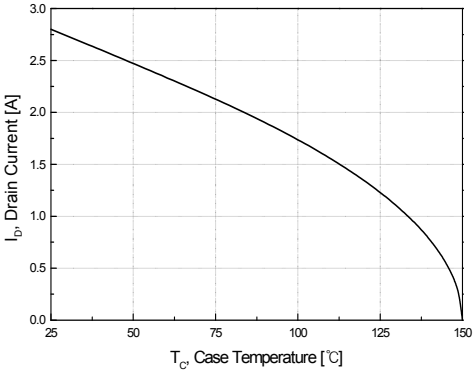


Figure 10. Maximum Drain Current vs Case Temperature

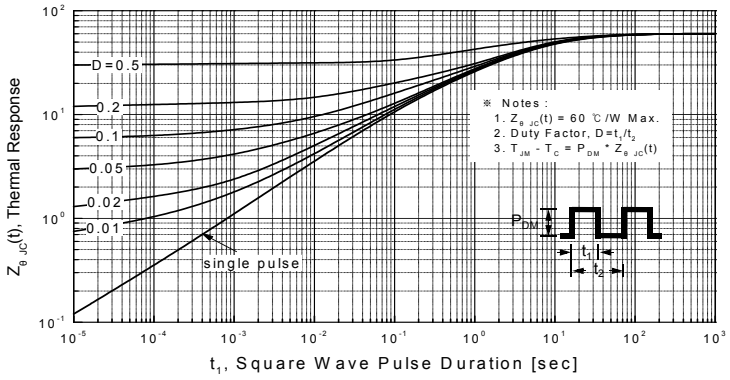


Figure 11. Transient Thermal Response Curve

Figure 12. Gate Charge Test Circuit & Waveform

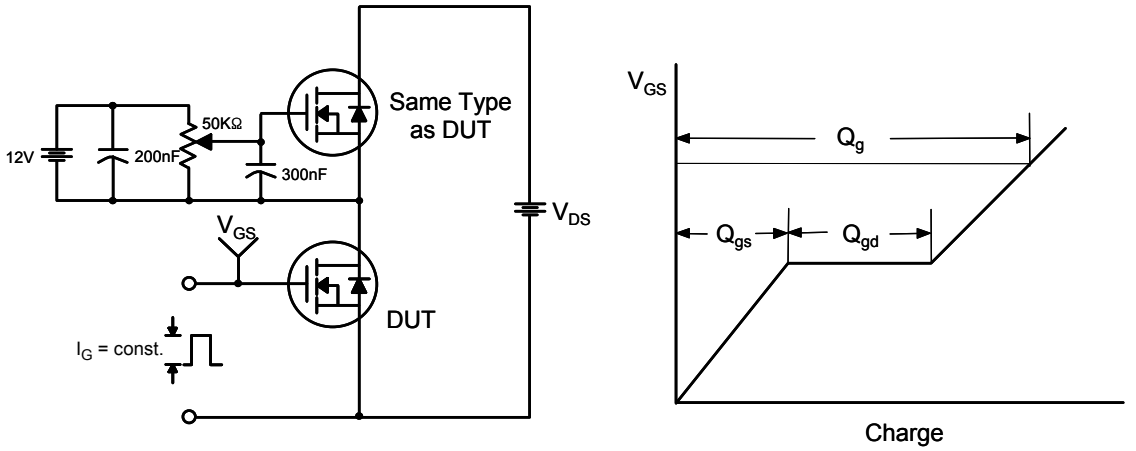


