



NDT2955

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P-Channel Enhancement Mode Field Effect Transistor

General Description

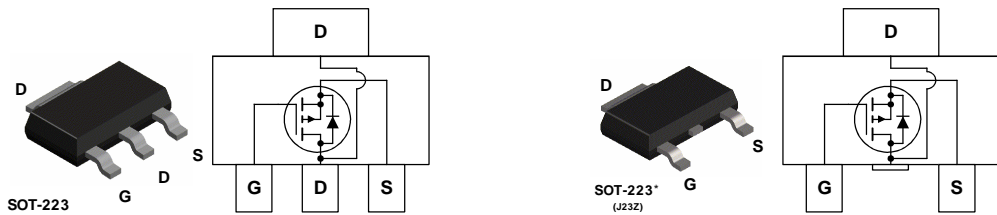
This 60V P-Channel MOSFET is produced using Fairchild Semiconductor's high voltage Trench process. It has been optimized for power management applications.

Applications

- DC/DC converter
- Power management

Features

- -2.5 A, -60 V. $R_{DS(ON)} = 300m\Omega @ V_{GS} = -10 V$
 $R_{DS(ON)} = 500m\Omega @ V_{GS} = -4.5 V$
- High density cell design for extremely low $R_{DS(ON)}$
- High power and current handling capability in a widely used surface mount package.



Absolute Maximum Ratings T_A=25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V _{DSS}	Drain-Source Voltage	-60	V
V _{GSS}	Gate-Source Voltage	±20	V
I _D	Drain Current – Continuous (Note 1a)	-2.5	A
	– Pulsed	-15	
P _D	Maximum Power Dissipation (Note 1a) (Note 1b) (Note 1c)	3.0	W
		1.3	
		1.1	
T _J , T _{STG}	Operating and Storage Junction Temperature Range	-55 to +150	°C

Thermal Characteristics

R _{θJA}	Thermal Resistance, Junction-to-Ambient (Note 1a)	42	°C/W
R _{θJC}	Thermal Resistance, Junction-to-Case (Note 1)	12	

Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
2955	NDT2955	13"	12mm	2500 units

Electrical Characteristics

$T_A = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Avalanche Ratings

W_{DSS}	Drain-Source Avalanche Energy	Single Pulse, $V_{DD} = 30\text{ V}$, $I_D = 2.5\text{ A}$			174	mJ
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Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_D = -250\ \mu\text{A}$	-60			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = -250\ \mu\text{A}$, Referenced to 25°C		-60		mV/ $^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -60\text{ V}$, $V_{GS} = 0\text{ V}$			-10	μA
I_{GSSF}	Gate-Body Leakage, Forward	$V_{GS} = -20\text{ V}$, $V_{DS} = 0\text{ V}$			100	nA
I_{GSSR}	Gate-Body Leakage, Reverse	$V_{GS} = -20\text{ V}$, $V_{DS} = 0\text{ V}$			-100	nA

On Characteristics (Note 2)

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = -250\ \mu\text{A}$	-2	-2.6	-4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = -250\ \mu\text{A}$, Referenced to 25°C		5.7		mV/ $^\circ\text{C}$
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = -10\text{ V}$, $I_D = -2.5\text{ A}$ $V_{GS} = -4.5\text{ V}$, $I_D = -2\text{ A}$ $V_{GS} = -10\text{ V}$, $I_D = -2.5\text{ A}$, $T_J = 125^\circ\text{C}$		95 163 153	300 500 513	m Ω
$I_{D(on)}$	On-State Drain Current	$V_{GS} = -10\text{ V}$, $V_{DS} = -5\text{ V}$	-12			A
g_{FS}	Forward Transconductance	$V_{DS} = -10\text{ V}$, $I_D = -2.5\text{ A}$		5.5		S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = -30\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$		601		pF
C_{oss}	Output Capacitance			85		pF
C_{rss}	Reverse Transfer Capacitance			35		pF

Switching Characteristics (Note 2)

