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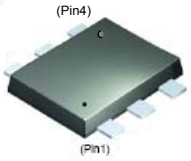
January 2015

2N7002V / 2N7002VA
N-Channel Enhancement Mode Field Effect Transistor

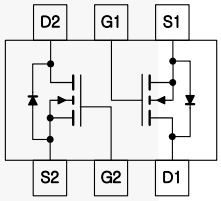
Features

- Dual N-Channel MOSFET
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- Lead Free by Design/RoHS Compliant

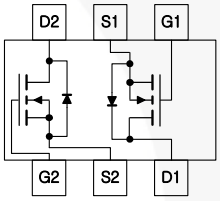


SOT- 563F

* Pin1 and Pin4 are exchangeable.



2N7002V



2N7002VA

Ordering Information

Part Number	Top Mark	Package	Packing Method
2N7002V	AB	SOT-563F 6L	Tape and Reel
2N7002VA	AC	SOT-563F 6L	Tape and Reel

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter		Value	Unit
V_{DSS}	Drain-Source Voltage		60	V
V_{DGR}	Drain-Gate Voltage (R_{GS} ≤ 1.0 MΩ)		60	V
V_{GSS}	Gate-Source Voltage	Continuous	±20	V
		Pulsed	±40	
I_D	Drain Current	Continuous	280	mA
		Pulsed	1.5	A
T_J, T_{STG}	Junction and Storage Temperature Range		-55 to +150	°C

Thermal Characteristics

Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter	Value	Unit
P_D	Total Device Dissipation	250	mW
	Derate Above T_A = 25°C	2.0	mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient(1)	500	°C/W

Note:

1. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch. Minimum land pad size.

Electrical Characteristics

Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics(2)						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 10 μA	60	78		V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 60 V, V_{GS} = 0 V		0.001	1.0	μA
		V_{DS} = 60 V, V_{GS} = 0 V, T_J = 125°C		7	500	
I_{GSS}	Gate-Body Leakage	V_{GS} = ±20 V, V_{DS} = 0 V		0.2	±100	nA
On Characteristics(2)						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 μA	1.00	1.76	2.50	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 5 V, I_D = 0.05 A		1.6	7.5	Ω
		V_{GS} = 10 V, I_D = 0.5 A			2.0	
		V_{GS} = 10 V, I_D = 0.5 A, T_J = 125°C		2.53	13.5	
$I_{D(ON)}$	On-State Drain Current	V_{GS} = 10 V, V_{DS} = 7.5 V	1.50	1.43		A
g_{FS}	Forward Transconductance	V_{DS} = 10 V, I_D = 0.2 A	80	356.5		mS
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS}= 0 V, f = 1.0 MHz		37.8	50	pF
C_{oss}	Output Capacitance			12.4	25	pF
C_{rss}	Reverse Transfer Capacitance			6.5	7	pF
Switching Characteristics						
$t_{D(ON)}$	Turn-On Delay Time	V_{DD} = 30 V, I_D = 0.2 A, V_{GEN} = 10 V, R_L = 150 Ω, R_{GEN} = 25 Ω		5.85	20	ns
$t_{D(OFF)}$	Turn-Off Delay Time			12.5	20	ns

Note:

