

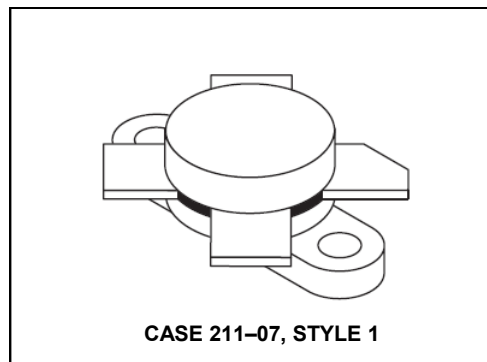
The RF Line NPN Silicon Power Transistor 25W(PEP), 30MHz, 28V

Rev. V1

Designed for high gain driver and output linear amplifier stages in 1.5 to 30 MHz HF/SSB equipment.

- Specified 28 V, 30 MHz characteristics —
Output power = 25 W (PEP)
Minimum gain = 22 dB
Efficiency = 35%
- Intermodulation distortion @ 25 W (PEP) —IMD = -30 dB (max)
- 100% tested for load mismatch at all phase angles with 30:1 VSWR
- Class A and AB characterization
- BLX 13 equivalent

Product Image



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	35	Vdc
Collector-Base Voltage	V_{CBO}	65	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	3.0	Adc
Withstand Current — 5 s	—	6.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1) Derate above 25°C	P_D	70 0.4	Watts $\text{W}/^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.5	$^\circ\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ($I_C = 50 \text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	35	—	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 50 \text{ mAdc}$, $I_E = 0$)	$V_{(BR)CBO}$	65	—	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10 \text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ($V_{CE} = 28 \text{ Vdc}$, $V_{BE} = 0$)	I_{CES}	—	—	10	mAdc

NOTE:

- This device is designed for RF operation. The total device dissipation rating applies only when the device is operated as an RF amplifier.

(continued)

The RF Line NPN Silicon Power Transistor 25W(PEP), 30MHz, 28V

Rev. V1

ELECTRICAL CHARACTERISTICS — continued ($T_C = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

ON CHARACTERISTICS

DC Current Gain ($I_C = 1.0 \text{ Adc}$, $V_{CE} = 5.0 \text{ Vdc}$)	h_{FE}	10	35	—	—
---	----------	----	----	---	---

DYNAMIC CHARACTERISTICS

Output Capacitance ($V_{CB} = 30 \text{ Vdc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)	C_{ob}	—	60	80	pF
---	----------	---	----	----	----

FUNCTIONAL TESTS (SSB)

Common-Emitter Amplifier Gain ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 25 \text{ W (PEP)}$, $f_1 = 30 \text{ MHz}$, $f_2 = 30.001 \text{ MHz}$, $I_{CQ} = 25 \text{ mA}$)	G_{PE}	22	25	—	dB
Collector Efficiency ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 25 \text{ W (PEP)}$, $f_1 = 30 \text{ MHz}$, $f_2 = 30.001 \text{ MHz}$, $I_{CQ} = 25 \text{ mA}$)	η	35	—	—	%
Intermodulation Distortion (2) ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 25 \text{ W (PEP)}$, $f_1 = 30 \text{ MHz}$, $f_2 = 30.001 \text{ MHz}$, $I_{CQ} = 25 \text{ mA}$)	$IMD_{(d3)}$	—	-35	-30	dB
Load Mismatch ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 25 \text{ W (PEP)}$, $f_1 = 30 \text{ MHz}$, $f_2 = 30.001 \text{ MHz}$, $I_{CQ} = 25 \text{ mA}$, VSWR 30:1 at All Phase Angles)	ψ	No Degradation in Output Power			

