

2N7479U3; 2N7480U3; 2N7481U3

N-Channel Radiation Hardened MOSFET (TO-276AA)

Rev. V7

Introduction

VPT Components' new radiation-tolerant power MOSFETs are now available in die and standard U3 package options, as well as custom packaging for HiRel environments. Applications within the military, aerospace, medical, nuclear power generation, and high-energy physics research laboratories can benefit from the use of this new series of MOSFETs. VPT Components' power MOSFETs are radiation tolerant to 100 krad (Si) and are SEGR/SEB immune to their full rated breakdown potential.

Operational power losses are minimized by VPT Components' ideal combination of low $r_{DS(on)}$ and gate charge. Die size is optimized for maximum current rating while meeting industry norms. These units are suitable for stand alone and hybrid applications.

These MOSFETs are well suited for low loss switching applications, such as DC to DC con-

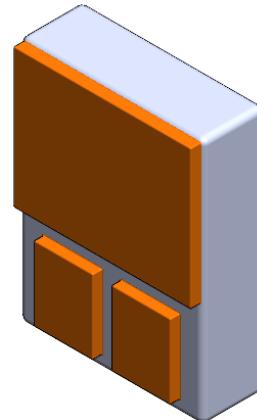
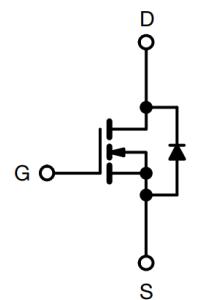


FIGURE 1:
TO-276AA, SMD-0.5 (U3)
Package



N-Channel MOSFET

Features

- Available in JANSR, JANTXVR
Per MIL-PRF-19500/703
- TO-276AA, SMD-0.5 (U3) package
- Hermetically Sealed

Maximum Ratings ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Type	P_T $T_C = +25^\circ\text{C}$ (1)	P_T $T_A = +25^\circ\text{C}$ (free air)	$R_{\theta JC}$	V_{DS}	V_{DG}	V_{GS}	I_{D1} $T_C = +25^\circ\text{C}$	I_{D2} $T_C = +100^\circ\text{C}$	I_S	I_{DM}	T_J & T_{STG}	Max $r_{DS(on)}$ $V_{GS} = 10\text{ V dc}$, $I_D = I_{D2}$, $T_J = +25^\circ\text{C}$ (1)
	W	W	°C/W	V dc	V dc	V dc	A dc	A dc	A dc	A (pk)	°C	Ω
2N7479U3	75	1.0	1.67	30	30	± 20	22	22	22	88	-55 to +150	0.020
2N7480U3				60	60			21				0.030
2N7481U3				100	100			16				0.060

NOTES:

- Derate linearly by 0.6 W/°C for $T_C > +25^\circ\text{C}$.

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Primary Electrical Characteristics

Characteristics	Test Conditions	Symbol	Min.	Max.	Unit
Drain-Source Breakdown Voltage 2N7479U3 2N7480U3 2N7481U3	$V_{GS} = 0 \text{ V}$, $I_D = 1 \text{ mA}$	$V_{(BR)DSS}$	30 60 100	—	V dc
Gate-Threshold Voltage	$V_{DS} \geq V_{GS}$, $I_D = 0.25 \text{ mA}$	$V_{GS(TH)1}$	2.0	4.0	V dc
Gate-Body Leakage Forward	$V_{GS} = +20\text{V}$, $V_{DS} = 0\text{V}$	I_{GSSF1}	—	+100	nA
Gate-Body Leakage Reverse	$V_{GS} = -20\text{V}$, $V_{DS} = 0\text{V}$	I_{GSSR1}	—	-100	nA
Zero-Gate Voltage Drain Current 2N7479U3 2N7480U3 2N7481U3	$V_{GS} = 0\text{V}$, $V_{DS} = 24\text{V}$ $V_{DS} = 48\text{V}$ $V_{DS} = 80\text{V}$	I_{DSS1}	—	10	μA
Forward Voltage Drain Diode 2N7479U3 2N7480U3 2N7481U3	Pulsed dc Voltage $V_{GS} = 0\text{V}$, $I_{D1} = 22\text{A}$ $I_{D1} = 22\text{A}$ $I_{D1} = 22\text{A}$	V_{SD}	—	1.2	V
Forward Transconductance 2N7479U3 2N7480U3 2N7481U3	$V_{DD} = 12\text{V}$, $I_{D2} = 22\text{A}$ $I_{D2} = 21\text{A}$ $I_{D2} = 16\text{A}$	g_{FS}	16 16 13	—	S
Turn-on Delay Time 2N7479U3 2N7480U3 2N7481U3	$V_{GS} = 12\text{V}$, $R_G = 2.35\Omega$, $I_{D1} = 22\text{A}$, $V_{DD} = 15\text{V}$ $I_{D1} = 22\text{A}$, $V_{DD} = 30\text{V}$ $I_{D1} = 22\text{A}$, $V_{DD} = 50\text{V}$	$t_{d(on)}$	—	25	ns
Rise Time 2N7479U3 2N7480U3 2N7481U3	$V_{GS} = 12\text{V}$, $R_G = 2.35\Omega$, $I_{D1} = 22\text{A}$, $V_{DD} = 15\text{V}$ $I_{D1} = 22\text{A}$, $V_{DD} = 30\text{V}$ $I_{D1} = 22\text{A}$, $V_{DD} = 50\text{V}$	t_r	—	100	ns
Turn-off Delay Time 2N7479U3 2N7480U3 2N7481U3	$V_{GS} = 12\text{V}$, $R_G = 2.35\Omega$, $I_{D1} = 22\text{A}$, $V_{DD} = 15\text{V}$ $I_{D1} = 22\text{A}$, $V_{DD} = 30\text{V}$ $I_{D1} = 22\text{A}$, $V_{DD} = 50\text{V}$	$t_{d(off)}$	—	35	ns
Fall Time 2N7479U3 2N7480U3 2N7481U3	$V_{GS} = 12\text{V}$, $R_G = 2.35\Omega$, $I_{D1} = 22\text{A}$, $V_{DD} = 15\text{V}$ $I_{D1} = 22\text{A}$, $V_{DD} = 30\text{V}$ $I_{D1} = 22\text{A}$, $V_{DD} = 50\text{V}$	t_f	—	30	ns

² NOTE: All voltages and currents are in dc.