Figure 13. Resistive Switching Test Circuit & Waveforms

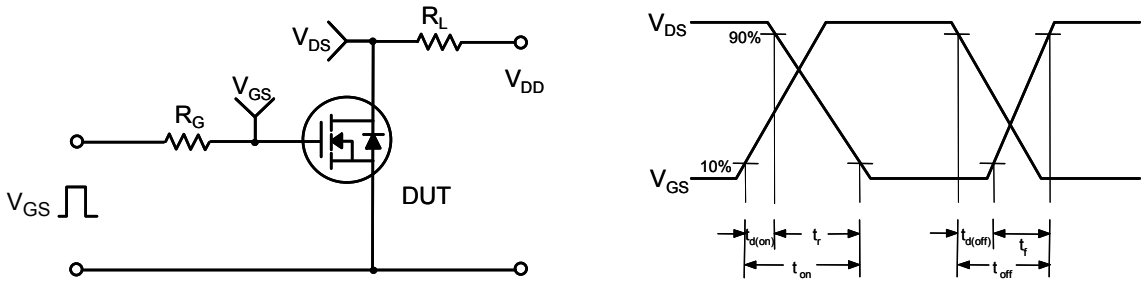


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

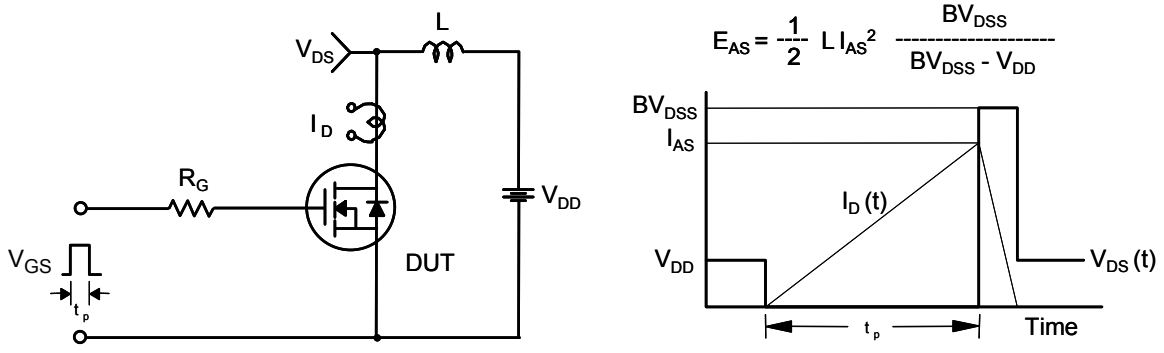
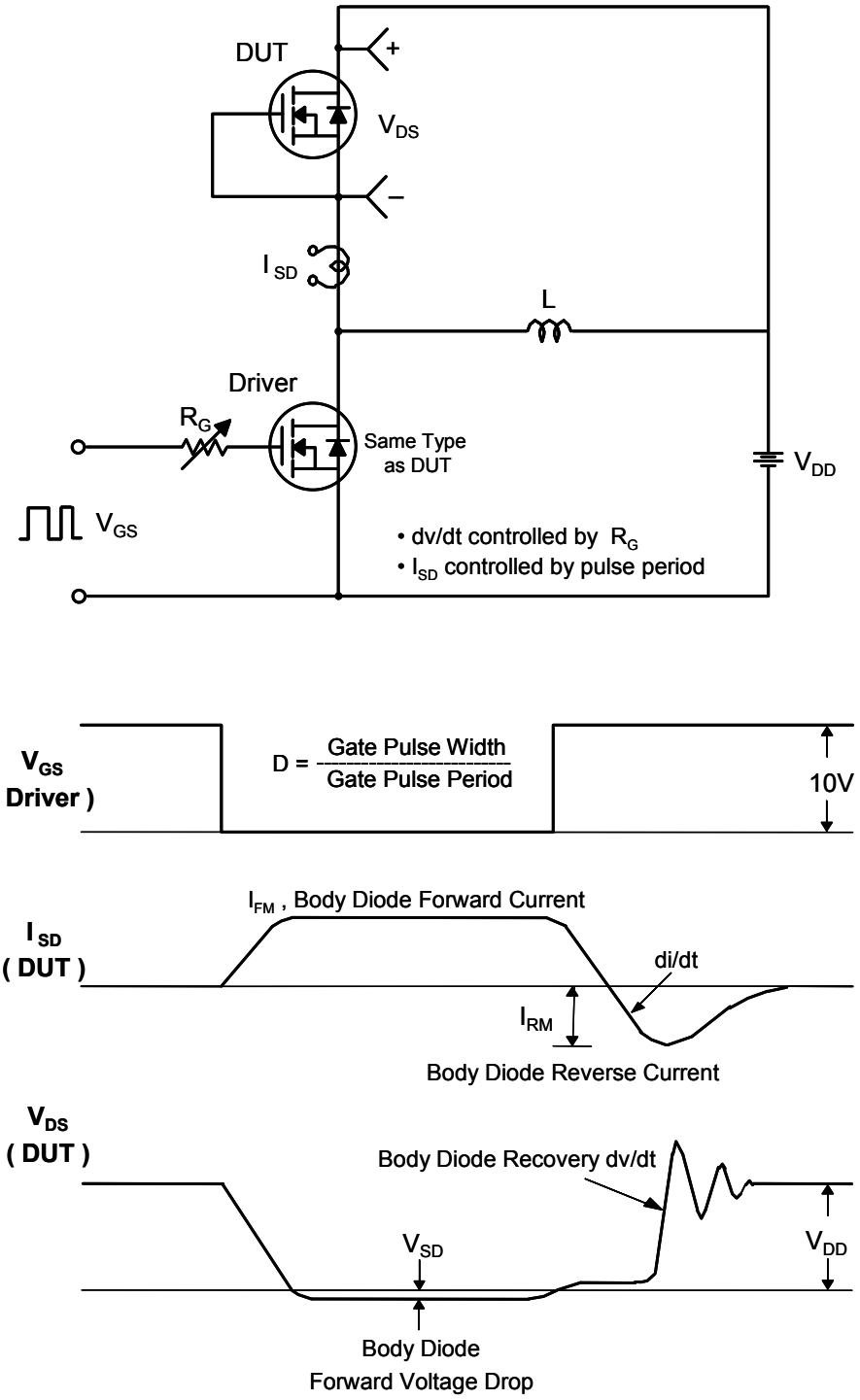
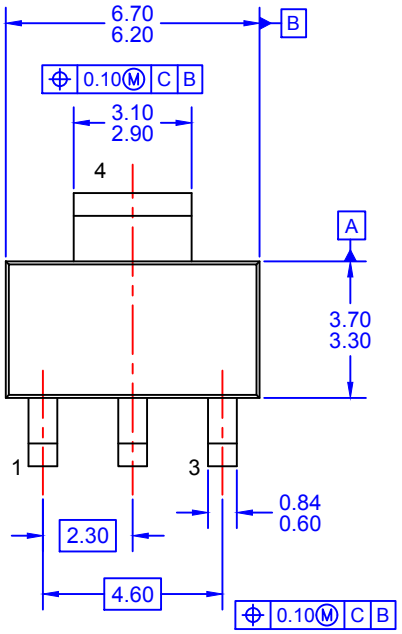
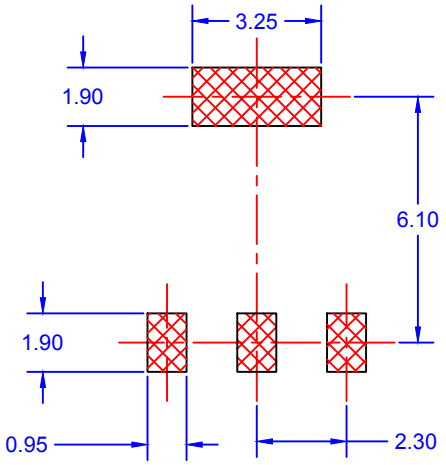


