



May 1999  
DISTRIBUTION GROUP\*

# MTP2955V

## P-Channel Enhancement Mode Field Effect Transistor

### General Description

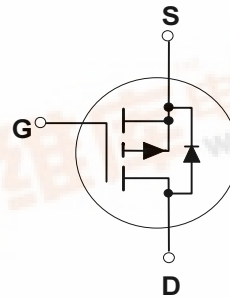
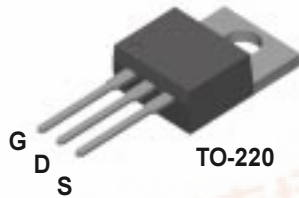
This P-Channel MOSFET has been designed specifically for low voltage, high speed switching applications i.e. power supplies and power motor controls.

These MOSFETs feature faster switching and lower gate charge than other MOSFETs with comparable  $R_{DS(ON)}$  specifications.

The result is a MOSFET that is easy and safer to drive (even at very high frequencies).

### Features

- 12 A, -60 V.  $R_{DS(ON)} = 0.230 \Omega @ V_{GS} = -10 \text{ V}$
- Critical DC electrical parameters specified at elevated temperature.
- Rugged internal source-drain diode can eliminate the need for an external Zener diode transient suppressor.
- 175°C maximum junction temperature rating.



### Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Ratings	Units
$V_{DSS}$	Drain-Source Voltage	-60	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current	- Continuous	-12
		- Pulsed	-42
$P_D$	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	60	W
	Derate above $25^\circ\text{C}$	0.40	W/ $^\circ\text{C}$
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-65 to +175	$^\circ\text{C}$

### Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction-to- Case	2.5	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to- Ambient (Note 1)	62.5	$^\circ\text{C}/\text{W}$

### Package Outlines and Ordering Information

Device Marking	Device	Package Information	Quantity
MTP2955V	MTP2955V	Rails/Tubes	45 units

\*Die and manufacturing source subject to change without prior notification.



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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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**DRAIN-SOURCE AVALANCHE RATINGS** (Note 2)

$w_{DSS}$	Single Pulse Drain-Source Avalanche Energy	$V_{DD} = -25\text{ V}$ , $I_D = -12\text{ A}$			216	mJ
$I_{AR}$	Maximum Drain-Source Avalanche Current				-12	A

**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 $25^\circ\text{C}$		-63		mV/ $^\circ\text{C}$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = -60\text{ V}$ , $V_{GS} = 0\text{ V}$			-10	$\mu\text{A}$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = -60\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_J = 150^\circ\text{C}$			-100	$\mu\text{A}$
$I_{GSSF}$	Gate-Body Leakage Current, Forward	$V_{GS} = 20\text{ V}$ , $V_{DS} = 0\text{ V}$			100	nA
$I_{GSSR}$	Gate-Body Leakage Current, 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	-3	-4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = -250\ \mu\text{A}$ , Referenced to $25^\circ\text{C}$		5		mV/ $^\circ\text{C}$
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = -10\text{ V}$ , $I_D = -6\text{ A}$			0.230	$\Omega$
$V_{DS(on)}$	Drain Source On-Voltage	$I_D = -12\text{ A}$ , $V_{GS} = -10\text{ V}$			-2.9	V
$g_{FS}$	Forward Transconductance	$V_{DS} = -10\text{ V}$ , $I_D = -6\text{ A}$	3.0			S

**Dynamic Characteristics**

$C_{iss}$	Input Capacitance	$V_{DS} = -25\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1.0\text{ MHz}$			700	pF
$C_{oss}$	Output Capacitance				280	pF
$C_{riss}$	Reverse Transfer Capacitance				100	pF

**Switching Characteristics** (Note 2)

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = -30\text{ V}$ , $I_D = -12\text{ A}$ , $V_{GS} = -10\text{ V}$ , $R_{GEN} = 9.1\ \Omega$			30	ns
$t_r$	Turn-On Rise Time				100	ns
$t_{d(off)}$	Turn-Off Delay Time				50	ns
$t_f$	Turn-Off Fall Time				80	ns
$Q_g$	Total Gate Charge	$V_{DS} = -48\text{ V}$ , $I_D = -12\text{ A}$ , $V_{GS} = -10\text{ V}$			30	nC
$Q_{gs}$	Gate-Source Charge			3		nC
$Q_{gd}$	Gate-Drain Charge			5		nC

**Drain-Source Diode Characteristics and Maximum Ratings**

$I_S$	Maximum Continuous Drain-Source Diode Forward Current (Note 2)				-12	A
$I_{SM}$	Maximum Pulsed Drain-Source Diode Forward Current (Note 2)				-42	A
$V_{SD}$	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}$ , $I_S = -12\text{ A}$ (Note 2)			-3.0	V