Information herein is accurate at time of publication. Specifications may change without notice as part of continuous product development.

Please verify current specifications for your specific application.

Visit www.vptcomponents.com for additional data sheets and product information.

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Primary Electrical Characteristics

Characteristics	Test Conditions	Symbol	Min.	Max.	Unit
On-state Gate Charge 2N7479U3 2N7480U3 2N7481U3	$V_{GS} = \pm 20V$, $T_A = +175^\circ C$, t=24 hours	$Q_{G(on)}$	—	65 45 50	nC
Gate to Source Charge 2N7479U3 2N7480U3 2N7481U3	$V_{GS} = \pm 20V$, $T_A = +175^\circ C$, t=24 hours	Q_{GS}	—	20 10 7.4	nC
Gate to Drain Charge 2N7479U3 2N7480U3 2N7481U3	$V_{GS} = \pm 20V$, $T_A = +175^\circ C$, t=24 hours	Q_{GS}	—	10 15 20	nC
Reverse Recovery Time 2N7479U3 2N7480U3 2N7481U3	$di/dt = 100A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $I_{D1} = 22A$ $I_{D1} = 22A$ $I_{D1} = 22A$	t_{rr}	—	102 125 250	ns

Temperature Testing Electrical Characteristics

Characteristics	Test Conditions	Symbol	Min.	Max.	Unit
High Temperature Operation	$T_C = T_J = +125^\circ C$	—	—	—	—
Gate-Body Leakage Forward	$V_{GS} = +20V$, $V_{DS} = 0V$	I_{GSSF2}	—	+200	nA
Gate-Body Leakage Reverse	$V_{GS} = -20V$, $V_{DS} = 0V$	I_{GSSR2}	—	-200	nA
Zero-Gate Voltage Drain Current 2N7479U3 2N7480U3 2N7481U3	$V_{GS} = 12V$ $V_{DS} = 24V$ $V_{DS} = 48V$ $V_{DS} = 80V$	I_{DSS2}	—	25	μA
Drain-Source On-Resistance 2N7479U3 2N7480U3 2N7481U3	$V_{GS} = 12V$, $I_{D2} = 22A$ $I_{D2} = 21A$ $I_{D2} = 16A$	$r_{DS(on)3}$	—	0.035 0.060 0.110	Ω
Gate-Threshold Voltage	$V_{DS} \geq V_{GS}$, $I_D = 1.0$ mA	$V_{GS(TH)2}$	1.0	—	V
Characteristics	Test Conditions	Symbol	Min.	Max.	Unit
Low Temperature Operation	$T_C = T_J = -55^\circ C$	—	—	—	—
Gate-Threshold Voltage	$V_{DS} \geq V_{GS}$, $I_D = 1.0$ mA	$V_{GS(TH)3}$	—	5.0	V

NOTE: All voltages and currents are in dc.

Outline Drawing (TO-276AA, SMD-0.5)

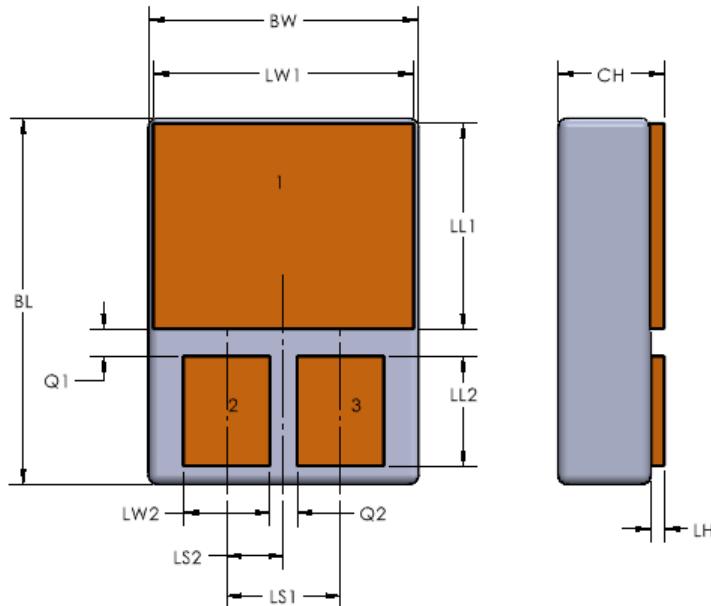


FIGURE 2: Dimensions and configuration of surface mount (TO-276AA, SMD-0.5) package.

Symbol	Inches		mm	
	Min	Max	Min	Max
BL	.395	.405	10.04	10.29
BW	.291	.301	7.39	7.65
CH	.1085	.124	2.76	3.15
LW1	.281	.291	7.14	7.39
LW2	.090	.100	2.29	2.54
LL1	.220	.230	5.59	5.84
LL2	.115	.125	2.92	3.18
LS1	.150 BSC		3.81BSC	
LS2	.075 BSC		1.91 BSC	
Q1	.030		.762	
Q2	.030		.762	
1	Drain			
2	Gate			
3	Source			

NOTES:

1. Dimension are in inches.
2. Millimeters are given for information only.
3. The lid shall be electrically isolated from the drain, gate and source.

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