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = -30\text{ V}$, $I_D = -1\text{ A}$, $V_{GS} = -10\text{ V}$, $R_{GEN} = 6\ \Omega$		12	21	ns
t_r	Turn-On Rise Time			10	20	ns
$t_{d(off)}$	Turn-Off Delay Time			19	34	ns
t_f	Turn-Off Fall Time			6	12	ns
Q_g	Total Gate Charge	$V_{DS} = -30\text{ V}$, $I_D = -2.5\text{ A}$, $V_{GS} = -10\text{ V}$		11	15	nC
Q_{gs}	Gate-Source Charge			2.4		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			-2.5	A	
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}$, $I_S = -2.5\text{ A}$ (Note 2)		-0.8	-1.2	V
t_{rr}	Diode Reverse Recovery Time	$I_F = -2.5\text{ A}$,		25		nS
Q_{rr}	Diode Reverse Recovery Charge	$d_{IF}/d_t = 100\text{ A}/\mu\text{s}$		40		nC

Notes:

- $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a) $42^\circ\text{C}/\text{W}$ when mounted on a 1 in^2 pad of 2 oz copper



b) $95^\circ\text{C}/\text{W}$ when mounted on a $.0066\text{ in}^2$ pad of 2 oz copper



c) $110^\circ\text{C}/\text{W}$ when mounted on a minimum pad.

- Pulse Test: Pulse Width $< 300\ \mu\text{s}$, Duty Cycle $< 2.0\%$

Typical Characteristics

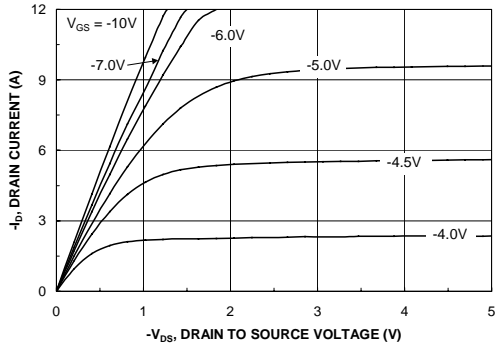


Figure 1. On-Region Characteristics.

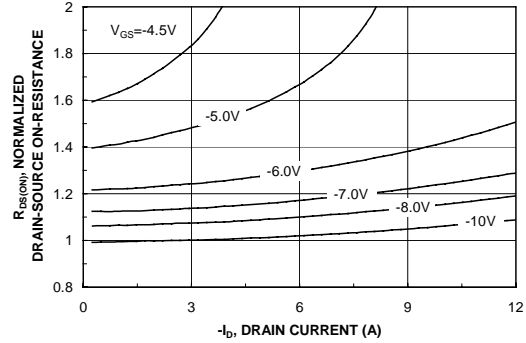


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

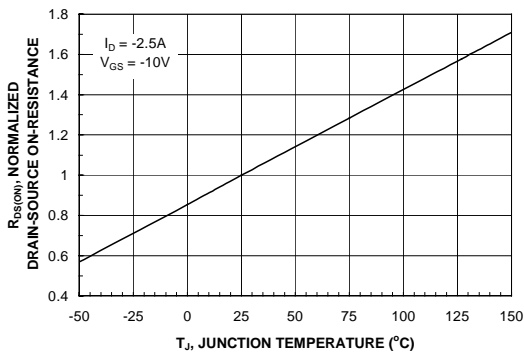


Figure 3. On-Resistance Variation with Temperature.