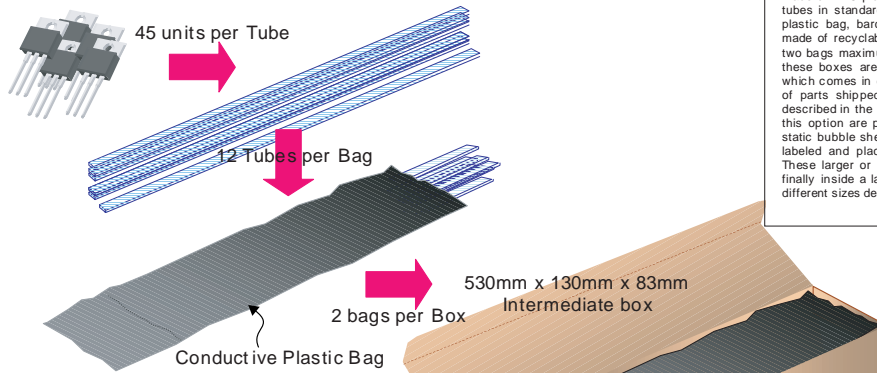
**Notes:**

- $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance.
- Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

# TO-220 Tape and Reel Data and Package Dimensions



## TO-220 Tube Packing Configuration: Figure 1.0

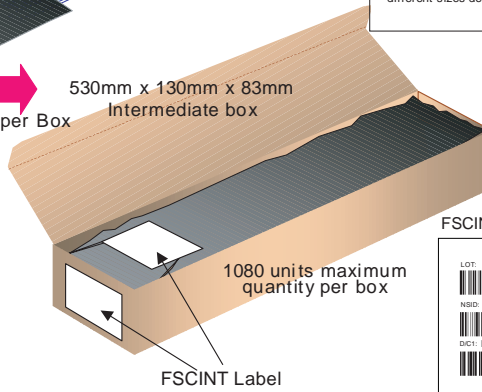


### Packaging Description:

TO-220 parts are shipped normally in tube. The tube is made of PVC plastic treated with anti-static agent. These tubes in standard option are placed inside a dissipative plastic bag, barcode labeled, and placed inside a box made of recyclable corrugated paper. One box contains two bags maximum (see fig. 1.0). And one or several of these boxes are placed inside a labeled shipping box which comes in different sizes depending on the number of parts shipped. The other option comes in bulk as described in the Packaging information table. The units in this option are placed inside a small box laid with anti-static bubble sheet. These smaller boxes are individually labeled and placed inside a larger box (see fig. 3.0). These larger or intermediate boxes then will be placed finally inside a labeled shipping box which still comes in different sizes depending on the number of units shipped.

## TO-220 Packaging Information: Figure 2.0

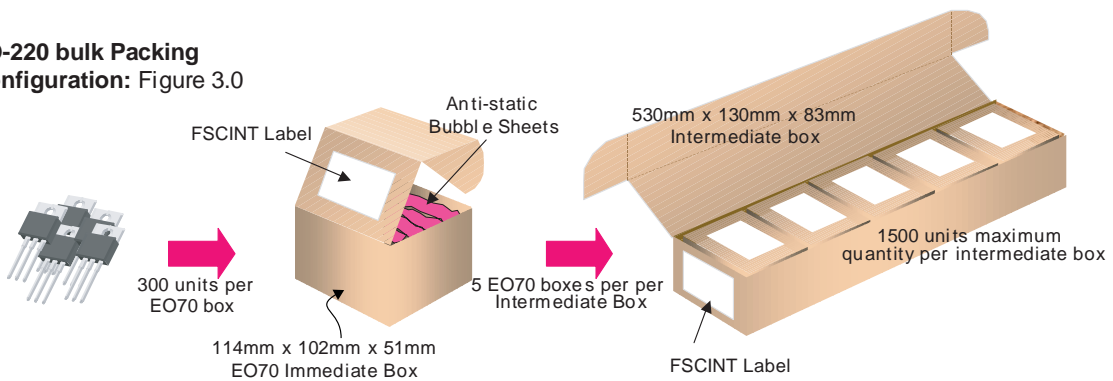
TO-220 Packaging Information		
Packaging Option	Standard (no flow code)	S62Z
Packaging type	Rail/Tube	BULK
Qty per Tube/Box	45	300
Box Dimension (mm)	530x130x83	114x102x51
Max qty per Box	1,080	1,500
Weight per unit (gm)	1.4378	1.4378
Note/Comments		