CLASS A PERFORMANCE

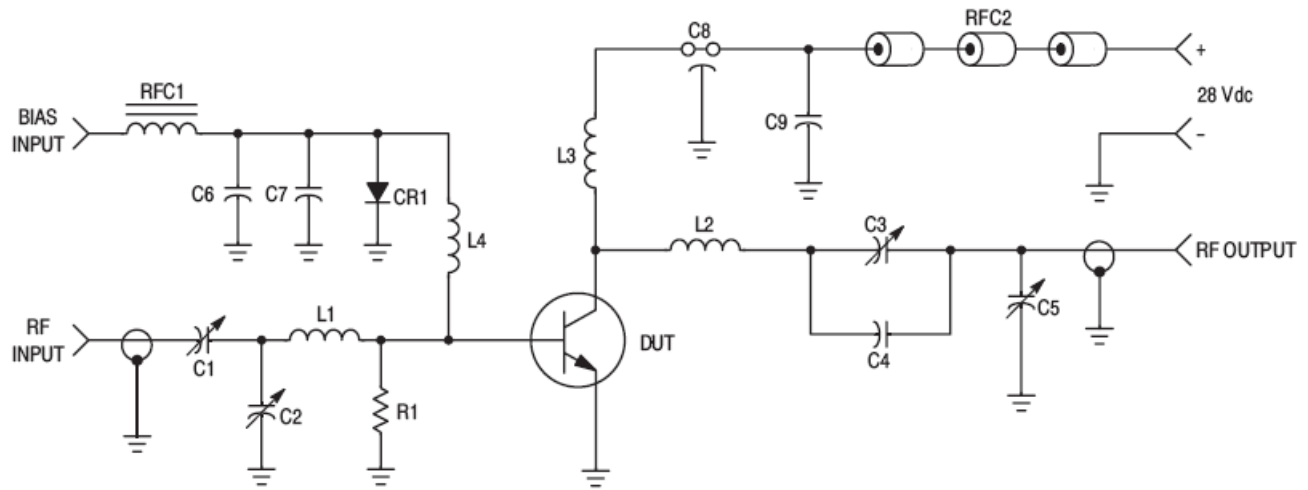
Intermodulation Distortion (2) and Power Gain ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 8.0 \text{ W (PEP)}$, $f_1 = 30 \text{ MHz}$, $f_2 = 30.001 \text{ MHz}$, $I_{CQ} = 1.2 \text{ Adc}$)	G_{PE} $IMD_{(d3)}$ $IMD_{(d5)}$	— — —	23.5 -40 -55	— — —	dB
--	--	-------------	--------------------	-------------	----

NOTE:

- To Mil-Std-1311 Version A, Test Method 2204B, Two Tone, Reference each Tone.

The RF Line NPN Silicon Power Transistor 25W(PEP), 30MHz, 28V

Rev. V1



C1, C2 — ARCO 469, 190–780 pF
 C3, C4 — ARCO 464, 25–280 pF
 C5 — 120 pF Dipped Mica
 C6, C7 — 100 μ F, 15 Vdc
 C8 — 680 pF F.T. Allen Bradley
 C9 — 1.0 μ F 35 V Tantalum
 CR1 — 1N4997

L1 — 3 Turns #16 0.25" ID
 L2 — 6 Turns #16 0.5" ID
 L3 — 7 Turns #20 0.38" ID
 L4 — 10 μ H Molded Choke Delevan
 RFC1 — Ferroxcube VK200/20–4B
 RFC2 — 3–Ferroxcube 5653065–3B
 RF — Input/Output Connectors UG53 A/ μ
 R1 — 10 Ω 1/2 Watt 10%