2. Short duration test pulse used to minimize self-heating effect.

Typical Performance Characteristics

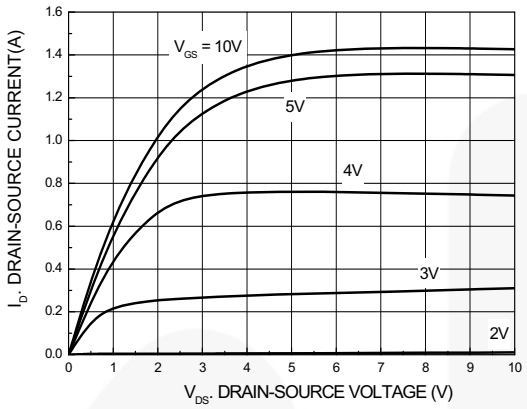


Figure 1. On-Region Characteristics

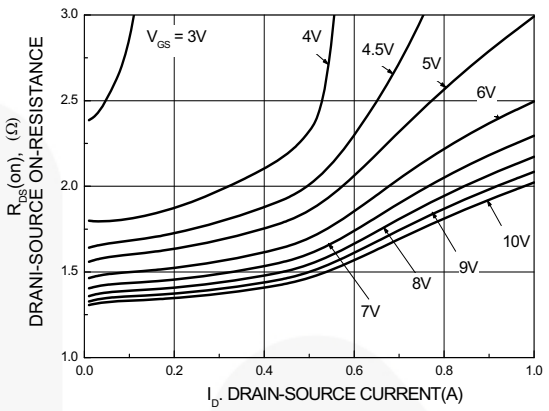


Figure 2. On-Resistance Variation with Gate Voltage and Drain Current

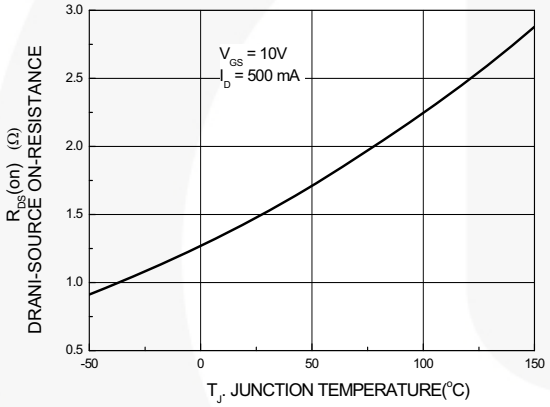


Figure 3. On-Resistance Variation with Temperature

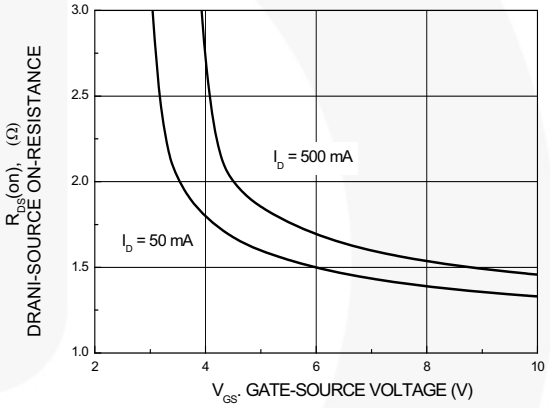


Figure 4. On-Resistance Variation with Gate-Source Voltage

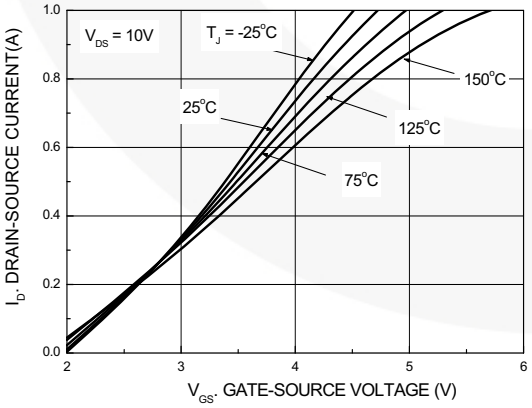


Figure 5. Transfer Characteristics

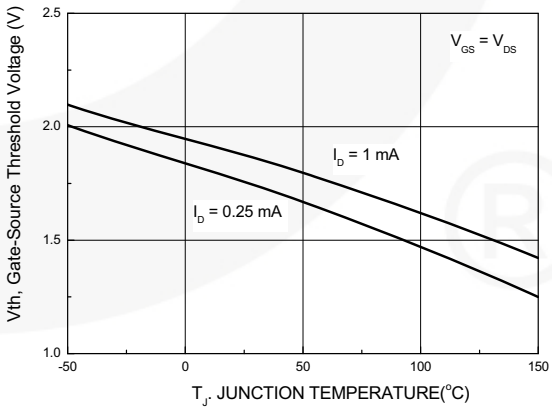


Figure 6. Gate Threshold Variation with Temperature

Typical Performance Characteristics (Continued)

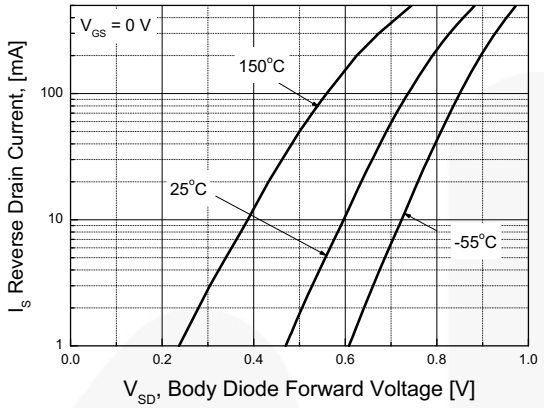


Figure 7. Reverse Drain Current Variation with Diode Forward Voltage and Temperature