### FSCINT Label sample

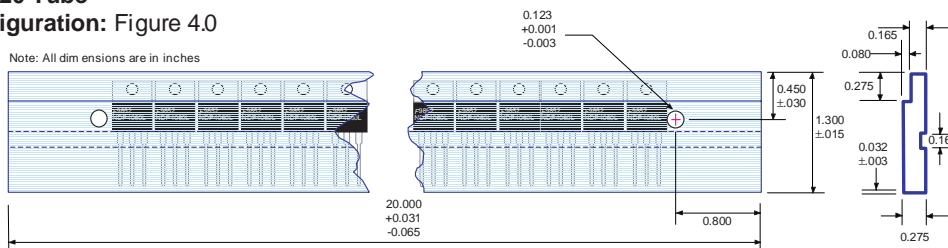


## TO-220 bulk Packing Configuration: Figure 3.0



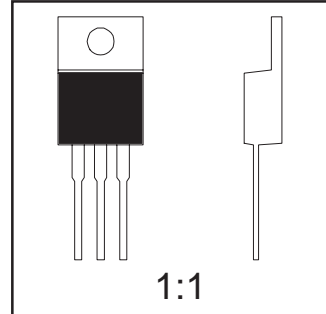
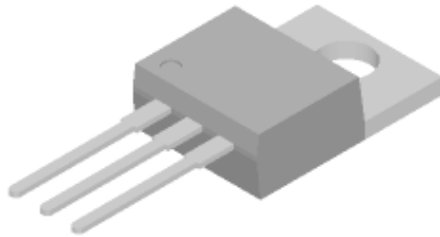
## TO-220 Tube Configuration: Figure 4.0

Note: All dimensions are in inches



**TO-220 Tape and Reel Data and Package Dimensions, continued**

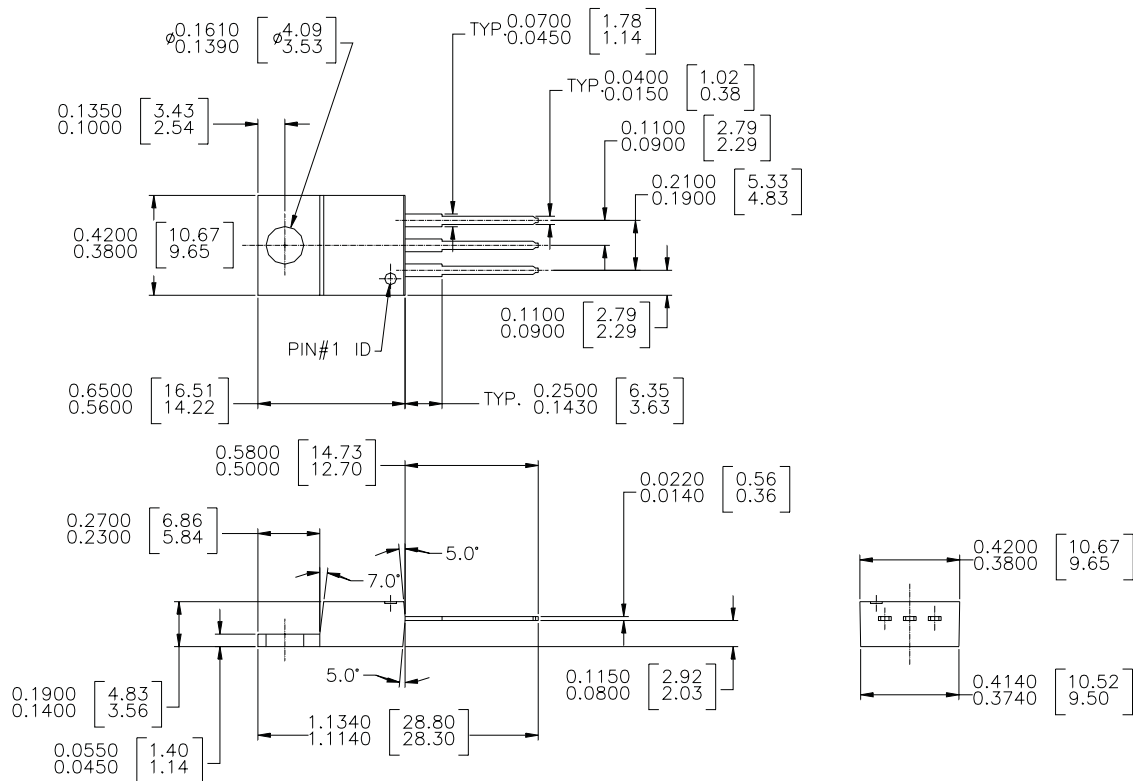
**TO-220 (FS PKG Code 37)**



Scale 1:1 on letter size paper

Dimensions shown below are in:  
inches [millimeters]

Part Weight per unit (gram): 1.4378



NOTE : UNLESS OTHERWISE SPECIFIED

1. STANDARD LEAD FINISH :  
200 MICROINCHES / 5.08 MICRON MINIMUM  
LEAD / TIN 15/85 ON OLIN 194 COPPER OR EQUIVALENT

2. DIMENSION BASED ON JEDEC STANDARD TO-220  
VARIATION AB, ISSUE J, DATED 3/24/87

TO 220 3 LEAD

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FAST®	Quiet Series™	
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HiSeC™	SuperSOT™-8	

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