Adjust Bias (Base) for $I_{CQ} = 20$ mA with No RF Applied

Figure 1. 30 MHz Linear Test Circuit

The RF Line NPN Silicon Power Transistor 25W(PEP), 30MHz, 28V

Rev. V1

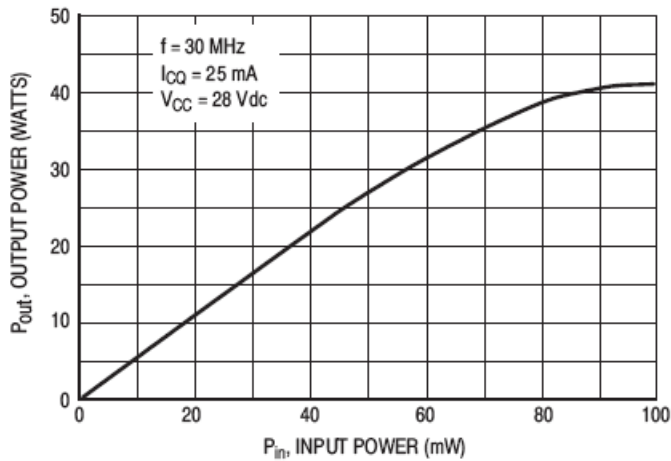


Figure 2. Output Power versus Input Power

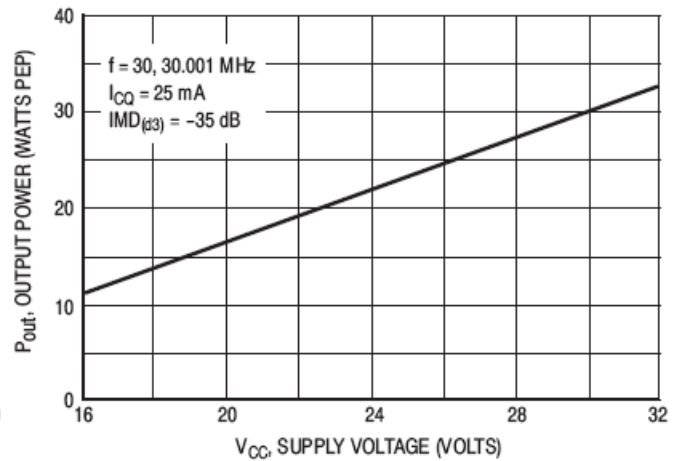


Figure 3. Output Power versus Supply Voltage

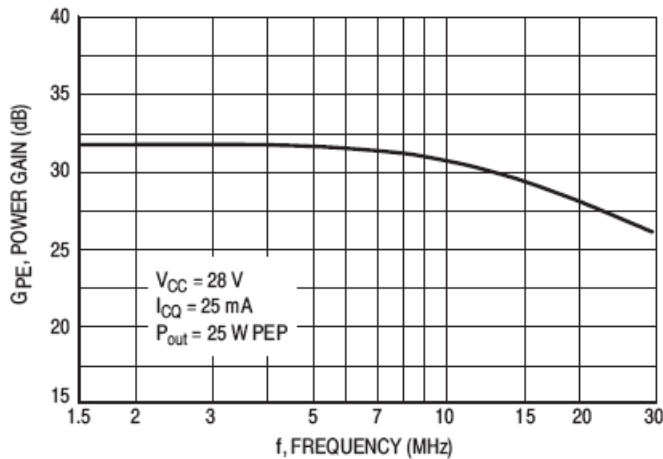


Figure 4. Power Gain versus Frequency