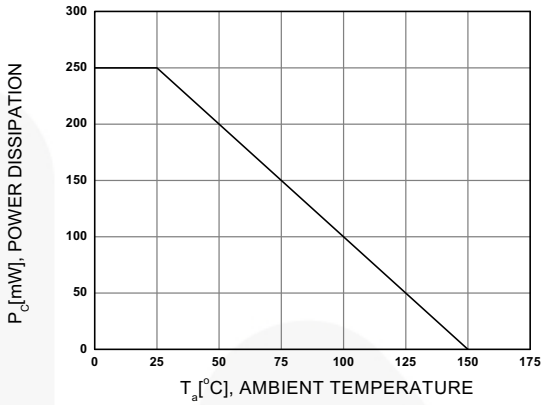


Figure 8. Power Derating

Physical Dimensions

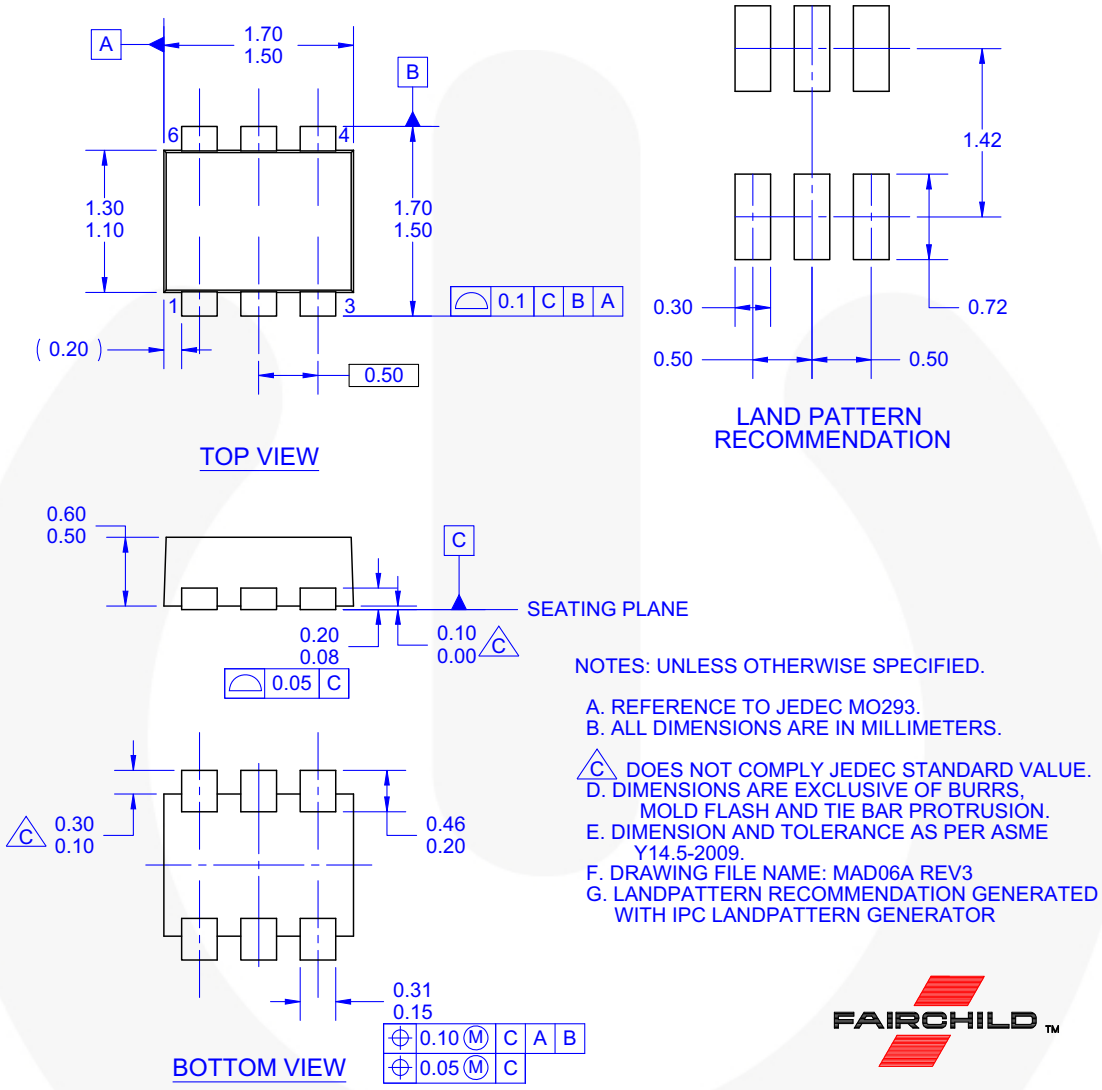


Figure 9. 6-LEAD, MO293, 1.2MM WIDE, SOT563F

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