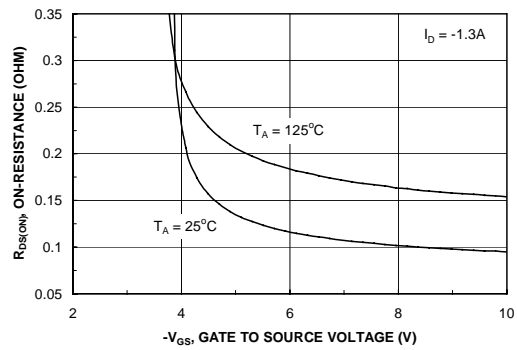


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

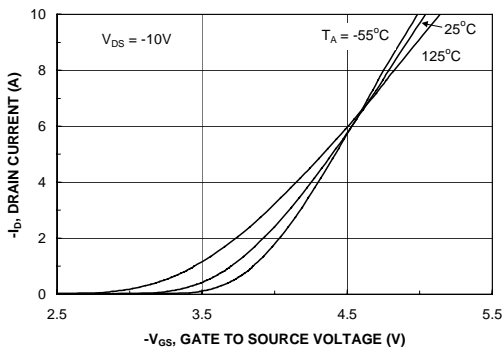


Figure 5. Transfer Characteristics.

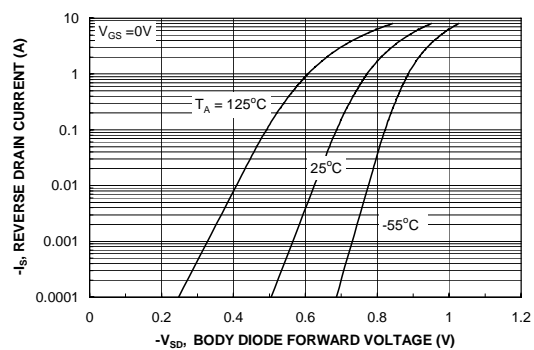
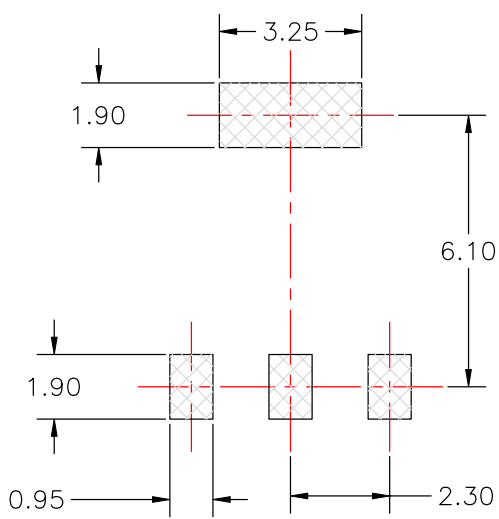
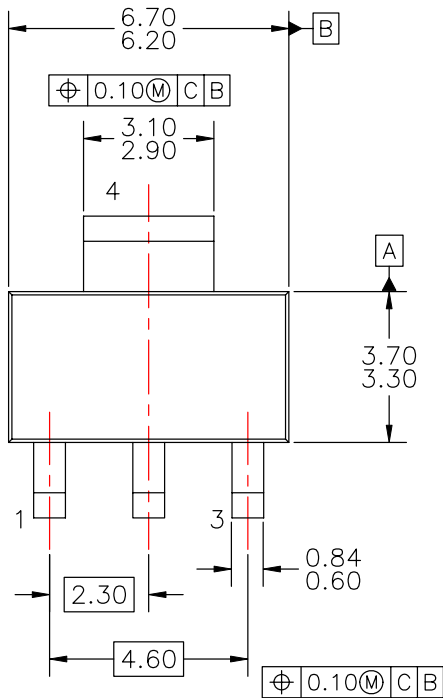