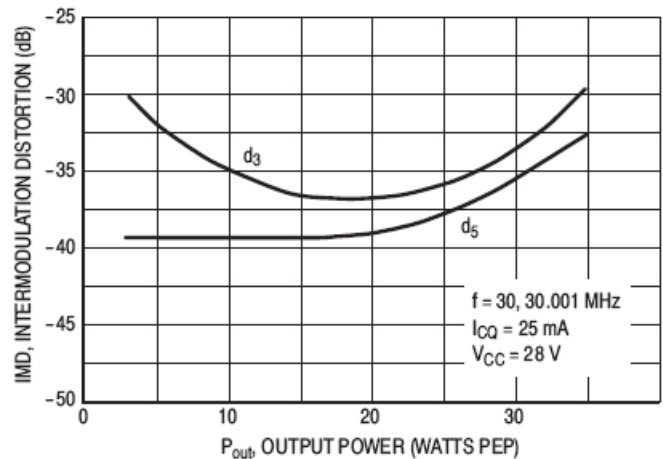


Figure 5. Intermodulation Distortion versus Output Power

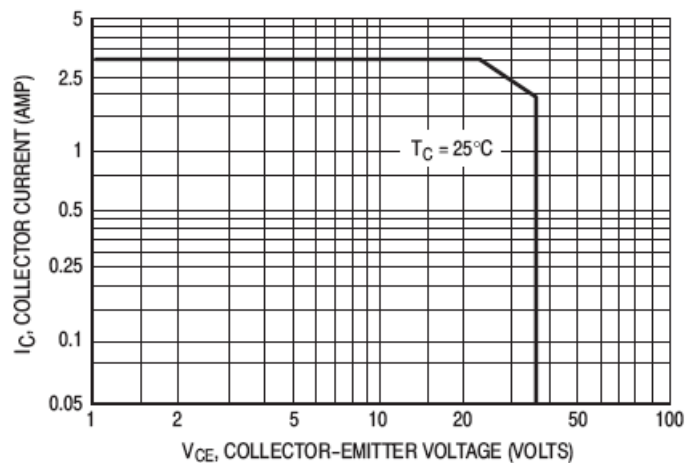


Figure 6. DC Safe Operating Area

The RF Line NPN Silicon Power Transistor 25W(PEP), 30MHz, 28V

Rev. V1

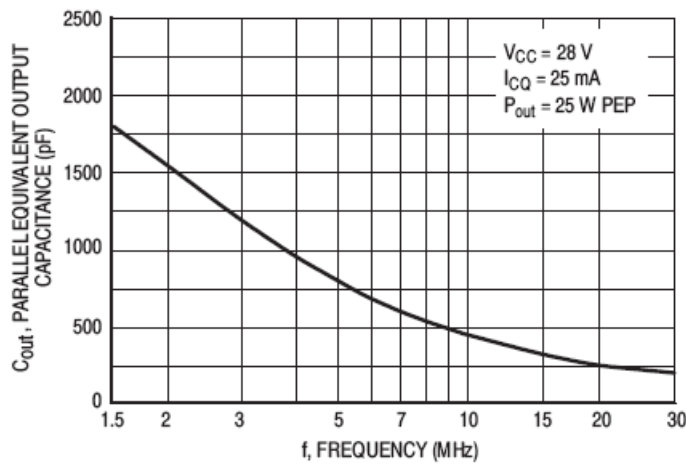


Figure 7. Output Capacitance versus Frequency

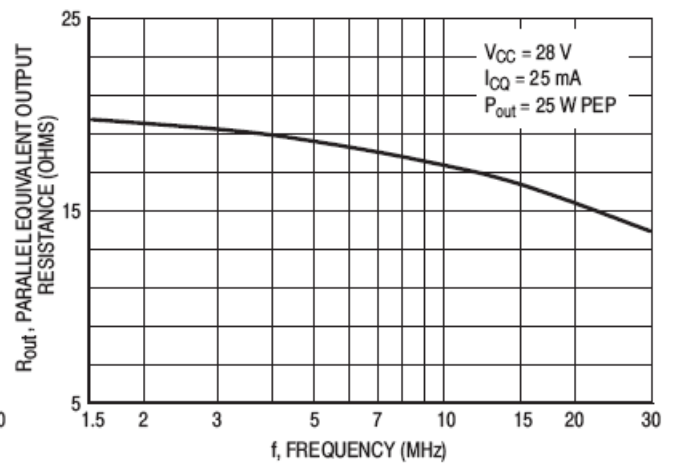


Figure 8. Output Resistance versus Frequency