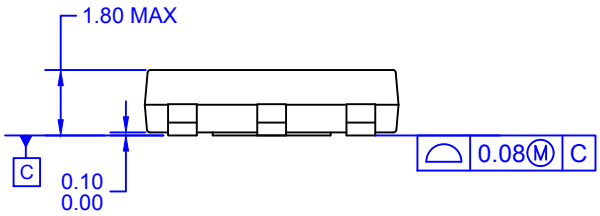
Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

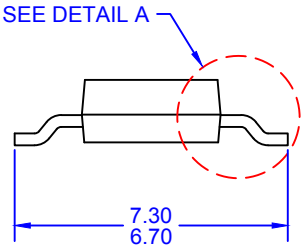




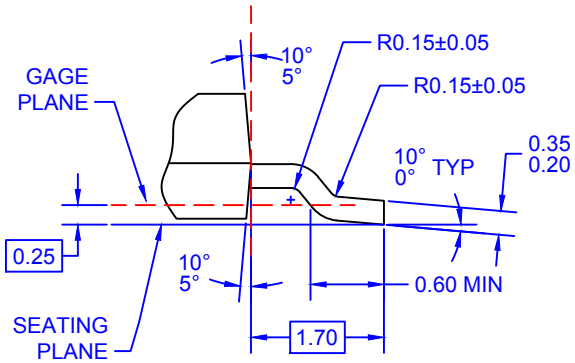


LAND PATTERN RECOMMENDATION





NOTES: UNLESS OTHERWISE SPECIFIED
A) DRAWING BASED ON JEDEC REGISTRATION TO-261C, VARIATION AA.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH. MOLD FLASH OR BURRS DOES NOT EXCEED 0.10MM.
D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2009.
E) LANDPATTERN NAME: SOT230P700X180-4BN
F) DRAWING FILENAME: MKT-MA04AREV3



DETAIL A
SCALE: 2:1

FAIRCHILD

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

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for MOSFET ***category:***

Click to view products by ON Semiconductor ***manufacturer:***

Other Similar products are found below :

614233C 648584F IRFD120 JANTX2N5237 FCA20N60_F109 FDZ595PZ 2SK2545(Q,T) 405094E 423220D TPCC8103,L1Q(CM MIC4420CM-TR VN1206L SBVS138LT1G 614234A 715780A NTNS3166NZT5G SSM6J414TU,LF(T 751625C BUK954R8-60E NTE6400 SQJ402EP-T1-GE3 2SK2614(TE16L1,Q) 2N7002KW-FAI DMN1017UCP3-7 EFC2J004NUZTDG ECH8691-TL-W FCAB21350L1 P85W28HP2F-7071 DMN1053UCP4-7 NTE221 NTE222 NTE2384 NTE2903 NTE2941 NTE2945 NTE2946 NTE2960 NTE2967 NTE2969 NTE2976 NTE455 NTE6400A NTE2910 NTE2916 NTE2956 NTE2911 DMN2080UCB4-7 TK10A80W,S4X(S SSM6P69NU,LF DMP22D4UFO-7B