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

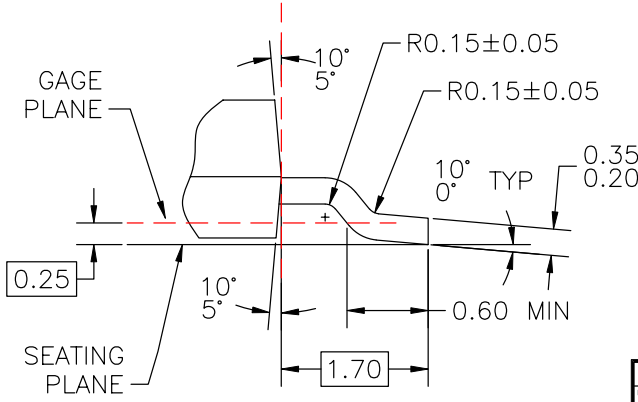
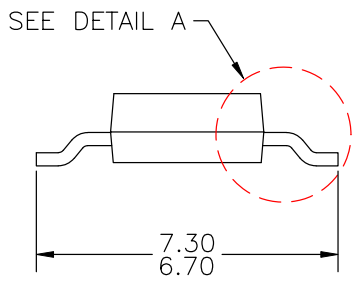
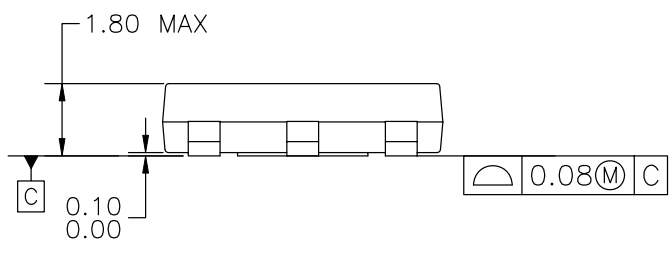
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APPROVED
July-14-2008

REVISIONS			
LTR	DESCRIPTION	DATE	NAME/SITE
A	RELEASE TO DOCUMENT CONTROL	JAN.25,1996	TL/FSCP
2	CHG DWG TEMPLATE FR NATIONAL TO FAIRCHILD; CHG DIM STYLE FR DUAL INCH[MM] TO SINGLE, MM; CHG LD WID FR 0.74 ±0.03 TO 0.60-0.84; REMOVE PKG THICK DIM (1.6); CHG TOTAL PKG HT FR 1.8 ±0.05 TO 1.80 MAX; CHG FOOT LANDING DIM FR 0.91 MIN TO 0.60 MIN; CHG LD THICKNESS FR 0.35 ±0.03 TO 0.20-0.35; ADD DRAFT ANGLE OF MOLDED BODY TOP & BOT; CHG LD LGTH TO PKG EDGE DIM TO BASIC; CHG LD PITCH FR 2.29 BS TO 2.30 BS; CHG BODY WID FR 3.56 ±0.33 TO 3.30; CHG BODY LN FR 6.53 ±0.33 TO 6.30; CHG TOTAL PKG WID FR 6.94 ±0.33 TO 7.30; CHG PAD SIZE FR 0.99 MAX TO 0.95; CHG PAD PITCH FR 2.286 TO 2.30; CHG THERMAL TAB SIZE FR 3.28 MAX TO 3.25; CHG PAD SIZE FR 1.5 TO 1.90; CHG PAD SPACE FR 6.3 TO 6.10; CHG NOTE '2' TO 'A' W/O DATE; DEL NOTE ON LD FINISH; ADD NOTES B, C, D, E & F.	12FEB08	LZSC/FSCP



LAND PATTERN RECOMMENDATION



DETAIL A
SCALE: 2:1

- NOTES: UNLESS OTHERWISE SPECIFIED
- A) DRAWING BASED ON JEDEC REGISTRATION TO-261, VARIATION AA.
 - B) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
 - C) ALL DIMENSIONS ARE IN MILLIMETERS.
 - D) DRAWING CONFORMS TO ASME Y14.5M-1994.
 - E) LANDPATTERN NAME: SOT230P700X180-4BN
 - F) DRAWING FILENAME: MKT-MA04AREV2

APPROVALS	DATE	FAIRCHILD SEMICONDUCTOR™
DRN: J.U. COMPARATIVO JR.	26FEB2008	
CHEK: L.Z. STA CRUZ		
APPROV: M.R. GESTOLE		
G.S. BAJE		MOLDED PACKAGE SOT-223, 4 LEAD
		SCALE: 1:1
		SIZE: A3
		DRAWING NUMBER: MKT-MA04A
		REV: 2
		FORMERLY: N/A
		SHEET: 1 OF 1



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Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
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