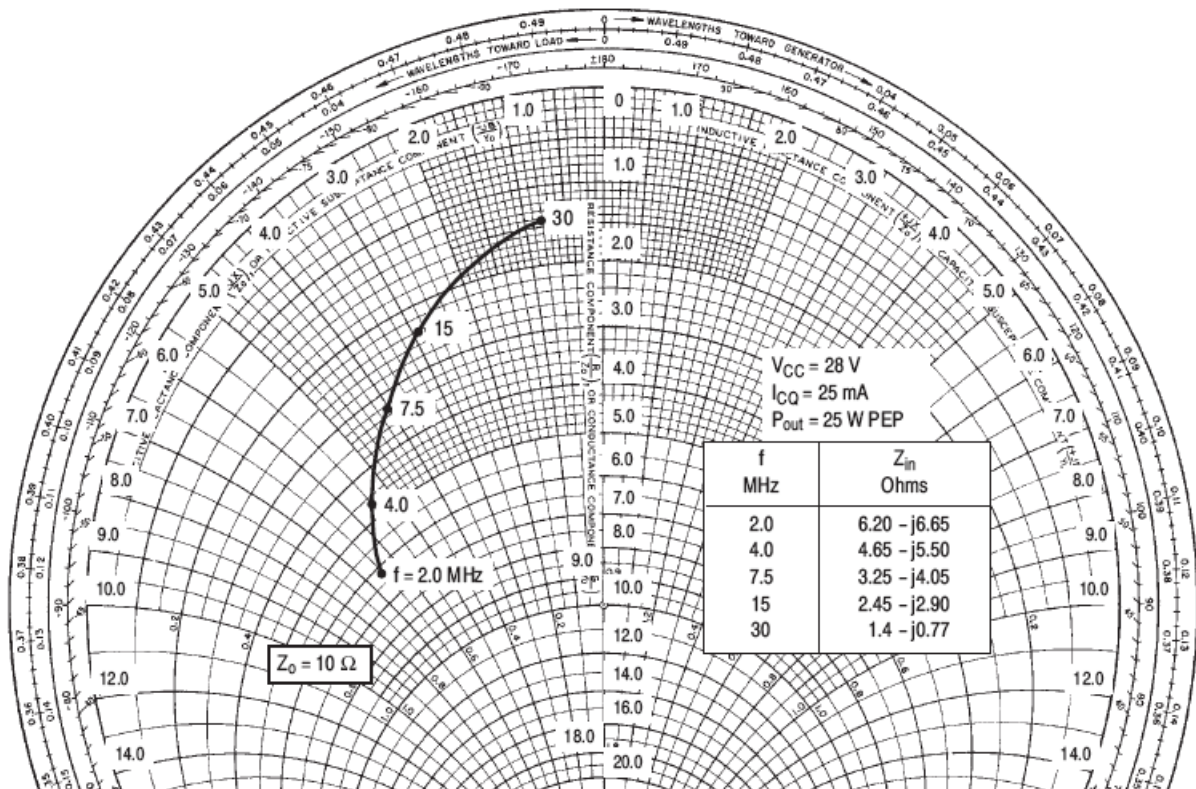
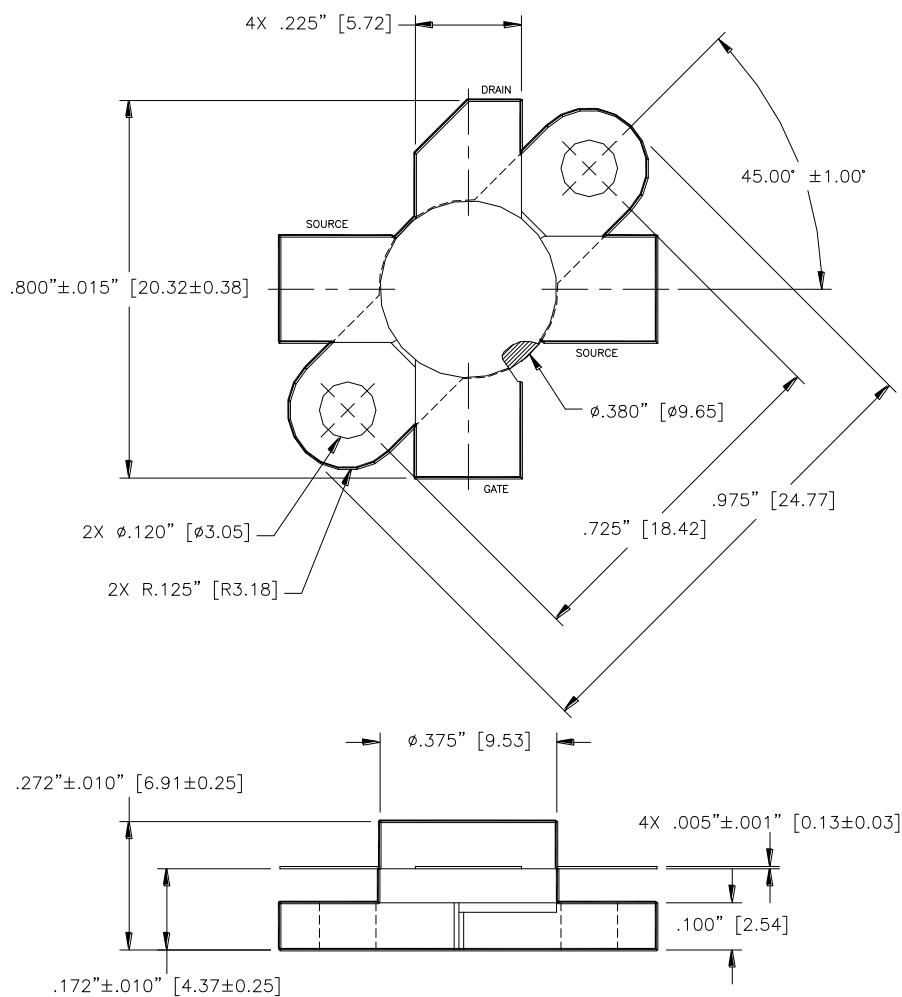


Figure 9. Series Equivalent Input Impedance

The RF Line NPN Silicon Power Transistor 25W(PEP), 30MHz, 28V

Rev. V1



Unless otherwise noted, tolerances are inches $\pm .005''$ [millimeters $\pm 0.13\text{mm}$]

M/A-COM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with M/A-COM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.